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**THE ROLE OF THE PERSONAL TAX  
SYSTEM IN OLD-AGE SUPPORT:  
A SURVEY OF 15 COUNTRIES**

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**DISCUSSION PAPER**

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**CENTRE FOR PENSIONS AND SUPERANNUATION**

# THE ROLE OF THE PERSONAL TAX SYSTEM IN OLD-AGE SUPPORT: A SURVEY OF 15 COUNTRIES

GORDON KEENAY AND EDWARD WHITEHOUSE

This paper describes and examines the tax treatment of pensioners in 15 OECD countries. Using a standard methodology, it calculates the average and marginal effective tax rates of older people and compares them with people of working age. These are then combined with a model of pension entitlements in different countries. This shows that tax differentials play an important role in old-age support.

## ACKNOWLEDGEMENTS

An analysis of the tax treatment of older people in nine countries formed part of the OECD's assessment of retirement-income systems (OECD, 2001*b*) and will appear as Keenay and Whitehouse (2002*a,b*). The extension to a further six countries also covered here is part of an OECD project to analyse retirement incentives in different countries.

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# The role of the personal tax system in old-age support: A survey of 15 countries

Gordon Keenay and Edward Whitehouse

Most industrialised countries offer concessions to older people in their personal income tax systems relative to the tax treatment of people of working age. Some treat certain types of pension income more favourably than other income sources. In addition, most countries do not levy social security contributions on older people. Others levy such charges at lower rates on pensioners than on people of working age. Together, these policies imply that the direct tax burden faced by older people is lower than that carried by people of working age. Tax differentials are therefore an important means by which governments support people during their retirement.

Our results will show that the value of direct-tax concessions to older people and their pattern with income varies substantially between the 15 countries surveyed. This has important implications for cross-country comparisons of retirement-income systems.<sup>1</sup> The cost of these concessions to the public purse can be substantial: they are an important part of fiscal policy as well as old-age support. These results also underpin the analysis of retirement incentives. They will be useful to analysts of saving incentives. Studies of the taxation of private pensions have assumed that individuals face the same effective tax rate during retirement as they do when working while accepting that this is unlikely to be the case.<sup>2</sup> The models used here can provide more realistic tax rates.

The rest of the paper is structured as follows. We begin with a brief overview of the methodology followed by a cross-country summary of the main features of direct tax systems relevant to older people.<sup>3</sup> The next three sections set out the empirical results. A final section summarises and concludes.

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<sup>1</sup> Indeed, Mulligan (2000) argues that the difference in taxation between pensioners and workers is an important characteristic that helps isolate the fundamental philosophy of retirement-income systems.

<sup>2</sup> See, for example, Whitehouse (1999) and OECD (1994).

<sup>3</sup> More detailed descriptions for some of the countries can be found in Keenay and Whitehouse (2002*a,b*). OECD (2001*a*) describes the tax-benefit position of people of working age.

## 1. Methodology<sup>4</sup>

The results focus on two groups of people: employees of working age and older people drawing public pensions.

### 1.1 *Earnings and incomes*

In each case, annual incomes are set at given fractions of the average gross wage earnings of adult, full-time production workers in the manufacturing sector.<sup>5</sup> This means that earnings data are derived from a minority of employees in each country. An obvious drawback is that the earnings of an average production worker will be at different positions in the overall income distribution in different countries. However, it has proved difficult in practice to obtain a broader measure that is consistent between countries.

The resulting measures of earnings are shown in Table 1 in both national currency and in United States dollars.<sup>6</sup> Earnings have been translated into dollars using OECD purchasing power parities, which calculate the cost of a common basket of goods in each country.<sup>7</sup>

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<sup>4</sup> OECD (2001*a*), Section III gives more details on the methodology.

<sup>5</sup> The sample covers manual workers and shop-floor based supervisors. Non-manual workers are excluded except in the Netherlands. Incomes generally exclude the value of fringe benefits, such as provision of food, housing or clothing by the employer free of charge or below market price.

<sup>6</sup> The sources and methodology for the calculation of earnings data are given in OECD (2001*a*), Section III.B.

<sup>7</sup> Market exchange rates, of course, fluctuate wildly, and can generate very misleading results.

**Table 1. Earnings of the average production worker, 1999**

|                | <i>Earnings of average production worker</i> |                    |
|----------------|--|--------------------|
|                | <i>National currency</i>                     | <i>US\$ at PPP</i> |
| Australia      | 39 800                                       | 30 600             |
| Canada         | 35 000                                       | 30 200             |
| Finland        | 140 600                                      | 23 300             |
| France         | 136 300                                      | 20 600             |
| Germany        | 59 500                                       | 29 600             |
| Italy          | 38 873 400                                   | 24 000             |
| Japan          | 4 203 500                                    | 25 800             |
| Korea          | 17 706 000                                   | 27 300             |
| Netherlands    | 57 500                                       | 27 800             |
| Norway         | 265 700                                      | 27 700             |
| Spain          | 2 416 400                                    | 18 500             |
| Sweden         | 215 500                                      | 22 400             |
| Switzerland    | 60 200                                       | 30 900             |
| United Kingdom | 17 500                                       | 26 600             |
| United States  | 29 100                                       | 29 100             |

*Note:* all values rounded to the nearest 100 for clarity  
*Source:* OECD (2001a)

### *1.2. Coverage of the analysis*

The results cover personal income tax and employee and employer social security contributions payable on wage earnings and pension income. For people of working age, it is assumed that the whole of income comes from earnings. Thus, the calculations exclude fringe benefits and capital income (such as dividends and interest).<sup>8</sup>

For pensioners, it is assumed that the whole of income derives from the public pension.<sup>9</sup> The higher income levels considered (up to 2½ times average earnings) are often beyond the maximum benefit from public pension systems. In this case, we have generally assumed that the income comes from a private pension scheme.<sup>10,11</sup> Some countries apply reliefs that vary by age; our basic assumption is that the pensioner is age 65.

Income tax due on capital income and non-wage labour income, some direct taxes (such as net wealth tax and corporate income tax) and all indirect taxes are not

<sup>8</sup> At these income levels, such income is generally insignificant. The main exception is the United States, where over 60 per cent of working-age people with earnings around those of the average production worker have income from these sources, which accounts, on average, for five per cent of their incomes.

<sup>9</sup> We include in this category mandatory occupational pensions in Finland and quasi-mandatory occupational pensions in the Netherlands. See OECD (2001) and Whitehouse (2002*a*) for details.

<sup>10</sup> We assume for Germany that income above the public pension comes from an occupational or personal pension plan taxed as a notional annuity.

<sup>11</sup> In most cases, private pension income is fully taxable. However, Canada offers a small tax credit for private pension income. Also, the state income tax in Detroit, Michigan (which we model here) exempts some private pension income. The calculations do not cover these concessions.

covered. However, all central-, state- and local-government personal income taxes are included.

Compulsory social security contributions paid to general government are treated as a tax (see OECD, 2001*c* for a more detailed discussion of the definition of a ‘tax’). Social security contributions can give rise to a benefit entitlement, which can also be related to the amount of contributions made. Nevertheless, even in these cases, at least some of the contribution is in effect a tax, because the net present value of benefits received does not equal the value of contributions made. Most OECD countries have at least some element of ‘social insurance’ in their social security systems: that is, social security contributions ‘buy’ entitlement to benefits (for example, in the case of unemployment or industrial injury or for retirement). It is natural that pensioners should not contribute to cover such contingencies with which they will not be faced. Thus, some of the differences in the results between workers and pensioners are systemic and not a result of concessions to older people. The results therefore show income and social security contributions separately.

Finally, all the results relate to the position of a single person. For the comparisons of older people with people of working age, we have taken a single person without children.<sup>12</sup>

### **1.3. Calculations**

The computation of the tax position of people of working age uses the ‘tax equations’ that underlie the OECD’s annual *Taxing Wages* report (OECD, 2001*a*). A sister publication — *Benefit Systems and Work Incentives* (OECD, 1999) — looks at the tax and benefit treatment of different family types both in and out of work. Together, these two OECD reports provide a detailed picture of the tax and benefit position of people of working age. This paper extends the analysis of tax positions to people of pension age by adapting the tax equations to include the additional concessions granted to older people. The results are based on the parameters of the tax system as they were in 1999 (the latest year for which the tax equations for people of working age were available).

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<sup>12</sup> Many countries, of course, provide generous support to families with children, as set out in OECD (2001*a*). However, there are many methodological obstacles to comparing the fiscal position of families of different sizes: for example, comparing a pensioner couple with a working age couple with children. Our results might, therefore, tend to exaggerate the fiscal advantage enjoyed by older people relative to people of working age in countries with generous support for children.



#### 1.4. *Interpreting the results*

The incomes of older people tend, on average, to be below those of people of working age.<sup>13</sup> Direct tax systems are progressive. Individuals are therefore likely to face a lower direct tax burden in retirement than they do when working. The analysis here is ‘horizontal’ in the sense that it compares people of working age and people of pension age with the same income. The general progressivity of the income tax system plays an important role in redistributing income to older people, as it does to lower-income people in general. Our aim in the first two empirical sections, however, is to isolate the effect of specific concessions directed at older people from the general structure of the tax system. Hence the focus on people in different circumstances with the same income. In section 5, we combine the results on the tax position of older people with calculations of the pension entitlement for full-career workers at different levels of earnings. These show the impact of the general progressivity of the tax system along with the effect of specific concessions aimed at older people.

The simple approach of comparing the tax and benefit position of example individuals provides many useful insights on the effect of governments on their citizens. Nonetheless, the results here need to be considered alongside other data. For example, OECD (2001*c*) provides more comprehensive information on the aggregate tax burden in the economy — including, for example, indirect taxes, corporate income taxes, property taxes *etc.* — which are not covered here. Also, a complete analysis of the effect of government on the economy would need to take account of the effect of publicly provided goods and services, such as health and education.<sup>14</sup>

The results set out the formal incidence of taxes. The final, economic incidence of taxes may of course be rather different, particularly for people of working age. For example, the tax burden might be shifted over time from employers onto employees and *vice versa* by adjustments to gross wages.

## 2. **Cross-country summary of tax treatment of older people**

Table 2 summarises the main types of concession granted to older people in the 15 countries’ personal income tax and social security contribution systems. It is

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<sup>13</sup> See Disney and Whitehouse (2001), OECD (2001*b*), Yamada (2001) and Yamada and Casey (2001).

<sup>14</sup> See Disney and Whitehouse (2001), Steckmest (1996), Whiteford and Kennedy (1995) and Smeeding *et al.* (1995) on valuing such in-kind benefits.

important to note that this list focuses on the reliefs granted directly to pensioners. Although the Table reports any concessions to income streams from private pensions, it excludes, for example, reliefs granted to lump-sum withdrawals from personal or occupational pension plans. Furthermore, other aspects of the tax treatment of private pensions — including the treatment of contributions and investment returns at the fund level — are not considered here.<sup>15</sup>

The relevant features of direct tax systems are divided into three types:

- Tax allowances and tax credits that are age-based, which exceed those available to taxpayers of working age. In many cases, these concessions are targeted on those with modest incomes by being withdrawn as income increases.
- Reliefs for some or all of pension income received. Several countries exempt or partially exempt pensions paid from public sources from the personal income tax. And, in some cases, there is a preferential tax treatment for modest pensions paid from private-sector schemes.
- Social security contributions are typically levied only on wage income and not on pension benefits (although they are, in some countries, levied on investment income). However, three countries charge contributions on pension income in respect of health insurance benefits and one, for survivors' pensions. In all cases, social security contributions have a substantial impact on the comparison between net incomes of pensioners and people of working age.

Table 3 shows in more detail the concessions granted to older people in countries' personal income tax systems.

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<sup>15</sup> Such tax concessions are an important source of state support for retirement incomes, particularly in Canada, the United Kingdom and the United States among the countries studied here: see OECD (1994) and Whitehouse (1999). Nevertheless, our focus is on retirement incomes and not on how they were built.

**Table 2. Summary of treatment of pensioners under the personal income tax and social security contributions**

|                | <i>Extra tax allowance/credit</i> | <i>Full or partial relief for pension income</i> |                       | <i>Social security contributions</i> |
|----------------|-----------------------------------|--|-----------------------|--------------------------------------|
|                |                                   | <i>Public scheme</i>                             | <i>Private scheme</i> |                                      |
| Australia      | ✓                                 | ✓  | ✓                     | low                                  |
| Canada         | ✓                                 | ✓  | ✓                     | zero                                 |
| Finland        | ✓                                 |  |                       | low                                  |
| France         |                                   |  |                       | zero                                 |
| Germany        |                                   | ✓  | ✓                     | low                                  |
| Italy          | ✓                                 |  | ✓                     | zero                                 |
| Japan          | ✓                                 |  |                       | zero                                 |
| Korea          | ✓                                 | ✓  | ✓                     |                                      |
| Netherlands    | ✓                                 |  |                       | low                                  |
| Norway         | ✓                                 |  |                       | low                                  |
| Spain          | ✓                                 |  |                       | zero                                 |
| Sweden         | ✓                                 |  |                       | zero                                 |
| Switzerland    |                                   |  |                       | zero                                 |
| United Kingdom | ✓                                 |  |                       | zero                                 |
| United States  | ✓                                 | ✓  |                       | zero                                 |

*Note:* the information for the United States refers to the Federal income tax. See below for information on state-level income taxes. 'Social security contributions' for Australia refers to the medicare levy, which is charged to total income. Pensioners pay the same rate but there is a relief for low-income pensioners. Swiss cantons often grant pensioners an additional allowance but there is no extra allowance in the Federal income tax

**Table 3. Concessions to older people in personal income tax systems**

| <i>Country</i> | <i>Concession</i>                                      | <i>Parameters</i>  |
|----------------|--|--|
| Australia      | Senior Australians' tax offset                         | Credit of \$1 600 for singles with income up to an income threshold of \$15,500. Withdrawn at 12.5% of income above this level                             |
|                | Pensioner tax offset                                   | Credit against certain types of pensioner income available only to people not claiming the senior Australians' offset. The latter is usually more generous |
| Canada         | Age credit   | Credit of 16% to maximum of over C\$3 600. Reduced at 15% of income between approximately C\$27 000 and C\$51 000  |
|                | Private pension income<br>Guaranteed income supplement | Credit of 16% on first \$1 000<br>No tax on this income-tested benefit   |
| Finland        | Age deduction: local income tax                        | Allowances of around FM34 000 for a single person and around FM29 000 for each partner in a couple   |
|                | Age deduction: central government income tax           | Allowance of FM23 000<br>Both allowances withdrawn at 70% by amount which pension exceeds the deduction  |

|             |  |  |
|-------------|--|--|
| Germany     | Pension income: public and some occupational schemes                           | Proportion of income not taxable depends on retirement age: e.g., only 32% taxable for age 60, 27% age 65 and 21% age 70 |
|             | Pension income: some occupational schemes                                      | 40% of income exempt up to ceiling of DM6 000  |
|             | Other pensioner income   | 40% of income exempt up to ceiling of DM3 700  |
| Italy       | Age credit   | Extra L120,000 if only pension income and it does not exceed L18m  |
|             | Private pension income   | 12.5% of occupational pension benefits not taxable; 40% with personal pension  |
| Japan       | Deductibility of income from public pension and tax-qualified retirement plans | 100% deduction of first ¥1m for over 65s, 25% up to ¥3.6m, 15% up to ¥7.2m and 5% thereafter; minimum deduction of ¥1.4m |
|             | Old-age tax deduction  | ¥0.5m additional deduction if total gross income under ¥10m  |
| Korea       | Age deduction  | Additional allowance of Won 0.5m above basic allowance of Won 1m   |
|             | Pension income deduction   | A schedule of deductions between particular thresholds. The latter are half the thresholds for deduction of earnings     |
| Netherlands | Age deduction  | Additional allowance of around NLG 500; increased to NLG 2 200 for incomes under NLG 57 000                              |
|             | Pensioner deduction  | Additional allowance for recipients of basic pension; worth NLG 500 or NLG3 100 for low-income pensioners                |

Table 3, continued

|                |                        |  |
|----------------|------------------------|--|
| Norway         | Age deduction          | Additional allowance of NKr 17 640   |
|                | Tax limitation rule    | Pensioners can forego the additional allowance and be taxed under this rule (around half either pay no tax or do so under the limitation rule) |
| Spain          | Age deduction          | Allowance of Pta 650 000 compared with Pta 550 000 for people of working age   |
| Sweden         | Age deduction          | Varies between SKr 8 700 and SKr 56 000 depending on pension income  |
| United Kingdom | Age deduction          | Additional deduction between around £1 400 and £1 600 depending on age; withdrawn at 50% above <i>circa</i> £17 000                            |
| United States  | Age deduction          | Additional deduction of around \$1 000 for a single person   |
|                | Tax credit             | Up to \$1 125; withdrawn once total income exceeds \$17 500 or untaxed public pension exceeds \$5 000  |
|                | Social security relief | Between 15% and 50% of social security income is not taxed, depending on total income  |

*Note:* values have been rounded for clarity

### 3. Empirical results: average effective tax rates on workers and pensioners

It is difficult from the parameters set out in Table 3 above to gauge directly the generosity of different countries' tax concessions granted to older people. This section therefore compares the impact of the personal income tax and social security contribution system on the incomes of pensioners and workers in the nine countries.

Figure 1 summarises the most important of the empirical results. The charts show the average effective tax rates on pensioners and workers, including the effect of the personal income tax and employee's social security contributions. Values of average tax rates at specific income levels are also given in Table 4.

In each chart, the solid black line shows the pensioner's total average effective tax rate. The solid grey line shows the same for the worker (including both income tax and social security contributions), while the dotted line separates out the worker's income tax liability as a percentage of total income. The charts run between income levels of 0.3 and two-and-a-half times the earnings of the average production worker in the relevant country.

It is immediately apparent from comparing countries in Figure 1 that there are vast differences between the overall generosity of the concessions offered to pensioners, the pattern of the concessions with income and the sources of the fiscal advantages that pensioners enjoy.

In **Italy**, there is just a small additional income tax credit for older people. Workers are able to deduct their social security contributions from their income tax liability, which means that they face a lower average tax rate from the income tax. However, the overall tax burden on older people is typically five percentage points lower than that faced by workers at the same income level because of the effect of social security contributions.

Australia, Canada, Finland and Sweden have the most highly targeted set of concessions, with the benefits enjoyed almost wholly by lower-income pensioners. In **Canada**, the age credit is withdrawn once income exceeds around three-quarters of economy-wide average earnings. The pensioner's tax burden moves rapidly towards that of workers over a relatively short income range. At the highest incomes, the difference in average tax rates is small because of the relatively low rate of social security contributions and the relatively low earnings ceiling.

There is a similar pattern in **Sweden**, although the withdrawal rate for the age credit is higher than in Canada (65 per cent) and the ceiling is lower. Again, the

difference in average effective tax rates at higher incomes is entirely due to social security contributions. (Indeed, the income tax burden is slightly higher for pensioners because workers are able to deduct social security contributions from their income tax liability.)

In **Finland**, the extra income tax allowance given to older people is withdrawn at a still higher rate than Sweden: 70 per cent. Pensioners are liable to social security contributions. And workers in Finland receive a deduction for work-related expenses. Thus, in Finland, higher-income pensioners face an average tax rate very slightly higher than that faced by workers on the same income.

The additional tax offset for older people in **Australia** is withdrawn once income exceeds 40 per cent of economy-wide average earnings and is exhausted when income reaches a little over 70 per cent of average pay. Above that level, workers and pensioners face the same tax charge.

**Norway** has a similar pattern to Australia, Canada, Finland and Sweden because of the benefit of the tax-limitation rule to lower-income pensioners. Once pensioners' income is too high to benefit from this rule, older people pay more in income tax than people of working age because their basic relief is lower than the maximum available to workers. Nevertheless, the lower rate of social security contributions paid by pensioners means that they have a lower overall tax burden across the income range.

There is a similar effect in **Korea** and **Spain** again due to higher maximum basic relief open to workers than to pensioners. Social security contributions also mean that the overall effective tax rate is higher for workers than it is for pensioners.

The patterns in the **Netherlands** and the **United Kingdom** are interesting because the gap between pensioners' and workers' overall average tax rates at first increases with incomes. This is mainly due to the effect of social security contribution floors.<sup>16</sup> As in Canada, however, a mix of the withdrawal of additional allowances from richer pensioners and the effect of social security contribution ceilings means that the difference between the tax burdens faced by older people and workers are smaller at higher income levels.

The difference between the tax position of pensioners and workers in **Germany** is the most pronounced. Here, public and private pension incomes receive a favourable income-tax treatment. Pensions in payment are treated as a notional annuity, and only

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<sup>16</sup> Note that the downward blips in average effective tax rates in the Netherlands result from the operation of the health-insurance system. Mandatory contributions are levied on incomes up to a ceiling of around average earnings. Above that level, however, people have to pay for their own health-insurance arrangements.

the notional interest is taxable, not the notional return of capital invested. At age 65, for example, just 27 per cent of the value of the public pension is taxed. However, pensioners are liable for some social security contributions, mitigating the effect of this advantage. Nonetheless, the difference in tax burdens between workers and pensioners of the same income is largest in Germany over most of the income range.

At the other end of the spectrum, pensioners in **France** have a lower maximum amount of basic relief than available for earned income. At incomes above half of economy-wide average earnings, they therefore have a larger income-tax burden than people of working age with the same income. However, pensioners are not liable for social security contributions and so their overall effective tax rate is lower than for workers.

The value of tax concessions to pensioners increases initially with income in **Japan**. The relative value of the tax allowance then declines and is mainly a result of social security contributions at higher income levels.

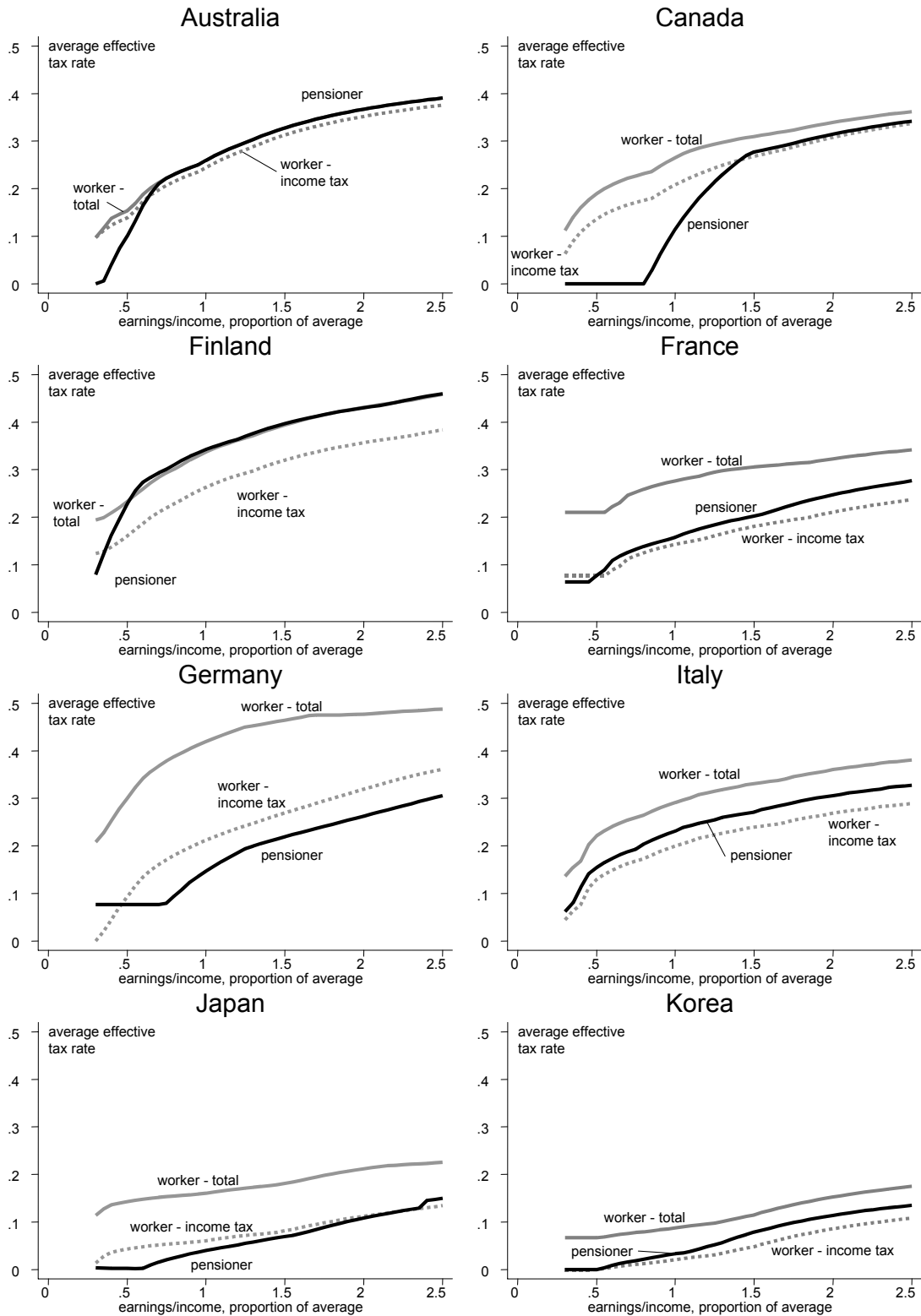
The pattern in the **United States** is one of a nearly constant difference between the tax position of pensioners and workers across the income range. Effective tax rates are typically 15 percentage points lower.<sup>17</sup> Around half of this difference is due to concessions in the income tax and half because older people are not liable for social security contributions on their pension income.

Basic relief is provided by a tax credit, tax allowance or zero-rate band in 12 of the 15 countries, which ensures that the lowest income pensioners pay no income tax. (The exceptions are France, Japan and Switzerland, which provide basic relief through the deduction of a percentage of income up to a ceiling.) However, the generosity of these provisions varies significantly. In Finland, Italy and the Netherlands, pensioners begin paying tax once their incomes reach around one quarter of economy-wide average earnings. At the other end of the spectrum, a 65 year old in Germany would need to have an income of nearly three-quarters of economy-wide average earnings to pay any income tax because the relief for pension income ensures that taxable income is below the basic relief given to taxpayers of all ages. In half the countries, the income at which pensioners begin to pay tax lies between 30 and 40 per cent of average earnings; it is a little higher in Korea and Spain (around 50 per cent).

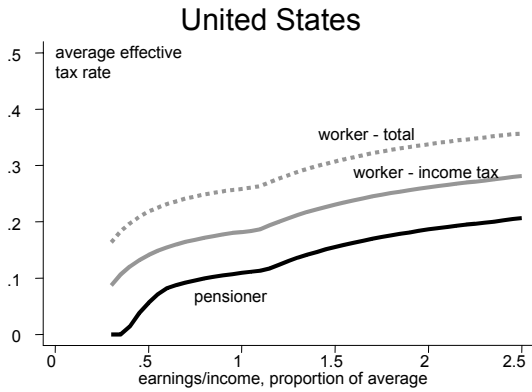
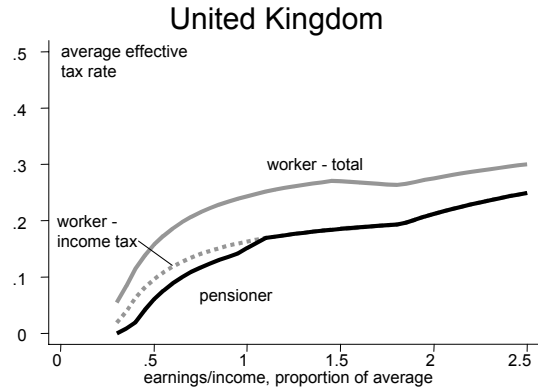
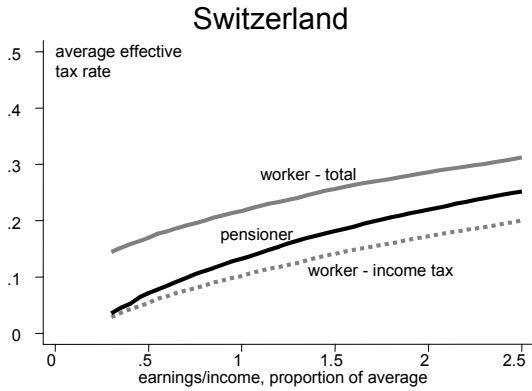
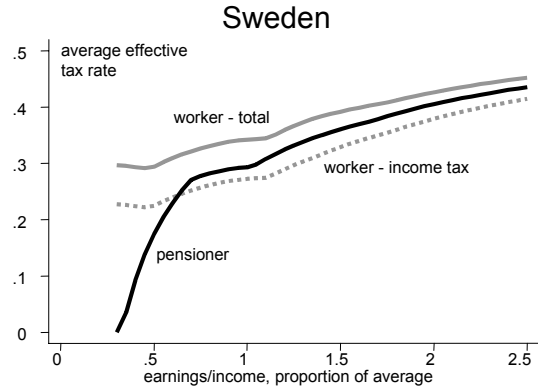
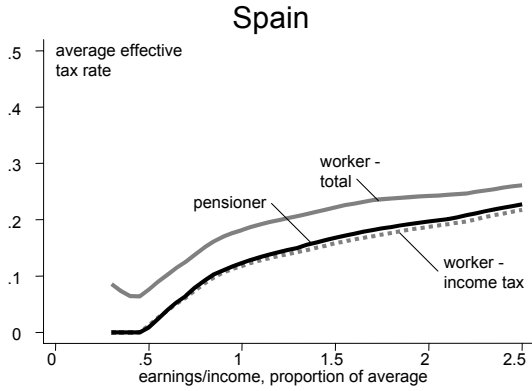
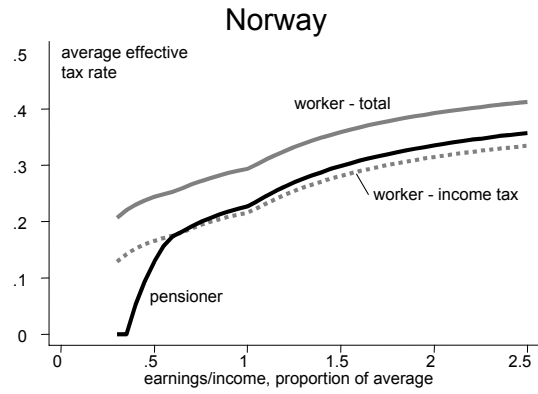
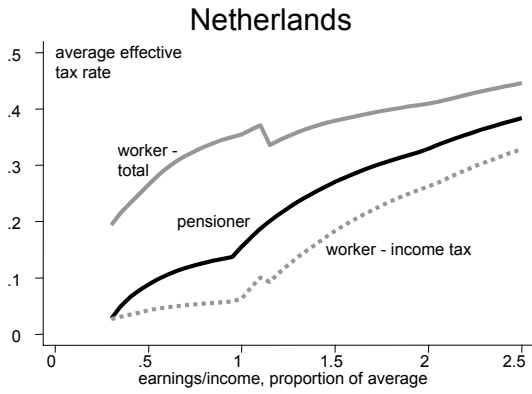
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<sup>17</sup> It should, however, be noted that people of working age also have relatively generous deductions in the United States — for mortgage interest, for example — that are not captured in this analysis. See OECD (2001*a*), Table III.6 for evidence on the main non-standard reliefs received by people of working age.

**Figure 1. Taxes paid by pensioners and workers:**  
Average effective tax rate including personal income tax and social security contributions







**Table 4. Taxes paid by pensioners and workers:**  
Average effective tax rate including personal income tax and social security contributions

4a. Income of half of earnings of average production worker

|                | <i>Pensioner</i> |               |                 | <i>Worker</i> |               |                 |
|----------------|------------------|---------------|-----------------|---------------|---------------|-----------------|
|                | <i>Total</i>     | <i>Income</i> | <i>Social</i>   | <i>Total</i>  | <i>Income</i> | <i>Social</i>   |
|                |                  | <i>tax</i>    | <i>security</i> |               | <i>tax</i>    | <i>security</i> |
| Australia      | 10.0             | 8.5           | 1.5             | 15.3          | 13.8          | 1.5             |
| Canada         | 0.0              | 0.0           | 0.0             | 18.9          | 13.6          | 5.3             |
| Finland        | 22.8             | 19.3          | 3.5             | 23.3          | 16.0          | 7.2             |
| France         | 7.7              | 7.7           | 0.0             | 21.0          | 7.6           | 13.4            |
| Germany        | 7.6              | 0.0           | 7.7             | 30.0          | 9.3           | 20.8            |
| Italy          | 15.4             | 15.4          | 0.0             | 22.1          | 13.0          | 9.2             |
| Japan          | 0.2              | 0.2           | 0.0             | 14.3          | 4.3           | 10.0            |
| Korea          | 0.0              | 0.0           | 0.0             | 6.7           | 0.0           | 6.7             |
| Netherlands    | 10.9             | 3.0           | 7.9             | 26.6          | 4.2           | 22.3            |
| Norway         | 12.9             | 12.9          | 0.0             | 24.4          | 16.6          | 7.8             |
| Spain          | 0.9              | 0.9           | 0.0             | 7.6           | 1.2           | 6.4             |
| Sweden         | 17.5             | 17.5          | 0.0             | 29.4          | 22.4          | 7.0             |
| Switzerland    | 7.1              | 7.1           | 0.0             | 16.9          | 5.4           | 11.6            |
| United Kingdom | 6.0              | 6.0           | 0.0             | 15.7          | 9.6           | 6.1             |
| United States  | 5.6              | 5.6           | 0.0             | 21.8          | 14.1          | 7.7             |

4b. Income of three-quarters of earnings of average production worker

|                | <i>Pensioner</i> |               |                 | <i>Worker</i> |               |                 |
|----------------|------------------|---------------|-----------------|---------------|---------------|-----------------|
|                | <i>Total</i>     | <i>Income</i> | <i>Social</i>   | <i>Total</i>  | <i>Income</i> | <i>Social</i>   |
|                |                  | <i>tax</i>    | <i>security</i> |               | <i>tax</i>    | <i>security</i> |
| Australia      | 22.2             | 20.7          | 1.5             | 22.2          | 20.7          | 1.5             |
| Canada         | 0.0              | 0.0           | 0.0             | 22.7          | 17.1          | 5.6             |
| Finland        | 30.1             | 26.2          | 3.9             | 29.3          | 22.0          | 7.3             |
| France         | 13.3             | 13.3          | 0.0             | 25.3          | 11.9          | 13.4            |
| Germany        | 7.9              | 0.3           | 7.7             | 37.8          | 17.1          | 20.8            |
| Italy          | 19.3             | 19.3          | 0.0             | 26.0          | 16.8          | 9.2             |
| Japan          | 2.0              | 2.0           | 0.0             | 15.3          | 5.3           | 10.0            |
| Korea          | 1.9              | 1.9           | 0.0             | 7.8           | 1.1           | 6.7             |
| Netherlands    | 15.6             | 4.4           | 11.2            | 32.5          | 5.3           | 27.2            |
| Norway         | 19.9             | 16.9          | 3.0             | 27.2          | 19.4          | 7.8             |
| Spain          | 8.0              | 8.0           | 0.0             | 13.9          | 7.5           | 6.4             |
| Sweden         | 27.8             | 27.8          | 0.0             | 32.6          | 25.7          | 7.0             |
| Switzerland    | 10.5             | 10.5          | 0.0             | 19.5          | 8.0           | 11.6            |
| United Kingdom | 11.7             | 11.7          | 0.0             | 21.5          | 14.1          | 7.4             |
| United States  | 9.6              | 9.6           | 0.0             | 24.5          | 16.8          | 7.7             |

#### 4c. Income of earnings of average production worker

|                | <i>Pensioner</i> |               |                 | <i>Worker</i> |               |                 |
|----------------|------------------|---------------|-----------------|---------------|---------------|-----------------|
|                |                  | <i>Income</i> | <i>Social</i>   |               | <i>Income</i> | <i>Social</i>   |
|                | <i>Total</i>     | <i>tax</i>    | <i>security</i> | <i>Total</i>  | <i>tax</i>    | <i>security</i> |
| Australia      | 25.9             | 24.4          | 1.5             | 25.9          | 24.4          | 1.5             |
| Canada         | 11.6             | 11.6          | 0.0             | 26.5          | 20.8          | 5.7             |
| Finland        | 34.2             | 30.3          | 3.9             | 33.7          | 26.3          | 7.4             |
| France         | 15.8             | 15.8          | 0.0             | 27.7          | 14.3          | 13.4            |
| Germany        | 14.7             | 7.0           | 7.7             | 41.9          | 21.2          | 20.8            |
| Italy          | 23.1             | 23.1          | 0.0             | 29.1          | 20.0          | 9.2             |
| Japan          | 4.0              | 4.0           | 0.0             | 16.0          | 6.0           | 10.0            |
| Korea          | 3.3              | 3.3           | 0.0             | 21.7          | 10.2          | 11.6            |
| Netherlands    | 19.1             | 5.7           | 13.4            | 35.4          | 6.3           | 29.1            |
| Norway         | 22.7             | 19.7          | 3.0             | 29.4          | 21.6          | 7.8             |
| Spain          | 12.3             | 12.3          | 0.0             | 18.2          | 11.8          | 6.4             |
| Sweden         | 29.3             | 29.3          | 0.0             | 34.2          | 27.2          | 7.0             |
| Switzerland    | 13.3             | 13.3          | 0.0             | 21.7          | 10.2          | 11.6            |
| United Kingdom | 15.1             | 15.1          | 0.0             | 24.4          | 16.3          | 8.1             |
| United States  | 10.9             | 10.9          | 0.0             | 25.8          | 18.2          | 7.7             |

#### 4d. Income of twice earnings of average production worker

|                | <i>Pensioner</i> |               |                 | <i>Worker</i> |               |                 |
|----------------|------------------|---------------|-----------------|---------------|---------------|-----------------|
|                |                  | <i>Income</i> | <i>Social</i>   |               | <i>Income</i> | <i>Social</i>   |
|                | <i>Total</i>     | <i>tax</i>    | <i>security</i> | <i>Total</i>  | <i>tax</i>    | <i>security</i> |
| Australia      | 36.7             | 35.2          | 1.5             | 36.7          | 35.2          | 1.5             |
| Canada         | 31.5             | 31.5          | 0.0             | 33.9          | 30.8          | 3.1             |
| Finland        | 43.0             | 39.1          | 3.9             | 43.1          | 35.7          | 7.4             |
| France         | 24.7             | 24.7          | 0.0             | 32.3          | 21.0          | 11.2            |
| Germany        | 26.2             | 21.4          | 4.8             | 47.7          | 31.9          | 15.8            |
| Italy          | 30.6             | 30.6          | 0.0             | 36.1          | 26.9          | 9.2             |
| Japan          | 10.8             | 10.8          | 0.0             | 21.2          | 11.2          | 10.0            |
| Korea          | 11.4             | 11.4          | 0.0             | 15.3          | 8.6           | 6.7             |
| Netherlands    | 32.7             | 25.8          | 6.9             | 40.9          | 26.2          | 14.7            |
| Norway         | 33.5             | 30.5          | 3.0             | 39.2          | 31.4          | 7.8             |
| Spain          | 19.7             | 19.7          | 0.0             | 24.2          | 18.7          | 5.4             |
| Sweden         | 40.5             | 40.5          | 0.0             | 42.6          | 37.9          | 4.7             |
| Switzerland    | 21.9             | 21.9          | 0.0             | 28.6          | 17.3          | 11.4            |
| United Kingdom | 21.2             | 21.2          | 0.0             | 27.5          | 21.2          | 6.3             |
| United States  | 18.6             | 18.6          | 0.0             | 33.8          | 26.1          | 7.7             |

#### 4. Empirical results: marginal effective tax rates on workers and pensioners

A second measure of the impact of tax systems on individuals is the marginal effective tax rate. Above, we presented average tax rates: the proportion of income paid in tax. The marginal tax rate is the proportion of a small addition to income that is due in tax.<sup>18</sup> This measure is much easier to relate to the parameters of the tax system than the average effective tax rate.

There is an important methodological difficulty with analysing marginal effective tax rates on pensioners in addition to the general issues outlined elsewhere in this. All

<sup>18</sup> These measures, their interpretation and their limitations are described in detail in OECD (1995, 1997 and 2001a).

nine countries provide some form of income-tested or means-tested support to older people. (Means-tested benefits depend on both income and assets, income-tested benefits are withdrawn against income alone.) The withdrawal of such support against other income sources increases effective marginal rates. However, we have chosen to model the structure of pension and other state benefits separately from the structure of the regime of tax and social security contributions. (The summary results in section 5 — and OECD, 2001*b* and Whitehouse, 2002*a,b* — present total pension incomes, including means- and income-tested benefits for people with different levels of earnings during their working lives.)

Figure 2 returns to the marginal effective tax rates, excluding the impact of withdrawal of the means- and income-tested benefits described above. In each chart, the black, solid line shows the marginal effective tax rate paid by a pensioner while the grey, dotted line shows the marginal tax rate on a worker. Again, these are shown for incomes between 0.3 and two-and-a-half-times the earnings of the average production worker.

The marginal effective tax rate can be easier to interpret than the average effective tax rate, since it can be related directly to the parameters of the tax system.

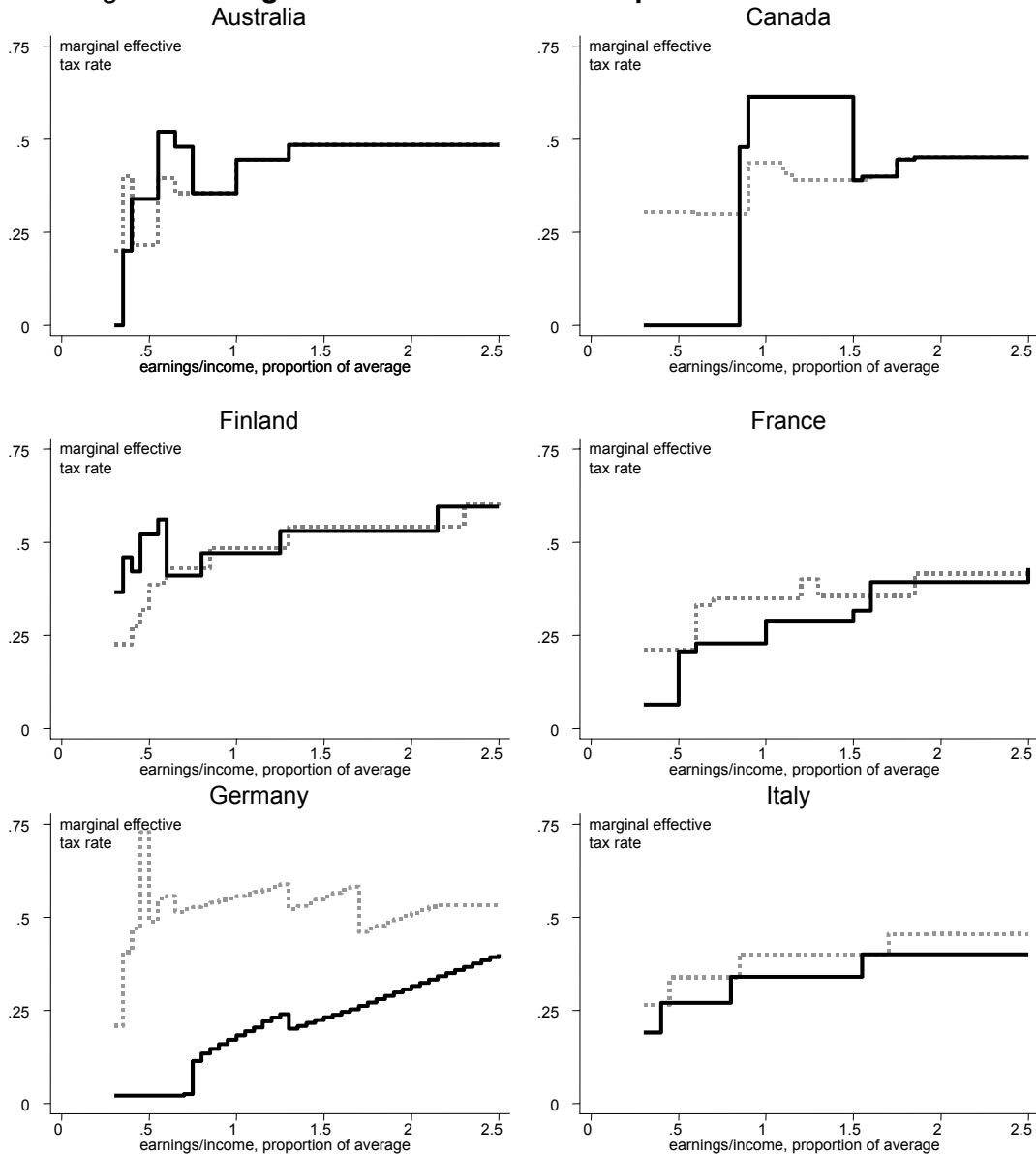
Taking the United Kingdom as an example, the three marginal rates of the income tax schedule — 10, 23 and 40 per cent — can be seen at different income ranges. The 34.5 per cent marginal rate on incomes between around 95 and 110 per cent of average earnings results from the withdrawal of the additional age allowance in the income tax. Since the withdrawal rate is 50 per cent, the total marginal effective tax rate is  $23 \times 1.5 = 34.5$  per cent.

The lowest-income worker in the United Kingdom chart pays a total marginal rate of 20 per cent: 10 per cent income tax plus 10 per cent social security contributions. Above the social security contribution ceiling — around one-and-three-quarters times average earnings — the overall marginal rate is at first 23 per cent and then 40 per cent, reflecting the values of the income tax schedule. At incomes above the ceiling, the marginal rates of workers and pensioners coincide because the age allowance has been withdrawn and no further social security contributions are due.

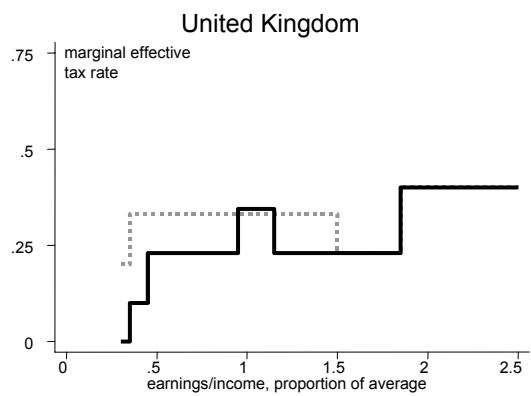
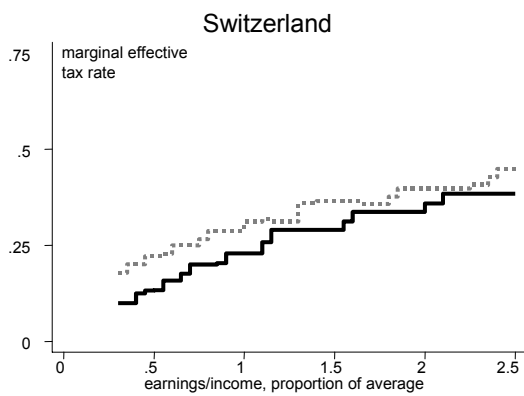
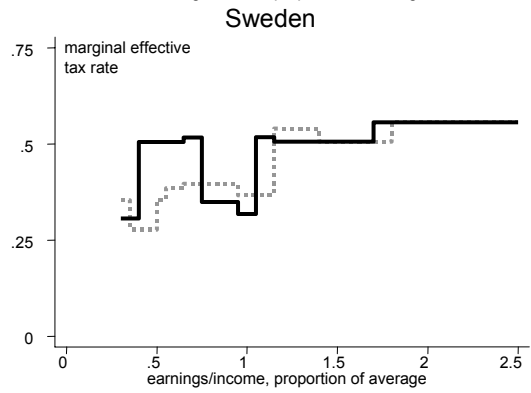
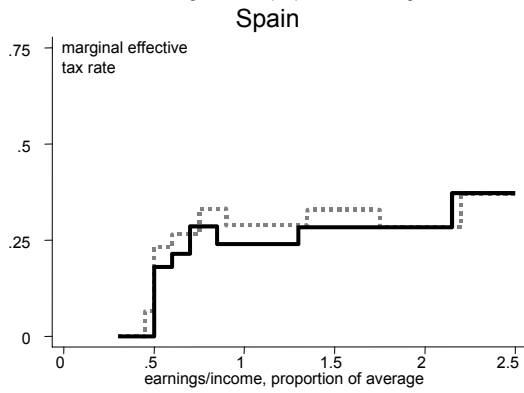
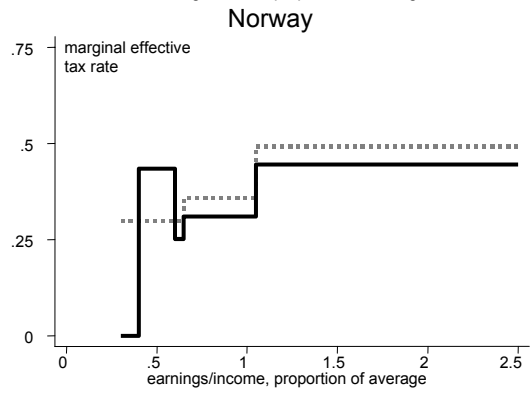
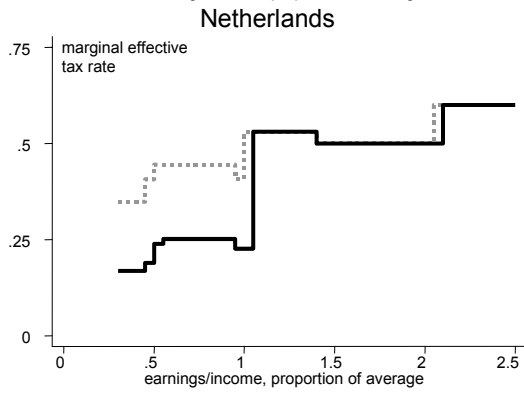
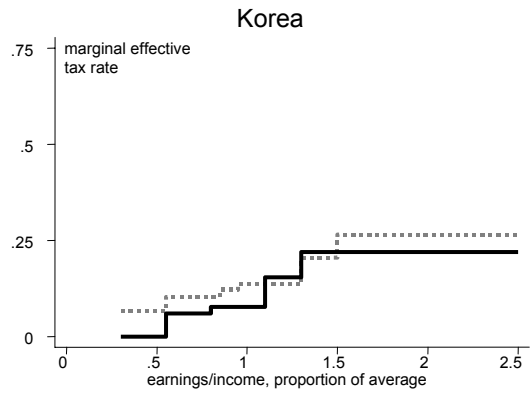
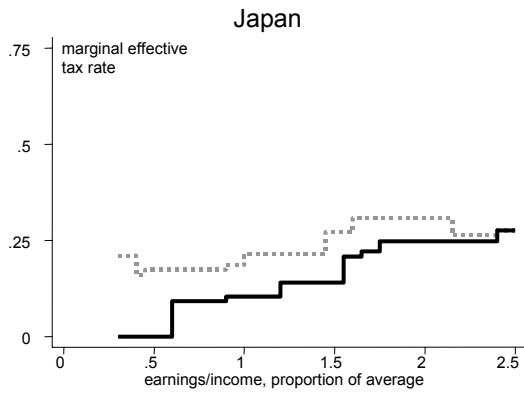
There are again differences in the pattern of marginal rate schedules between countries. In some, such as Germany, Italy, Japan, Switzerland and the United States, pensioners face a lower marginal rate across the income range.<sup>19</sup> In Australia, Canada, Finland, Norway and Sweden, the withdrawal of extra basic reliefs from pensioners

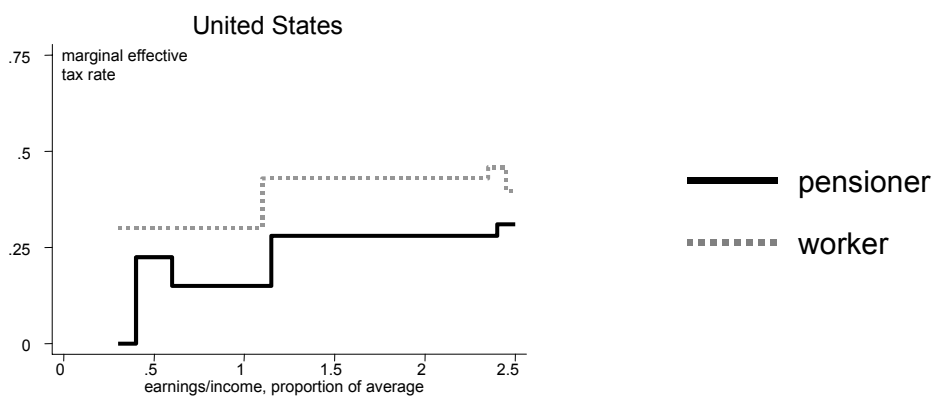
results in a relatively high marginal rate on low-to-middle income older people. In Australia, Canada, the Netherlands, Spain, Sweden and the United Kingdom, higher-income pensioners (usually those with incomes above one-and-a-half to two times average earnings) face the same marginal rates as higher-income workers.

**Figure 2. Marginal effective tax rates on pensioners and workers**



<sup>19</sup> Note that the high marginal rate on lower-income German workers reflects operation of the solidarity surcharge.





### 5. Empirical results: gross and net replacement rates

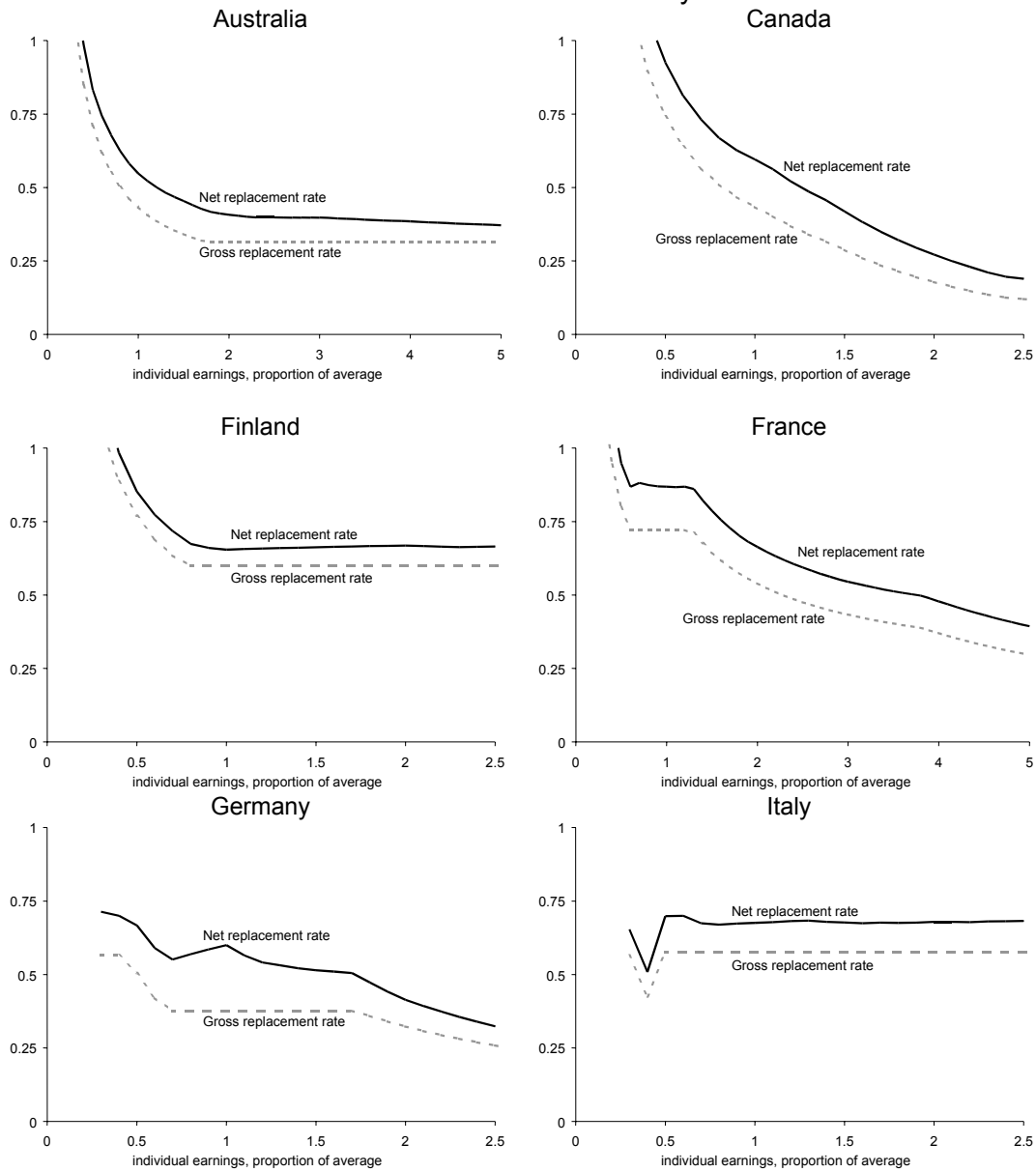
The tax system has two main effects on pensioners' economic well being relative to the position when they were in work. First, as previously noted, income tax systems are progressive. In addition, gross replacement rates (that is, the ratio of gross pension income to gross income when in work) are less than 100 per cent over most of the income range. Thus, the progressivity of the tax system ensures that people will face a smaller direct tax burden when retired than they did when in work. Secondly, there are concessions in income tax systems for older people and they typically do not pay social security contributions (or pay at a lower rate).

The results in the previous two sections isolated the second effect. In this section, we consider both effects together, by looking at the pension entitlements of workers relative to their incomes in work before and after tax. The results show, for full-career workers at different income levels, the value of the pension entitlement that they would receive under today's pension rules. The calculations all components of the retirement-income system, including basic, resource-tested and earnings-related schemes. They also include mandatory occupational and personal pensions where appropriate. The details of the calculations are set out in a companion paper (Whitehouse, 2002*b*) and results were also presented in OECD (2001).

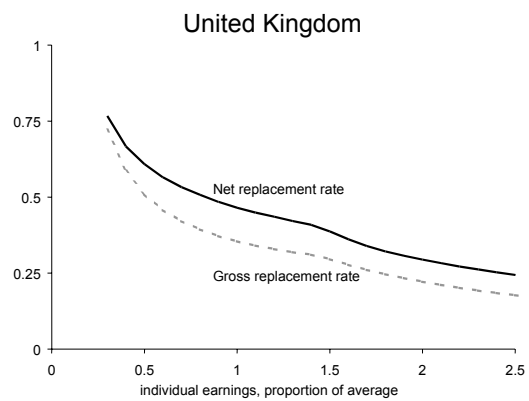
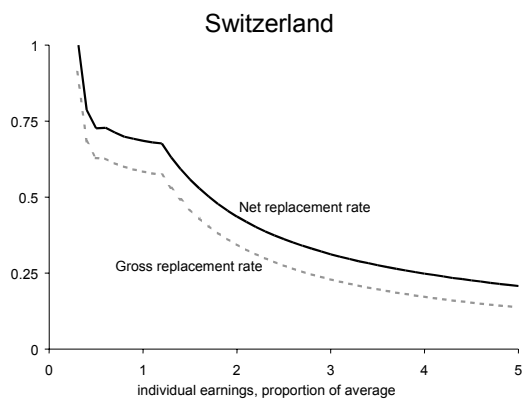
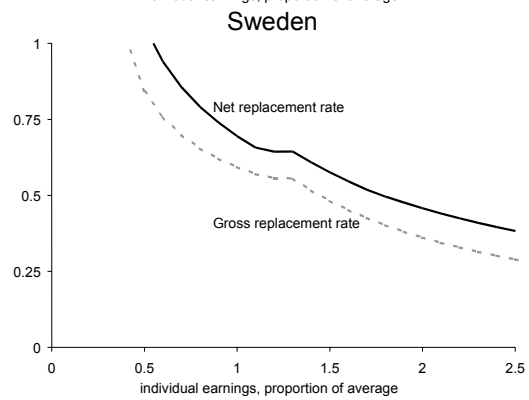
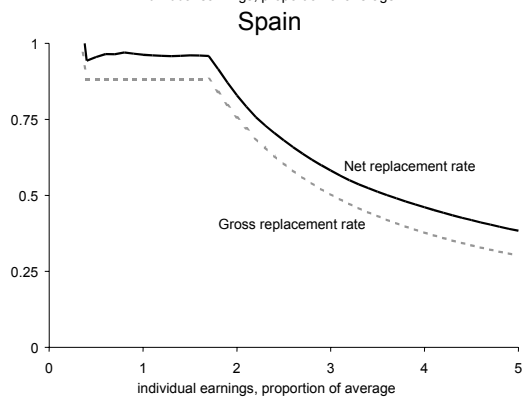
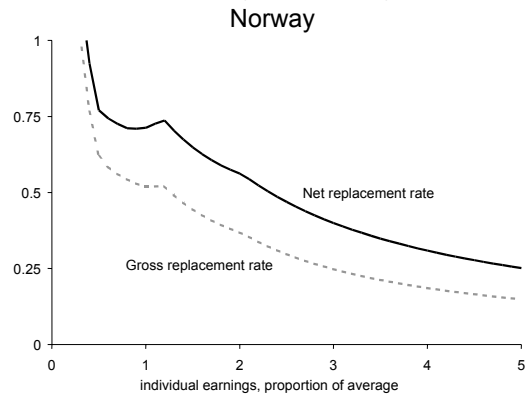
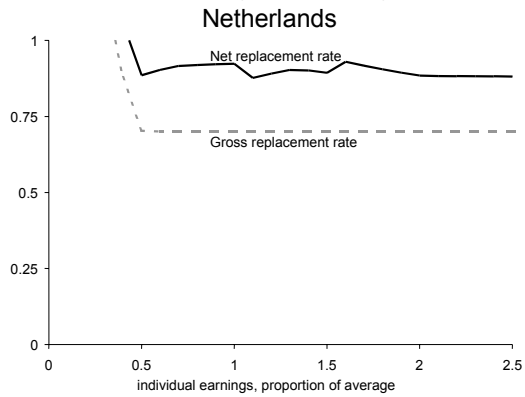
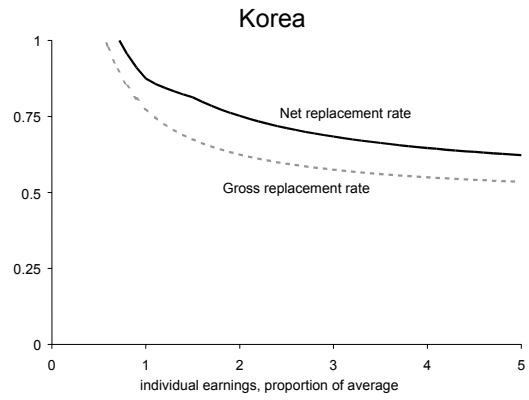
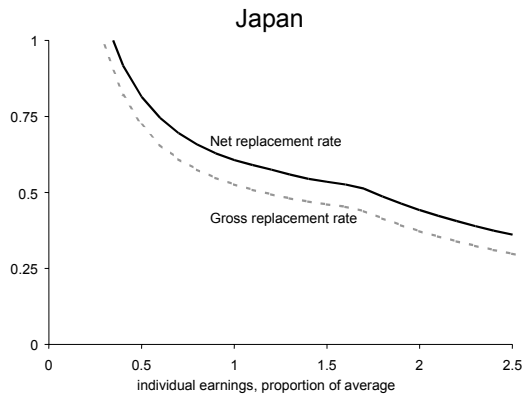
Figure 3 shows gross and net replacement rates, again between 0.3 and two-and-a-half times average earnings (although note that the y-axis has been capped at 100 per cent of average earnings). The differences between the two are in most cases large. For a full career worker on average earnings, for example, the tax differential accounts for one fifth of the net replacement rate projected for retirement on average across the countries. At this income level, taxation plays the most important role in determining retirement

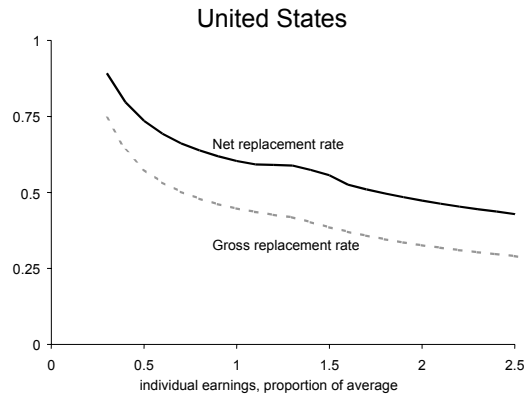
incomes in Germany, Norway and the two North America nations. Tax differences play generally play a smaller role for people on lower incomes. This is because allowances and non-wastable tax credits can not reduce the tax liability below zero. At higher income levels, the proportion of the net replacement rate deriving from tax differentials is generally similar to that at average earnings.

**Figure 3. Gross and net replacement rates:**  
 Projected pension entitlement as a proportion of individual earnings before and after income tax and social security contributions









## 6. Summary and conclusions

This paper has set out the detailed method for calculating the tax position of older people, based as closely as possible on the methodology of the twin OECD reports — *Taxing Wages* and *Benefits and Work Incentives* — that look at the tax and benefit position of people of working age.

Most of the 15 OECD countries analysed offer substantial concessions to older people through their income tax systems. Also, they either do not levy social security contributions on pensioners or levy them at lower rates.<sup>20</sup>

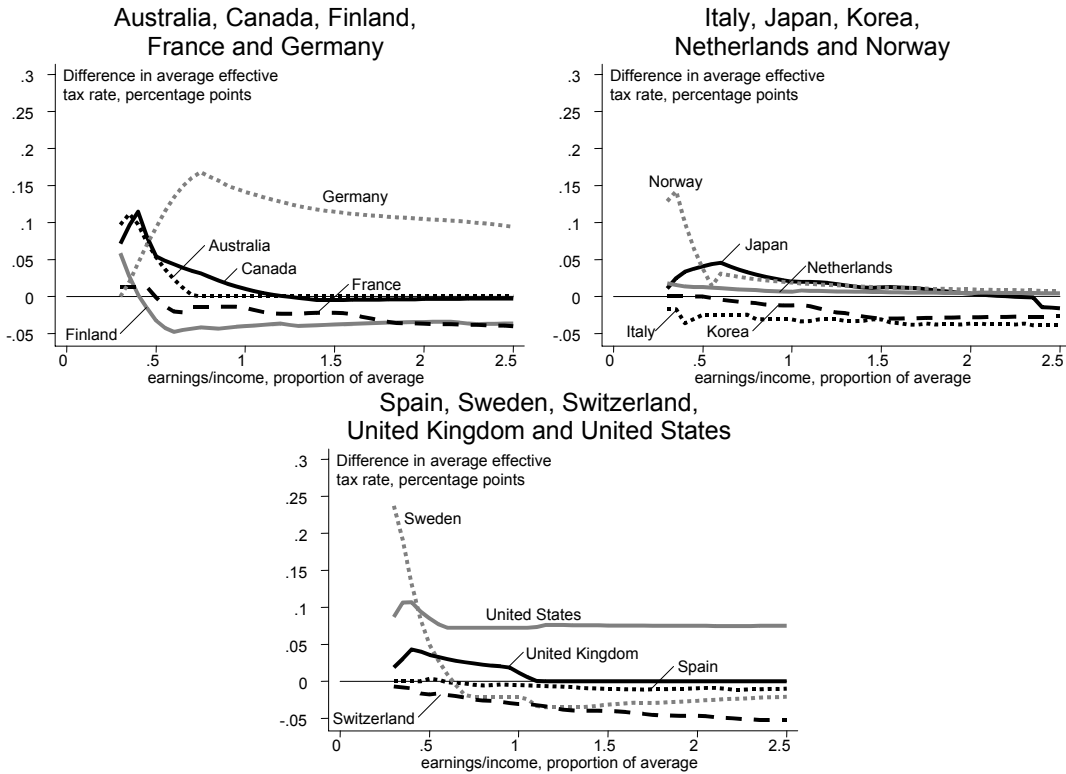
The charts in Figure 4, showing the difference in average effective tax rates between employees and pensioners with the same income level, summarise the main results of the paper. The first set of charts focuses on the personal income tax alone, while the second set covers both the personal income tax and social security contributions. All of the charts show the absolute difference in average effective tax rates in percentage points.

The Figure confirms that there are significant differences between countries in the pattern of concessions for older people against income. Some countries offer highly targeted reliefs, which are substantially withdrawn from older people with higher incomes. Others offer concessions that are substantial right across the income range.

<sup>20</sup> Naturally, in insurance-based social security systems, this reflects the fact that pensioners are not entitled to many benefits. Nonetheless, this affects comparisons of pensioners' incomes with those of workers.

**Figure 4. Summary: difference in average effective tax rates between workers and pensioners by gross income level, percentage points**

**4a. Income tax**



**4b. Income tax and social security contributions**

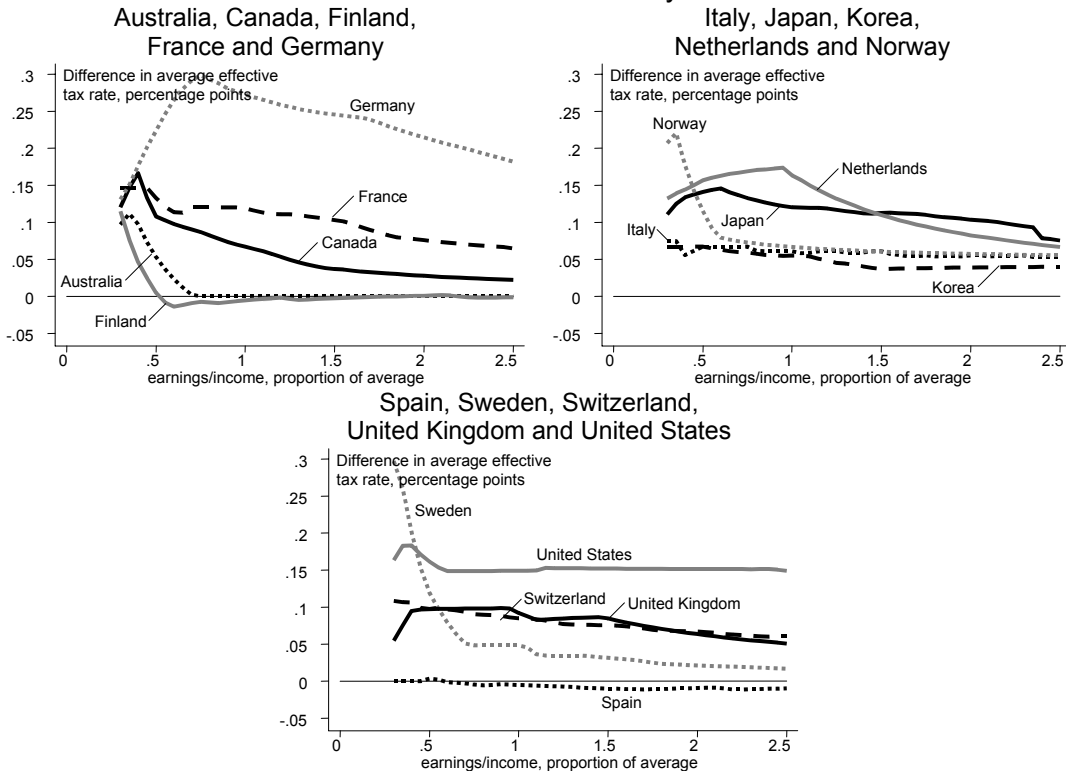


Figure 4 shows that the scale of support offered to older people through the tax system is substantial in all of the 15 countries studied. It is natural to question whether older people should pay less tax than people of working age *with the same income*.<sup>21</sup> Nevertheless, some economic analysis of optimal tax and transfer policy supports the use of categorical information (such as age) as well as income in determining liabilities and entitlements.<sup>22</sup>

Tax expenditure accounts, extracts of which are provided in Table 5, illustrate the cost of these concessions. The Table shows government estimates of the revenues foregone from reliefs under the personal income tax system aimed at older people. However, it is important that these estimates are treated only as illustrative as there are many difficulties in their calculation and pitfalls in their interpretation.<sup>23</sup>

**Table 5. Tax expenditures: estimates of revenues foregone from particular income tax concessions to older people**

|   | <i>National currency<br/>(bn)</i> | <i>Percentage of total<br/>income tax revenues</i> |
|---|-----------------------------------|--|
| <b>Canada (2000)</b>                      |                                   |  |
| Guaranteed income supplement not taxed    | 0.3                               | 0.2  |
| Age credit                                | 1.5                               | 1.0  |
| Pension credit                            | 0.4                               | 0.3  |
| <b>Finland (1984)</b>                     |                                   |  |
| Exemption of national pension supplements | 0.7                               | 1.3  |
| Pension income deduction                  | 4.4                               | 7.9  |
| <b>United Kingdom (1999-2000)</b>         |                                   |  |
| Age allowance                             | 1.3                               | 1.7  |
| <b>United States (2000)</b>               |                                   |  |
| Additional deduction                      | 1.8                               | 0.2  |
| Social security: partially not taxed      | 18.0                              | 2.0  |

*Note:* methodological differences mean that these estimates cannot be compared between countries. See OECD (1996) for an extensive analysis of such problems

*Source:* authors' calculations based on Canada, Department of Finance (1999); United Kingdom, HM Treasury (1999), Inland Revenue (1999); United States, Office of Management and Budget (2000); OECD (1996, 2000b)

It is important that policy-makers bear in mind the role of the tax system in providing retirement-income support. In particular, they should avoid considering the

<sup>21</sup> See Forman (1995), Penner (2000) and Shoemaker (1995) on the United States and Morris (1981) and Dilnot *et al.* (1994), Section 3.6 on the United Kingdom.

<sup>22</sup> See Immonen, Kanbur, Keen and Tuomala (1997) and Dilnot, Kay and Morris (1984).

<sup>23</sup> On which see OECD (1984, 1996).

rates and structure of retirement benefits without also considering the effect on older people of systems of personal income tax and social security contributions. In addition to their import for fiscal and pension policy, these results are also a valuable input to studies of incentives to retire and incentives to save.

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