

## TAX RATIOS ON LABOUR AND CAPITAL INCOME AND ON CONSUMPTION

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## INTRODUCTION

In order to assess the effects of taxation on labour markets, investment, savings and redistribution, it is necessary to construct measures that take account of statutory tax rates, rules that determine the tax base and credits. One approach is to calculate effective tax rates for particular household types or investment/source of finance combinations based on information about these tax factors. This approach, which is used in OECD *Taxing Wages* to calculate average effective tax rates on labour and in Devereux and Griffith (1998) to calculate average effective tax rates on capital, requires a great deal of detailed information and the combination of many individual cases to obtain representative aggregate estimates. Another approach, pioneered by Mendoza *et al.* (1994), is to calculate tax ratios,<sup>1</sup> which relate realised tax revenues directly to the relevant macroeconomic variables in the national accounts. This approach is relatively simple, captures the overall effects of deductions, credits and taxpayer behaviour. However, it relies on a number of limiting assumptions, most of which are needed to allow the available data to be used to form estimates of the value of revenue streams and the relevant macroeconomic variables. Moreover, the estimates are backward looking and, in the case of capital tax ratios, may not be well adapted to assessing the effects of taxation on both investment and saving in the presence of cross-border capital flows. Despite these limitations, tax ratios may provide a useful starting point for assessing tax burdens on labour and capital, notably to respond to claims that globalisation has resulted in a shift in the tax burden from capital to labour, and for analysing the effects of taxation on labour markets. However, this should be complemented by a broader approach when examining the economic effects of taxation that also considers average and marginal effective tax rates and, if possible, the effects of tax shifting on final tax incidence.

Tax ratio estimates could be improved by relaxing some of the unrealistic assumptions made by Mendoza *et al.* (1994). This paper proposes a number of changes to make the underlying assumptions more realistic. These changes reduce the increase in labour income tax ratios and raise the increase in capital income tax ratios compared with the Mendoza estimates, overturning the conclusion that there has been a relative shift in the tax burden from capital to labour in recent decades. The two data sets are, however, highly correlated in most countries. Even these revised tax ratio estimates are based on a number of unrealistic

assumptions that could not be systematically relaxed owing to a lack of data for certain countries and/or periods. Relaxing these assumptions where possible sometimes results in large changes in tax ratios, especially when assumptions concerning the treatment of self-employed income and personal capital income are modified. These results reinforce the view that caution is required when using tax ratios to support a given policy stance or to advocate a particular direction for reform.<sup>2</sup> They should be used in conjunction with more broadly based analyses and with other tax indicators and information that can corroborate the story they tell.

The methodology and underlying assumptions used to calculate tax ratios are outlined in the next section along with some of the data problems that are encountered. Revised tax ratios are presented in the following section, together with the main differences from tax ratios calculated using the Mendoza equations and simple regressions relating the revised ratios to the major macroeconomic variables of interest. Finally, the results of the sensitivity analysis to relaxation of some of the remaining assumptions that appear to be unrealistic are presented.

## METHODOLOGY

### General approach, underlying assumptions and data problems

The Mendoza *et al.* (1994) methodology involves relating realised tax revenues to estimates of the associated tax bases. Tax shifting is not taken into account: the initial impact of taxes is assumed to be the final incidence. Hence the tax burdens calculated using this methodology will not correspond to the burdens impacting on economic incentives if, as is likely, there is tax shifting. The tax treatment of losses, cross-border flows and tax planning are also ignored, further reducing the relevance of some tax ratios (notably, capital income tax ratios) as an input to analyses of the effects of taxes on relevant macroeconomic variables. Tax revenue data come from OECD *Revenue Statistics*. This contains time series on revenue streams from various types of tax – on personal incomes, corporate profits, sales, property, etc. – as reported by member countries. Estimates of the value of the associated tax bases come from national accounts. As such data do not readily fit with the tax revenue data, a number of assumptions – some of them very restrictive – are required to align the two data sets. One particular problem of fit concerns data on household taxes. These data do not distinguish between taxes paid on labour- and capital income. Mendoza *et al.* (1994) deal with this problem by assuming households pay the same effective tax rates on capital and labour incomes (*i.e.* they assume that the labour component of the household income tax is proportional to labour's share in household income). OECD data on statutory tax arrangements show that this assumption is unlikely to be a good one for many OECD countries (OECD, 1994). Some have dual income systems that treat capital income differently from labour income and/or

provide relief from double taxation of dividends. There are also special arrangements for pensions, owner-occupied housing and individual share ownership.

Another problem is that no distinction is made in national accounts between the labour and capital components of self employed income. As noted above, Mendoza *et al.* (1994) assign all self-employed income to capital. Alternative approaches, presented in the section on results, are to assign part of this income flow to labour and part to capital or to exclude taxes paid on this income from estimates of the tax ratios on labour and capital. The former entails making an estimate of labour income of the self-employed, which is an inherently difficult task that could be approached in a variety of ways, while the latter approach “gets around the problem” by setting it aside. Other problems that arise from using national accounts data are that:

- The definitions of national accounts data categories (*e.g.* the definition of the corporate and quasi-corporate sector) may not be fully comparable to analogous tax revenue data categories (*e.g.* corporate income taxes paid);
- The procedures for estimating the consumption of fixed capital, which is used in calculating net operating surplus, are not comparable across countries (and this has an important influence on the estimates);
- National accounts data may reflect avoidance and evasion incentives created by national tax systems. For example, if a country's tax policies favour capital income over labour income, then there would be an incentive to disguise labour income as capital income.<sup>3</sup> The potential for switching reduces the reliability and comparability of estimates of the tax bases associated with capital and labour; and
- It also should be borne in mind that there are differences between the concepts of a comprehensive tax base in national accounts and in tax codes, especially for capital income. For instance, capital gains would be included in comprehensive income in a tax code but not in the national accounts (because there is no value added). Similarly, the payment of dividends increases the tax base in countries with a classical system for taxing corporate earnings (*i.e.* there is double taxation of dividends) but does not increase capital income in the national accounts (paying dividends does not create value added). Another problem is that *Revenue Statistics* are on a cash basis<sup>4</sup> whereas national accounts are on an accrual basis. This means that the timing of the two data sets does not correspond.

### Household income tax ratio, $\tau_h$

#### *Mendoza method*

In order to calculate the labour ( $\tau_l$ ) or capital ( $\tau_k$ ) income tax ratios, it is necessary to calculate the household income tax ratio ( $\tau_h$ ). This is used to allocate per-

Table 1. **Mendoza and revised tax ratios**

Mendoza method	Revised method	
	Social security contributions not deductible	Social security contributions deductible
<b>Tax ratio for total household income, <math>\tau_h</math></b>		
$\tau_h = 1100 / (\text{OSPUE} + \text{PEI} + W)$	Same as Mendoza	$\tau_h = 1100 / (\text{OSPUE} + \text{PEI} + W - 2100 - 2300 - 2400)$
<b>Tax ratio on labour income, <math>\tau_l</math></b>		
$\tau_l = (\tau_h * W + 2000 + 3000) / (W + 2200)$	$\tau_l = (\tau_h * W + 2100 + 2200 + \alpha * 2400 + 3000) / (\text{WSSS} + 3000)$  $\alpha = W / (\text{OSPUE} + \text{PEI} + W)$ = share of labour income in household income $\beta = 1 - \alpha$ = share of capital income in household income	$\tau_l = (\tau_h * (W - 2100 - \alpha * 2400) + 2100 + 2200 + \alpha * 2400 + 3000) / (\text{WSSS} + 3000)$  $\alpha = (W - 2100) / (\text{OSPUE} + \text{PEI} + W - 2100 - 2300)$  Same as not deductible
<b>Tax ratio on consumption, <math>\tau_c</math></b>		
$\tau_c = (5110 + 5121) / (\text{CP} + \text{CG} - \text{CGW} - 5110 - 5121)$	$\tau_c = (5110 + 5121 + 5122 + 5123 + 5126 + 5128 + 5200 - 5212) / (\text{CP} + \text{CG} - \text{CGW})$	Same as not deductible
<b>Tax ratio on labour income and consumption combined, <math>\tau_{LC}</math></b>		
	$\tau_{LC} = \tau_l + (1 - \tau_l) * \tau_c$	Same as not deductible
<b>Tax ratio on capital income, <math>\tau_k</math></b>		
$\tau_k = [\tau_h * (\text{OSPUE} + \text{PEI}) + 1200 + 4100 + 4400] / \text{OS}$	$\tau_k = [\tau_h * (\text{OSPUE} + \text{PEI}) + 2300 + \beta * 2400 + 1200 + 4000 + 5125 + 5212 + 6100] / (\text{OS} - 3000)$	$\tau_k = [\tau_h * (\text{OSPUE} + \text{PEI} - 2300 - \beta * 2400) + 2300 + \beta * 2400 + 1200 + 4000 + 5125 + 5212 + 6100] / (\text{OS} - 3000)$

sonal income tax to capital and labour under the assumption that the average tax rate paid by each factor of production is the same (*i.e.*  $\tau_h$ ). (The results of sensitivity analysis exploring the importance of this assumption for the estimated labour and capital tax ratios are reported in the section on results.) The household income tax ratio is equal to personal income tax receipts divided by household income (Table 1). Note that in some countries,<sup>5</sup> enterprise taxes are included in personal income tax (1100); symbols and mnemonics are described in Box 1. Household income comprises operating surplus of the private unincorporated sector (OSPUE),<sup>6</sup> property and entrepreneurial income (PEI)<sup>7</sup> and dependent wage income (W). Note that imputed rentals on owner-occupied housing are included in OSPUE and that pension fund and life insurance earnings, which are imputed to households in the national accounts, are included in PEI.

### Box 1. Variable names and symbols used

The tax revenue data are identified using the OECD system (OECD *Revenue Statistics*):

- 1100 Taxes on income, profits and capital gains of individuals or households.
- 1200 Taxes on income, profits and capital gains of corporations.
- 1300 Unallocated taxes on income, profits and capital gains.
- 2000 Total social security contributions (2100 is paid by employees; 2200 by employers; 2300 by the self-employed and persons outside of the labour force; 2400 is unallocated).
- 3000 Taxes on payroll and workforce.
- 4000 Taxes on property.
- 4100 Recurrent taxes in immovable property.
- 4400 Taxes on financial and capital transactions.
- 5110 General taxes on goods and services (5111 VAT).
- 5120 Taxes on specific goods and services (5121 excise taxes; 5122 profits of fiscal monopolies; 5123 customs and import duties; 5125 taxes on investment goods; 5126 taxes on specific services; 5128 other taxes).
- 5200 Taxes on use of goods and performances [5212 taxes on motor vehicles paid by others (*i.e.* other than households)].
- 6100 Other taxes paid solely by businesses.

The variables from *National Accounts* are:

- CP Private final consumption expenditure.
- D Household dividend receipts.
- EE Dependent employment.
- ES Self-employment.
- CG Government final consumption expenditure.
- CGW Government final wage consumption expenditure.
- IG Investment by general government.
- INT Household interest receipts;
- IP Investment by private sector.
- IROOHN Imputed rental income on owner occupied housing net of expenses.
- OS Net operating surplus of the overall economy.<sup>1</sup>
- OSPUE Unincorporated business net income (including imputed rentals on owner-occupied housing).<sup>2</sup>
- PEI Interest, dividends and investment receipts.<sup>3</sup>

**Box 1. Variable names and symbols used (cont.)**

- PIAPH Property income attributable to policy holders (life insurance and pension funds, excluding capital gains).
- W Wages and salaries of dependent employment.
- WSSS Compensation of employees (including private employers' contributions to social security and to pension funds).
- YPEPG Government interest payments.

1. This normally includes the statistical discrepancy.
2. The mnemonics for this variable reflect the definition in SNA68/ESA79, "Operating surplus of private unincorporated enterprises".
3. The mnemonics for this variable reflect the definition in SNA68/ESA79, "property and entrepreneurial income".

### **Revisions to Mendoza method**

Mendoza *et al.* (1994) assume that households are not able to deduct social security contributions from their taxable income. While this is true in the United States, it is not so in most other countries.<sup>8</sup> The household tax ratio equations should allow for this possibility, as they do in the third column of Table 1.

Some reallocation of tax data is also needed to make the estimates more realistic. In particular, business taxes, which are levied on unincorporated enterprises, should be removed from household tax and allocated directly to capital.<sup>9</sup> This treatment would be in line with that accorded to corporate taxes. Business tax revenues in the countries concerned (Japan, Germany, and Austria) are shown in Table A1. Moreover, taxes on income, profits and capital gains that had not been allocated to households or companies (1300) should be allocated to one or the other on the basis of what seems most appropriate; Mendoza *et al.* (1994) ignored these taxes. The allocations of 1300 made for the revised calculations are as follows:

- Canada, non-resident withholding tax is added to 1200;
- Austria, tax on interest is added to 1100;<sup>10</sup>
- Denmark, almost all of this category represents a tax on pension fund earnings and, as a tax on capital income, is added to 1200;
- Greece, this category (*impôts extraordinaires*) is allocated to households (1100) and companies (1200) according to the relative weights of each in taxes on income, profits and capital gains (1000);

- Hungary, withholding taxes on dividends and interest are added to 1100;
- New Zealand, taxes on interest and dividends are added to 1100 while the remainder of 1300 is added to 1200; and
- Portugal, professional tax (*impôt professionnel*), supplementary personal tax (*impôt complémentaire personnes singulières et collectives*), and capital gains tax (*impôt sur plus-values*) are allocated to 1100, and industrial tax (*impôt industriel*), land tax (*impôt foncier rural et urbain*), agriculture tax (*impôt industrie agricole*), local direct taxes (*impôts directs perçus par les administrations locales*) and interest on late payments (*intérêts payés en retard*) are added to 1200.

### Labour income tax ratio, $\tau_L$

#### *Mendoza method*

The labour tax ratio relates labour's share of household income taxes ( $\tau_h * W$ ) and taxes levied directly on labour income to labour income (see Table 1). The term for allocating household income taxes to labour ( $\tau_h * W$ ) does this in line with labour's share in household income. All social security charges (2000) and payroll taxes (3000) are also allocated to labour, through the other terms in the numerator. Labour income, which appears in the denominator of labour tax ratio equation, consists of compensation from dependent employment, including employers' social security contributions (2200) (but excluding employers' contributions to private pension funds).

#### *Revisions to Mendoza method*

Private employers' contributions to pension funds and payroll taxes should be added to the labour income base, as they are elements of wage compensation.<sup>11</sup> These items can be included in the labour income base by replacing the denominator of the labour income tax ratio with "compensation of employees" (WSSS) plus "taxes on payroll and workforce" (3000),<sup>12</sup> as in columns 2 and 3 of Table 1.

Social security contributions of the self-employed (2300) should be allocated to capital, not labour, as self-employed income is treated as capital income in the Mendoza methodology. On the other hand, unallocated social security contributions (2400)<sup>13</sup> should be allocated to capital and labour, not just labour, as they are paid out of both labour and capital incomes. Incorporating these changes entails disaggregating total social security contributions so that employees' (2100) and employers' (2200) contributions can be allocated to labour along with its share ( $\alpha$ ) of unallocated contributions (2400) and allocating self-employed contributions and the remaining unallocated contributions to capital.



**Consumption tax ratio,  $\tau_c$** ***Mendoza method***

The consumption tax ratio ( $\tau_c$ ) is calculated as the sum of general consumption taxes on goods and services (5110) and excise taxes (5121) divided by the sum of private consumption (CP) and government non-wage consumption (CG-CGW) net of these indirect taxes (see Table 1). Value added tax, which is by far the largest indirect tax in most countries, is included in the 5110 category. The denominator is considerably wider than the tax base normally subject to indirect taxation as government non-wage consumption expenditure and many goods and services (*e.g.* basic food in some countries, financial services, medical services) in final private consumption expenditure generally are not subject to indirect taxes. This wider tax base is retained on the grounds that indirect tax (notably VAT) is generally paid on inputs to produce such goods and services. Hence, contrary to the assumption made for calculating the other tax ratios, it is implicitly assumed that the tax burden on the inputs for such goods and services is passed through into higher output prices. Government wages (CGW) are excluded from the tax base because no indirect tax is levied on purchases of labour. Indirect taxes are deducted in the denominator to reflect the tradition of expressing indirect tax rates as a percentage of the price excluding the tax. For example, a 20 per cent VAT adds 20 per cent to the pre-tax price but represents 16.7 per cent of the total price including VAT. This adjustment ensures that the theoretical  $\tau_c$  for this tax is 20 per cent, not 16.7 per cent.

***Revisions to Mendoza method***<sup>14</sup>

A number of other indirect taxes should also be taken into account in the consumption tax ratio. These are taxes on profits of fiscal monopolies (5122), customs and import duties<sup>15</sup> (5123), taxes on specific services (5126), other taxes on specific goods and services (5128)<sup>16</sup> and taxes on the use of goods and performance activities (5200) except motor vehicle charges paid by others (5212).<sup>17</sup> It would also be preferable to express the consumption tax base in gross terms (*i.e.* including indirect taxes) to improve comparability with the tax ratios on labour and capital income and to facilitate calculating a combined tax ratio on labour income and consumption.

**Labour and consumption tax ratio combined,  $\tau_{LC}$** 

The labour and consumption tax ratio combined is of interest because this measures the relevant tax burden for choices between supplying labour or enjoying leisure. Assuming that all net labour income is consumed (now or in the future), it can easily be calculated by adding to the labour tax ratio the

consumption tax ratio adjusted for the share of net labour income in gross labour income: workers cannot spend income that has been taxed away. Mendoza *et al.* (1994) did not calculate a combined labour and consumption tax ratio.

### Capital income tax ratio, $\tau_k$

#### *Mendoza method*

The capital income tax ratio relates the share of household income tax pertaining to capital income [ $\tau_h * (\text{OSPUE} + \text{PEI})$ ] and taxes paid directly out of capital income or wealth to capital income (see Table 1). Once again, household income taxes are allocated in line with the productive factor's share in household income, where household capital income comprises unincorporated business net income (OSPUE, which includes self-employed income and imputed rentals on owner occupied housing) and interest, dividends and investment receipts (PEI). The taxes paid directly out of capital income are corporate income taxes (1200),<sup>18</sup> recurrent taxes on immovable property (4100) and taxes on financial and capital transactions (4400) to capital. While 4100 and 4400 are taxes on stocks of capital and capital transactions, respectively, they nevertheless represent a tax cost levied on capital investment that can be expressed as a percentage of income from capital.

#### *Revisions to Mendoza method*

All property taxes (4000) should be included in the capital tax ratio as they can be considered as surcharges on capital income.<sup>19</sup> There is also a number of other taxes paid by business that should be included, including taxes on investment goods (5125),<sup>20</sup> motor vehicle charges paid by others<sup>21</sup> (5212) and other taxes paid solely by businesses (6100).

## RESULTS

### Revised approach

The tax ratio on capital income (based on net operating surplus) increased by 6.4 percentage points between 1975-80 and 1990-2000 for OECD countries with complete data sets,<sup>22</sup> to 46.3 per cent (Table 2, Figure 1); see Table A2 for tax ratios for individual countries. This increase was greater than that in the labour tax ratio, which rose by 5.3 percentage points to 32.3 per cent, and in the consumption tax ratio, which increased by 1.1 percentage point to 15.7 per cent. Hence, there was a relative shift in the tax burden from labour to capital income, including when the labour tax burden is assessed using the combined labour and consumption tax ratio.<sup>23</sup> The relative shift in the tax burden towards capital was particularly

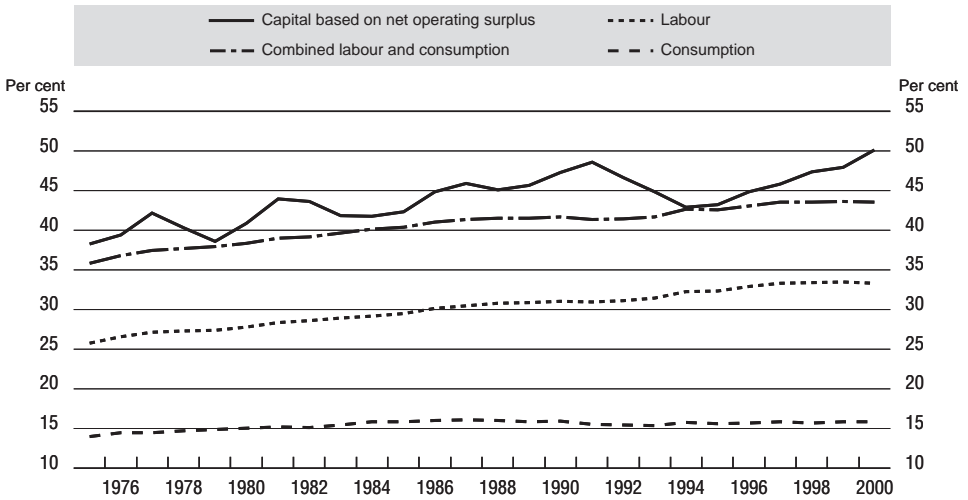
Table 2. **Tax ratios**  
Per cent

	Capital based on net operating surplus				Capital based on gross operating surplus				Labour				Consumption				Combined labour and consumption			
	1975-80	1980-90	1990-2000	Change between 1975-80 and 1990-2000	1975-80	1980-90	1990-2000	Change between 1975-80 and 1990-2000	1975-80	1980-90	1990-2000	Change between 1975-80 and 1990-2000	1975-80	1980-90	1990-2000	Change between 1975-80 and 1990-2000	1975-80	1980-90	1990-2000	Change between 1975-80 and 1990-2000
<b>Revised approach</b>																				
United States	42.2	37.9	39.5	-2.7	29.2	25.8	27.3	-1.9	20.4	22.1	23.4	3.1	6.7	6.6	6.4	-0.4	25.7	27.3	28.3	2.6
Japan	35.4	47.6	50.0	14.6	24.4	31.1	27.9	3.5	17.3	21.7	24.1	6.8	6.0	5.8	6.4	0.4	22.9	26.8	29.4	6.5
EU-15 <sup>1</sup>																				
Average	42.4	46.0	47.5	5.2	24.6	27.0	28.7	4.1	32.0	35.1	38.0	6.0	15.9	17.3	17.8	1.9	42.6	46.3	48.9	6.3
Standard deviation	19.7	17.4	13.0	-6.7	9.4	8.4	6.2	-3.2	6.6	7.0	8.0	1.4	4.3	3.3	2.0	-2.4	8.1	7.4	7.6	-0.5
OECD <sup>2</sup>																				
Average	39.9	43.9	46.3	6.4	24.4	26.6	28.1	3.7	27.0	29.6	32.3	5.3	14.6	15.6	15.7	1.1	37.3	40.4	42.6	5.3
Standard deviation	15.9	15.0	12.7	-3.3	8.0	7.4	5.8	-2.2	9.7	10.0	10.3	0.6	5.2	5.5	5.3	0.1	10.8	10.4	10.8	0.0
<b>Mendoza approach</b>																				
United States	39.3	35.3	36.4	-2.8	27.2	24.1	25.2	-2.0	23.2	25.6	27.1	3.9	5.4	5.3	5.2	-0.2	27.3	29.5	30.9	3.6
Japan	31.4	41.9	42.5	11.1	21.7	27.4	23.8	2.2	19.7	25.1	27.6	7.9	4.6	4.9	6.1	1.6	23.4	28.7	32.0	8.7
EU-15 <sup>1</sup>																				
Average	33.0	36.6	37.4	4.4	20.1	22.1	23.1	3.1	35.5	39.2	42.5	7.0	16.4	18.1	18.8	2.4	45.7	49.9	53.1	7.4
Standard deviation	15.6	15.6	11.7	-3.9	8.4	8.4	6.5	-1.8	8.6	8.1	8.7	5.1	5.5	4.6	3.0	-2.5	11.4	10.0	9.7	-1.7
OECD <sup>2</sup>																				
Average	31.9	35.7	37.2	5.3	19.5	21.1	22.1	2.6	29.7	32.8	35.6	5.9	14.0	15.5	16.0	2.0	39.0	42.7	45.4	6.4
Standard deviation	12.8	12.6	10.6	-2.2	6.7	6.7	5.6	-1.0	11.4	11.5	11.9	0.5	7.3	7.9	7.5	0.2	14.0	13.3	13.1	-0.9

1. Simple averages of the countries with data in 1975. These countries are Austria, Belgium, Finland, France, Germany, Italy, Spain, Sweden and the United Kingdom.
2. Simple averages of the countries with data in 1975. In addition to the EU countries listed above, these countries are Australia, Canada, Japan, Korea, Norway, Switzerland and the United States.

Source: OECD, *Revenue Statistics and National Accounts*.

Figure 1. Tax ratios on labour and capital income and on consumption  
 OECD average,<sup>1</sup> per cent



1. Simple averages of the countries with data in 1975. These countries are: Austria, Australia, Belgium, Canada, Finland, France, Germany, Italy, Japan, Korea, Norway, Spain, Sweden, Switzerland, the United Kingdom and the United States.

Source: OECD, *Revenue Statistics and National Accounts*.

marked in Japan, where the percentage point increase in the capital income tax ratio was twice that in the labour income tax ratio. By contrast, the tax burden shifted from capital to labour in the United States in absolute terms and in EU countries in relative terms, with the shift in the United States being particularly marked.

A problem with using capital income tax ratios based on net operating surplus to make cross-country comparisons is that charges for depreciation of fixed assets in countries' national accounts vary a great deal from one country to another. This variation is mainly attributable to assumed differences in service lives, which are often based on very old studies of tax lives<sup>24</sup> and are implausibly large. One way of circumventing this problem is to focus on capital income tax ratios based on gross operating surplus for such purposes. On this basis, the increase in the capital income tax ratio in OECD countries was 3.7 percentage points, similar to the increases in the EU and Japan but much higher than in the United States, where the capital income tax ratio fell. These movements brought the capital income tax ratios (based on gross operating surplus) more or less into line in the United States, Japan and the EU at 27-29 per cent. The distribution of capital income tax ratios also narrowed for the group of OECD countries for which full data sets are available.

Labour income and consumption tax ratios are well below the OECD average in the United States and Japan and higher in the EU. The distribution of labour income and consumption tax ratios in OECD countries for which full data sets are available has remained broadly unchanged over the past quarter century. In EU countries, by contrast, the distribution of labour income tax ratios has widened and that of consumption tax ratios has narrowed.

There are a number of caveats to bear in mind when comparing tax ratios across countries. One is that estimates of labour income tax ratios are influenced by the extent to which countries rely on private rather than public arrangements for the provision of retirement income. This is because contributions to private schemes, even if they are compulsory, are (rightly) not considered to be taxes whereas contributions to public schemes are considered to be taxes. Similarly, predominantly private health insurance arrangements (as in the United States) tend to reduce the labour income tax ratio compared with countries with predominantly social health insurance arrangements. As for the retirement income financing arrangements, this does not mean, however, that cross-country comparisons are false. It just means that readers should be aware that differences in labour income tax ratios may reflect to a considerable extent differences in social insurance coverage. By contrast, cross-country comparisons of capital income tax ratios will be distorted if public enterprises are subject to corporate tax in some countries but not in others (the government taking its share of earnings in the form of higher dividends).<sup>25</sup> It should also be noted that tax ratios on both labour and capital income are somewhat overstated in countries that levy taxes and/or social security contributions on most social security benefits. Such levies are particularly high in Denmark, Finland, the Netherlands and Sweden (Adema, 2001, pp. 27-28); this increases the numerator of the household income tax ratio without affecting the denominator. The effect on the estimates of adjusting for this factor in 1997 (the only year for which data are available) are examined below.

### **Differences from the Mendoza approach**

Capital income tax ratios are higher in the revised approach than in the Mendoza approach. This is especially so in the EU, where this difference (based on net operating surplus) reaches 10 percentage points in 1990-2000. The difference reflects the wider range of taxes taken into account in the revised estimates, including social security contributions of the self-employed (which are larger in EU countries), and, in EU countries, the deduction of payroll taxes from operating surplus in the denominator.<sup>26</sup> These differences are considerably smaller when the tax base is gross operating surplus – as the tax base is bigger, differences in tax revenues are less amplified. The distribution of capital income tax ratios (based on both gross and net operating surplus) has narrowed more using the revised approach than the Mendoza approach, especially for EU countries.

Labour income tax ratios based on the revised approach are somewhat lower than in the Mendoza approach. This reflects the facts that part of social security contributions (2300 and part of 2400) is no longer allocated to labour and that the tax base is wider, including employer contributions to private pension schemes and payroll taxes. These changes do not, however, affect the ranking of labour income tax ratios – they remain much higher in EU countries than in the United States or Japan. While there is no change in the distribution of labour tax ratios for OECD countries in both sets of estimates, there is a widening in the distribution for EU countries in the revised estimates that is not present in the estimates based on the Mendoza approach.

Consumption tax ratios are lower in the revised method, despite a wider range of indirect taxes being included. This is because the base is expressed in gross terms (*i.e.* including indirect taxes). Consumption taxes continue to be much higher in the EU than in the US or Japan, although the difference is somewhat less marked than in the Mendoza approach.

Whereas there is a relative shift in the tax burden in OECD countries from labour to capital (based on net operating surplus) in the revised approach, the opposite occurs in the Mendoza approach. The relative shift in the tax burden from labour to capital in Japan is much stronger in the revised approach than in the Mendoza approach but somewhat weaker in EU countries. In the United States, the absolute shift in the tax burden from capital to labour is somewhat weaker in the revised approach than in the Mendoza approach.

Despite these differences, tax ratios in the revised approach are highly correlated with those based on the Mendoza approach in the majority of cases, suggesting that many empirical results would not be affected by the choice of approach (Table 3). There are, however, a number of exceptions to this rule: approximately 10 per cent of the correlation coefficients are less than 0.8.

### **Relations with variables of interest**

The revised labour tax ratios are inversely correlated across countries with hours worked per member of the working age population (Figure 2). Results are similar when the tax burden on labour is measured using the combined tax ratio on labour income and consumption expenditures.<sup>27</sup> Denmark, Finland and Sweden, which have the highest labour income tax ratios, stand out for having higher hours worked per member of the working-age population than would be predicted on the basis of this relationship. This may reflect favourable childcare arrangements, which would help to compensate for the effects of high labour taxation by facilitating female labour force participation. By contrast, neither labour income nor combined labour and consumption tax ratios are significantly related to structural unemployment.<sup>28</sup> This is what would be expected if real wage rates are flexible in the

Table 3. Correlation between Mendoza and revised approaches<sup>1</sup>  
1975-2000<sup>2</sup>

	Capital based on net operating surplus	Capital based on gross operating surplus	Labour	Consumption	Combined labour and consumption
United States	0.99	0.99	0.98	0.94	0.98
Japan	0.98	0.99	1.00	0.82	1.00
Germany <sup>3</sup>	0.96	0.96	0.98	0.97	0.99
France	0.92	0.92	1.00	0.95	1.00
Italy	0.98	0.98	0.99	0.99	0.99
United Kingdom	0.97	0.98	0.98	0.98	0.98
Canada	0.99	0.99	1.00	<b>0.09</b>	0.98
Australia	0.98	0.99	1.00	0.94	0.98
Austria	<b>0.77</b>	0.87	0.99	0.95	0.98
Belgium	0.99	0.98	1.00	0.88	0.99
Czech Republic <sup>4</sup>	0.99	0.99	<b>0.49</b>	<b>0.81</b>	<b>0.69</b>
Denmark	0.98	0.97	1.00	1.00	0.99
Finland	1.00	0.99	1.00	1.00	0.99
Greece	1.00	1.00	0.99	0.86	1.00
Hungary	..	0.93	..	<b>-0.78</b>	..
Ireland	0.97	..	1.00	0.97	0.99
Korea	1.00	1.00	1.00	<b>0.31</b>	0.96
Netherlands	<b>0.79</b>	<b>0.70</b>	0.97	0.98	0.96
New Zealand	0.96	..	0.98	0.93	0.99
Norway	0.90	0.95	0.91	0.98	0.96
Poland	..	0.93	..	0.80	..
Portugal <sup>5</sup>	0.98	0.96	<b>0.42</b>	0.92	0.95
Spain	0.98	0.98	0.94	0.98	0.98
Sweden	0.92	0.91	0.97	0.96	0.98
Switzerland	0.97	0.90	<b>-0.18</b>	0.96	<b>0.17</b>

1. Correlation coefficients less than 0.8 are bolded.

2. Czech Republic: 1993-2000; Denmark: 1998-2000; Ireland: 1977-2000; Greece: 1990-2000; Hungary: 1995-2000; Poland: 1991-2000; Netherlands: 1990-2000; New Zealand and Portugal: 1990-2000.

3. West Germany before 1991.

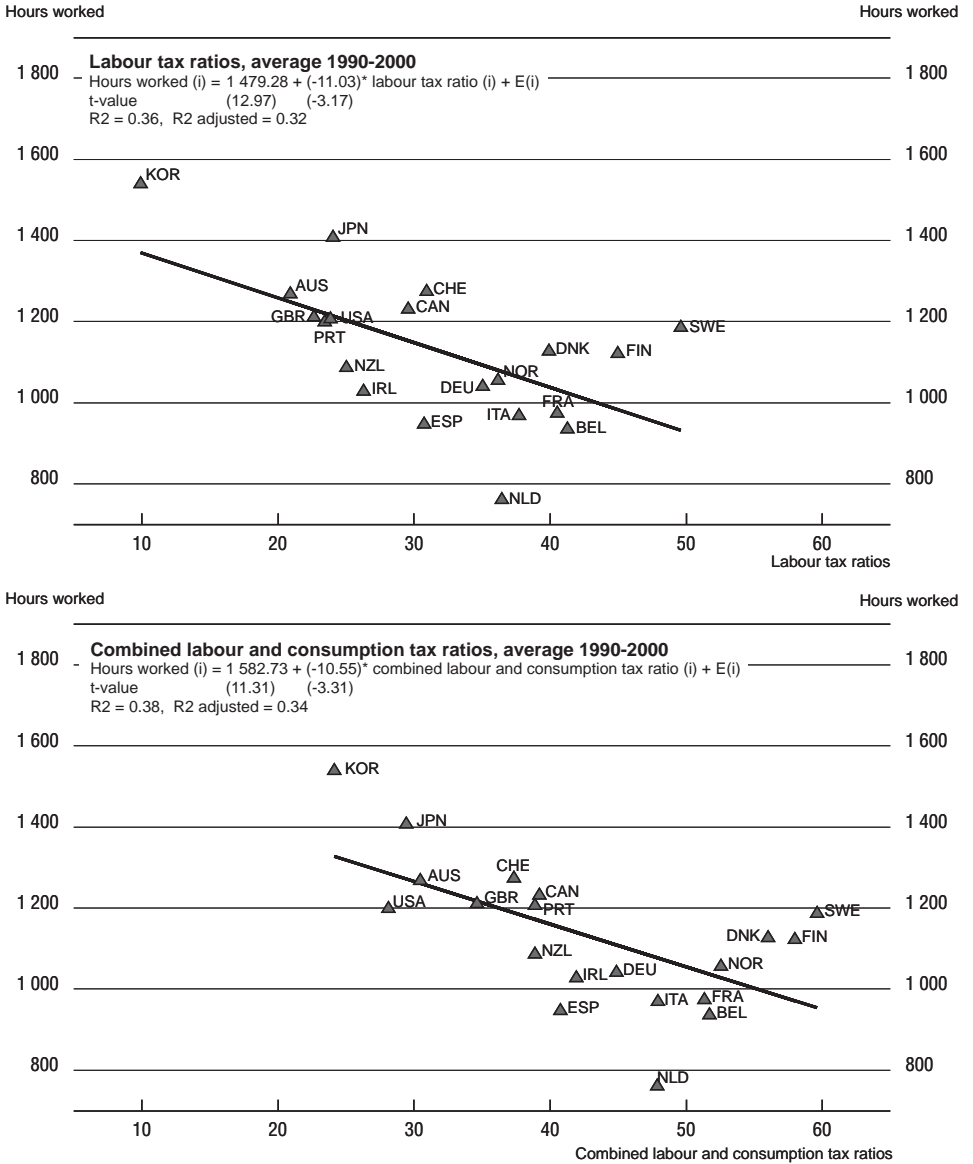
4. It is assumed that the tax ratio on capital in 2000 is the same as in 1999.

5. It is assumed that the tax ratios on capital in 1999 and 2000 are the same as in 1998.

Source: OECD, *Revenue Statistics and National Accounts*.

long run. Similarly, capital income tax ratios are not significantly related to either investment rates (business sector investment/GDP) or private saving rates (private saving/GDP).<sup>29</sup> This could reflect high international capital mobility in OECD countries, which weakens the link between domestic saving and investment. In these circumstances, taxes that discourage household saving may not have much effect on investment because the decline in household saving would tend to raise gross investment returns, attracting foreign capital and so driving rates of return back towards the level in world capital markets. Similarly, taxes that discourage

Figure 2. Labour tax ratios and hours worked<sup>1</sup>  
Per cent



1. Hours worked per member of the working age population.  
 Source: OECD, Revenue Statistics and National Accounts.



domestic investment need not reduce domestic saving if gross rates of return are determined in world capital markets. Capital income tax ratios that distinguished between taxes on returns from domestic savings and on returns from domestic investment would be more suited to assessing the effects of taxation on investment and savings decisions.

## EFFECTS OF MODIFYING CERTAIN ASSUMPTIONS

There are a number of other adjustments to the tax ratio equations that could be made to obtain more realistic estimates. These relate to accounting for self-employed income (it is not all capital income, as assumed above), taxes on government transfer payments and preferential tax treatment for household capital income. Unfortunately, such changes cannot be made systematically owing to a lack of data for certain countries and/or periods. This section assesses the extent to which the inability to make these adjustments in most cases matters by estimating the impact on the revised estimates, henceforth referred to as the baseline, of making these adjustments whenever possible.

### Dividing self-employed income into capital and labour components

Self-employed income does not fit neatly into either of the available categories – labour or capital income – in the above estimates. It does not entirely consist of capital income, as assumed above, but rather contains elements of both labour- and capital income. Unfortunately, SNA data do not provide a breakdown of self-employed income into these two categories. One approach to making such a breakdown is to assign this income flow to both labour and capital. Making such an assignment is inherently difficult and could be done in a number of ways. The approach adopted here is to assume that the self-employed “pay themselves” the same annual salary net of social security contributions (WSE) as that earned by the average employee [wages and salaries of dependent employment (W) minus employees’ social security contributions (2100), all divided by dependent employment (EE)] (Table 4).<sup>30</sup> The product of this imputed wage rate and the number of self-employed (ES) gives the imputed “wage bill” for the self-employed (WSE), excluding social security payments. This estimate of self-employed labour income is then used to calculate a labour income tax ratio that includes self-employed labour income and a capital income tax ratio that excludes such income.

This adjustment substantially raises the capital income tax ratio (the average increase is 15 percentage points in OECD countries) and slightly reduces the labour income tax ratio (the average reduction is 1 percentage point) in most countries (Table 5). The increase in the capital income tax ratio between 1975-80 and 1990-2000 is smaller than in the baseline in most countries (2 percentage

Table 4. **Dividing self-employed income into labour and capital components**  
Modified tax ratios

Social security contributions not deductible	Social security contributions deductible
$WSE = ES * (W - 2100)/EE$ $\alpha = (W + WSE)/(OSPUE + PEI + W)$	$WSE = ES * (W - 2100)/EE$ $\alpha = (W - 2100 + WSE - 2300)/(OSPUE + PEI + W - 2100 - 2300)$
$\tau_l = (\tau_h * (W + WSE) + 2100 + 2200 + 2300 + \alpha * 2400 + 3000)/(WSSS + WSE + 2300 + 3000)$ $\tau_k = [\tau_h * (OSPUE + PEI - WSE) + 1200 + \beta * 2400 + 4000]/(OS - WSE - 2300 - 3000)$	$\tau_l = (\tau_h * (W - 2100 + WSE - 2300 - \alpha * 2400) + 2100 + 2200 + 2300 + \alpha * 2400 + 3000)/(WSSS + WSE + 2300 + 3000)$ $\tau_k = [\tau_h * (OSPUE + PEI - WSE - \beta * 2400) + 1200 + \beta * 2400 + 4000]/(OS - WSE - 2300 - 3000)$
<i>Source:</i> OECD.	

points less, on average) while that in the labour income tax ratio is broadly unchanged. With these changes, the conclusions that there was a relative shift in the tax burden from labour to capital on average in OECD countries and in Japan over the past quarter century are reversed. Moreover, the relative shift in the tax burden towards labour in EU countries<sup>31</sup> on average and the absolute shift in the United States are stronger than in the baseline estimates. Nevertheless, the adjusted and baseline series are highly correlated in almost all countries for labour income tax ratios and in most countries (the correlation coefficient is 0.8 or more in 78 per cent of countries) for capital income tax ratios. There are, however, a number of exceptions to this conclusion: the adjusted and baseline capital income tax ratios are not highly correlated in Japan, France, Australia, Austria and Ireland while the labour income tax ratios are not highly correlated in the Czech Republic.

A weakness of this approach is that it may not accurately reflect the split of self-employed income into labour- and capital income components. There is a great variety of labour and capital income components for self-employed persons. At one extreme, the capital input can be almost zero (*e.g.* an opera singer) while at the other it can be very high (*e.g.* a farmer) (Directorate-General of the European Commission, 1998). It is not obvious that an assumption that self-employed persons pay themselves the average wage accurately reflects the average labour income for the self employed – it certainly doesn't for the two extreme cases cited.

### Separating self-employed income from labour- and capital income

In view of the difficulties in decomposing self-employed income into labour and capital components, the alternative of abstracting from taxes on such income

Table 5. Effect of dividing self-employed income into labour- and capital components  
 1975-2000

	Labour income tax ratio			Capital income tax ratio <sup>1</sup>		
	Change in average level <sup>2</sup>	Difference in change between 1975-80 and 1990-2000	Correlation coefficient <sup>3</sup>	Change in average level <sup>2</sup>	Difference in change between 1975-80 and 1990-2000	Correlation coefficient <sup>3</sup>
United States	-0.19	0.16	1.00	4.82	-3.39	0.94
Japan	-1.36	0.58	1.00	50.30	-33.03	<b>-0.48</b>
Germany	-1.01	0.76	0.99	4.46	-4.98	0.93
France	-1.17	1.28	1.00	2.11	-12.30	<b>0.58</b>
Italy	-3.45	-0.16	1.00	12.75	1.38	0.90
United Kingdom	-0.67	-0.32	1.00	21.86	2.21	0.94
Canada	-0.75	-0.50	1.00	17.32	17.49	0.98
Australia	-0.44	-0.11	1.00	21.84	-9.70	<b>0.65</b>
Austria	-2.63	..	1.00	51.76	..	<b>-0.27</b>
Belgium	-1.28	-0.51	1.00	13.29	-4.19	0.88
Czech Republic <sup>4</sup>	-0.87	..	<b>0.77</b>	2.78	..	1.00
Denmark	0.00	..	1.00	21.61	..	0.97
Finland	-1.00	-0.07	1.00	12.07	4.55	0.93
Greece	-9.09	..	0.99	4.09	..	1.00
Hungary	..	..	..	..	..	..
Ireland	-1.65	..	1.00	8.57	..	<b>0.72</b>
Korea	..	..	..	..	..	..
Netherlands	0.96	..	1.00	2.21	..	0.96
New Zealand	0.18	..	1.00	9.43	..	0.96
Norway	-1.08	0.71	0.94	0.05	1.92	0.98
Poland	..	..	..	..	..	..
Portugal <sup>5</sup>	-2.39	..	0.98	21.52	..	0.97
Spain	-3.70	2.41	0.96	9.87	-3.80	0.93
Sweden	-0.70	-0.25	1.00	16.84	-21.50	0.88
Switzerland	-0.36	-1.43	0.98	20.34	39.67	0.89
Average <sup>6</sup>	-1.48	0.18		14.99	-1.83	

1. Based on net operating surplus.

2. Compared with the revised approach baseline, percentage points.

3. Correlation coefficients less than 0.8 are bolded.

4. It is assumed that the capital income tax ratio in 2000 is the same as in 1999.

5. It is assumed that the capital income tax ratios in 1999 and 2000 are the same as in 1998.

6. Simple average.

Source: OECD, *Revenue Statistics and National Accounts*.

altogether in the labour and capital income tax ratios has been followed in some studies (Directorate-General of the European Commission, 1998; Volkerink and de Haan, 2001). As no data are available in OECD *Revenue Statistics* on household income taxes paid on self-employed income, they must be estimated. Following the general approach above, this can be done by assuming that taxes are paid on such income in proportion to its share in household income. Putting this adjustment into

Table 6. **Separating self employed income from labour and capital income**  
Modified tax ratios

Social security contributions not deductible	Social security contributions deductible
$\gamma = PEI / (OSPUE + PEI + W)$ $\delta = 1 - \alpha - \gamma$ $\tau_k = [\tau_h * PEI + 1200 + \gamma * 2400 + 4000 + 5125 + 5212 + 6100] / (OS - 3000 - OSPUE)$ $\tau_s = [\tau_h * OSPUE + 2300 + \delta * 2400] / OSPUE$	$\gamma = PEI / (OSPUE + PEI + W - 2100 - 2300)$ $\delta = 1 - \alpha - \gamma$ $\tau_k = [\tau_h * (PEI - \gamma * 2400) + 1200 + \gamma * 2400 + 4000 + 5125 + 5212 + 6100] / (OS - 3000 - OSPUE)$ $\tau_s = [\tau_h * (OSPUE - 2300 - \delta * 2400) + 2300 + \delta * 2400] / OSPUE$
<i>Source:</i> OECD.	

effect entails only allocating to capital the share of household income taxes relating to “interest, dividends and investment receipts” (PEI) (Table 6). The share of PEI in household income ( $\gamma$ ) must also be calculated so as to allocate unallocated social security contributions (2400) to labour and (pure) capital income.

This adjustment, which can only be made for most countries in the 1990s, does not affect the labour income tax ratio but has a large positive effect (28 percentage points, on average) on the capital income tax ratio in many countries (Table 7). Differences from the baseline capital income tax ratios tend to be greater than for the previous adjustment. Of the countries for which data are available to make the adjustment since 1975, it reinforces the shift in the tax burden from capital to labour in the United States and Norway between 1975-80 and 1990-2000 and strengthens the opposite (relative) shift in Finland and Korea. The adjustment also reverses the relative shift in the tax burden (from labour to capital) in Australia. The adjusted and baseline capital income tax ratios are highly correlated in most countries (the correlation coefficient is 0.8 or more in 78 per cent of countries); the exceptions are France, Australia, Austria, Ireland and Switzerland.

### Excluding tax on government interest (transfer) payments

Government interest payments are transfers, not distributions of earnings on the factor of production capital. As such, taxes on government interest payments should be excluded from the calculations.<sup>32</sup> This can be done by deducting an estimate of residents’ government interest receipts (YPEPG) from household capital income in the numerator of the capital income tax ratio: in this way, the part of household income taxes relating to government interest receipts is not allocated (Table 8). It is also necessary to deduct non-resident withholding taxes on government interest payments from corporate tax receipts (I200) in the numerator of the capital income tax ratio.<sup>33</sup> The non-resident withholding tax rate ( $t_{NRW}$ ) used in

Table 7. **Effect of separating self-employment income from labour and capital income**  
1975-2000

	Capital income tax ratio <sup>1</sup>		
	Change in average level <sup>2</sup>	Difference in change between 1975-80 and 1990-2000	Correlation coefficient <sup>3</sup>
United States	8.98	-4.68	0.95
Japan	28.14	16.54	0.82
Germany	22.60	..	0.90
France	110.92	..	<b>0.21</b>
Italy	20.98	..	0.98
United Kingdom	29.98	..	0.89
Canada	13.48	..	0.99
Australia	39.55	-12.83	<b>0.58</b>
Austria	27.41	..	<b>0.69</b>
Belgium	30.48	..	0.87
Czech Republic <sup>4</sup>	14.77	..	1.00
Denmark	44.68	..	0.95
Finland	23.56	2.65	0.89
Greece	41.50	..	0.99
Hungary	..	..	..
Ireland	8.97	..	<b>0.66</b>
Korea	24.16	6.67	0.92
Netherlands	7.13	..	0.93
New Zealand	12.10	..	0.96
Norway	16.83	-12.23	0.92
Poland	..	..	..
Portugal <sup>5</sup>	24.81	..	1.00
Spain	23.93	..	0.97
Sweden	48.64	..	0.98
Switzerland	28.29	..	<b>0.62</b>
Average <sup>6</sup>	28.34	-0.64	

1. Based on net operating surplus.  
2. Compared with the revised approach baseline, percentage points.  
3. Correlation coefficients less than 0.8 are bolded.  
4. It is assumed that the capital income tax ratio in 2000 is the same as in 1999.  
5. It is assumed that the capital income tax ratio in 1999 and 2000 are the same as in 1998.  
6. Simple average.

Source: OECD, *Revenue Statistics and National Accounts*.

each country to make this calculation is the modal rate.<sup>34</sup> A difficulty in making this adjustment is that there are no data in most countries on non-residents' share of government interest payments. Based on such evidence for Australia and New Zealand, it is assumed that the non-resident share of government bond holdings is one-third.

This adjustment does not affect the labour income tax ratio and in general only reduces capital income tax ratios by a small amount (3 percentage points, on

Table 8. **Excluding tax on government interest payments**  
Modified tax ratios

Social security contributions not deductible	Social security contributions deductible
$\tau_k = [\tau_h * (OSPUE + PEI - 0.67 * YPEPG) + 1200 + 2300 + \beta * 2400 - 0.33 * YPEPG * \tau_{NRW} + 4000 + 5125 + 5212 + 6100]/(OS - 3000)$	$\tau_k = [\tau_h * (OSPUE + PEI - 2300 - \beta * 2400 - 0.67 * YPEPG) + 1200 + 2300 + \beta * 2400 - 0.33 * YPEPG * \tau_{NRW} + 4000 + 5125 + 5212 + 6100]/(OS - 3000)$
<i>Source:</i> OECD.	

average) (Table 9). However, the adjustment has a quite a large effect on capital income tax ratios in Denmark, Sweden and Belgium, where government interest payments have been substantial. The adjustment reinforces the relative shift in the tax burden from capital to labour in EU countries<sup>35</sup> between 1975-80 and 1990-2000 but reverses the relative shift (from labour to capital) in OECD countries.<sup>36</sup> Nevertheless, the correlation between this and the baseline series is high for all countries; even in Belgium and Ireland, where there have been large changes in public debt interest payments over the past quarter century, the correlation coefficient is over 0.80.

### Excluding direct taxes and social security contributions on government benefit (transfer) payments

Government benefit payments are also transfers, not factor incomes. Accordingly, direct taxes and social security contributions paid on them should also be excluded from the tax ratio calculations. This can be done by deducting direct taxes on social security benefits (DTB) from household income taxes (1100) in the numerator of the household income tax ratio and by deducting social security contributions levied on social security benefits (SSCB) from the numerator of the labour income tax ratio (Table 10). Estimates of these taxes and social security contributions come from Adema (2001) and are only available for 1997.<sup>37</sup> The modified equations are as follows:<sup>38</sup>

Adjusting for direct taxes and social security contributions on government benefit payments reduces both labour and capital income tax ratios, with the decline in the former (3 percentage points, on average) being greater than that in the latter (1 percentage point, on average) (Table 11). The decline in labour income tax ratios is particularly large in the Netherlands, Denmark, Finland and Sweden where such tax revenues are important. (Indeed, taking this factor into account, the labour income tax ratio in the Netherlands is actually well below the OECD average, not above it). The effect of the adjustment on the capital income

Table 9. **Effect of excluding tax on government interest payments**  
1975-2000

	Capital income tax ratio <sup>1</sup>		
	Change in average level <sup>2</sup>	Difference in change between 1975-80 and 1990-2000	Correlation coefficient
United States	-1.78	-0.79	0.99
Japan	-1.41	-1.08	1.00
Germany	-1.35	-0.75	0.99
France	-0.97	-1.02	1.00
Italy	-3.23	-3.40	1.00
United Kingdom	-2.32	1.67	1.00
Canada	-6.73	-5.81	0.97
Australia	-2.52	-0.31	0.99
Austria	-2.23	-1.38	0.99
Belgium	-8.18	-3.52	0.87
Czech Republic <sup>3</sup>	-0.43	..	1.00
Denmark	-10.67	..	0.99
Finland	-2.30	-3.04	0.99
Greece	-0.96	..	1.00
Hungary	..	..	..
Ireland	-2.51	..	0.86
Korea	-0.09	-0.05	1.00
Netherlands	-2.77	..	0.91
New Zealand	-3.40	..	0.87
Norway	-1.89	0.06	1.00
Poland	..	..	..
Portugal <sup>4</sup>	-2.65	..	0.99
Spain	-0.95	-1.56	1.00
Sweden	-9.06	-3.48	0.99
Switzerland	-1.48	-0.39	1.00
Average <sup>5</sup>	-3.04	-1.55	

1. Based on net operating surplus.
2. Compared with the revised approach baseline, percentage points.
3. It is assumed that the capital income tax ratio in 2000 is the same as in 1999.
4. It is assumed that the capital income tax ratios in 1999 and 2000 are the same as in 1998.
5. Simple average.

Source: OECD, *Revenue Statistics and National Accounts*.

tax ratio is much smaller than on the labour income tax ratio in countries, such as the Netherlands, where most taxes on social security benefits take the form of social security contributions. Unfortunately, no data are available to calculate the effect of this adjustment over time. There is a risk that such taxes and contributions have increased over time, exaggerating the increase in tax ratios, notably for labour income, in the countries where these taxes had a large impact in 1997.

Table 10. **Excluding direct tax and social security contributions on public social benefits**  
Modified tax ratios

Social security contributions not deductible	Social security contributions deductible
$\tau_h = (1100 - DTB)/(OSPUE + PEI + W)$	$\tau_h = (1100 - DTB)/(OSPUE + PEI + W - 2100 - 2300 - 2400)$
$\tau_l = (\tau_h * W + 2100 + 2200 + \alpha * 2400 + 3000 - SSCB)/(WSSS + 3000)$	$\tau_l = (\tau_h * (W - 2100 - \alpha * 2400) + 2100 + 2200 + \alpha * 2400 + 3000 - SSCB)/(WSSS + 3000)$
<i>Source:</i> OECD.	

Table 11. **Effect of excluding direct tax and social security contributions on public social benefits, 1997**  
Per cent

	Tax ratios		Change in level <sup>1</sup>	
	Labour	Capital <sup>2</sup>	Labour	Capital <sup>2</sup>
United States	23.7	38.5	-0.54	-0.26
Japan	24.2	49.7	-0.33	-0.10
Germany	33.5	32.5	-2.03	-0.36
Italy	38.0	40.8	-4.05	-2.63
United Kingdom	21.3	50.8	-0.53	-0.34
Canada	27.9	59.4	-2.45	-1.33
Australia	21.9	47.5	-0.41	-0.33
Austria	38.0	46.3	-3.89	-0.45
Belgium	39.4	52.5	-2.41	-1.67
Czech Republic	41.2	34.2	0.00	0.00
Denmark	34.6	64.8	-6.79	-4.44
Finland	39.8	40.1	-6.20	-3.48
Ireland	25.7	23.0	-0.47	-0.17
Korea	11.6	23.0	0.00	0.00
Netherlands	27.7	51.0	-7.44	-0.63
New Zealand	21.8	40.4	-2.52	-2.21
Norway	32.5	38.1	-4.06	-1.41
Sweden	46.1	57.1	-5.46	-5.12
Average <sup>3</sup>	30.5	43.9	-2.75	-1.39

1. Compared with the revised approach baseline, percentage points.

2. Based on net operating surplus.

3. Simple average.

*Source:* OECD, *Revenue Statistics and National Accounts* and Adema (2001).



**Allowing for preferential tax treatment of household capital income<sup>39</sup>**

Households pay lower tax rates on many forms of capital income than on labour income, contrary to the assumption underlying the standard tax ratio methodology that all household income is taxed at the same rate. Earnings on investments of pension funds and life insurance and imputed rentals on owner-occupied dwellings are usually not taxed at all, there is widespread relief from the double taxation of dividends and interest receipts are often taxed at a low rate. Each of these cases is examined in the remainder of this section for 1994-2000,<sup>40</sup> along with the effects of allowing for all of them at once.

**Excluding property income attributable to members of pension funds and life insurance policy holders from household income**

Earnings (excluding capital gains, which are not income in the SNA) on the investments of pension funds and life insurance policies (PIAPH) are imputed to their beneficial owners in SNA. They are included in the category of household income entitled "interest, dividends and investment income" (PEI). However, households do not pay tax on such earnings;<sup>41</sup> in the rare cases<sup>42</sup> where tax is levied on such earnings, it is paid by the pension fund or insurance company and as such, is included in corporate taxes (1200).<sup>43</sup> Accordingly, PIAPH should be deducted from the household income series used to allocate personal income taxes and unallocated social security contributions to labour and capital income (Table 12).

This adjustment results in a small decline in the capital income tax ratio (2 percentage points, on average) and a small increase (1 percentage point, on average) in the labour income tax ratio (Table 13). Although it is not possible to calculate the adjusted series before 1994, owing to a lack of information on tax systems, the impact of the adjustment over 1994-2000 generally seems to be too small to have much effect on shifts in the tax burden over the past quarter century. In addition,

Table 12. **Excluding pension fund and life insurance earnings from household income**  
Modified tax ratios

Social security contributions not deductible	Social security contributions deductible
$\alpha = W / (OSPUE + PEI - PIAPH + W)$	$\alpha = (W - 2100) / (OSPUE + PEI - PIAPH + W - 2100 - 2300)$
$\tau_h = 1100 / (OSPUE + PEI - PIAPH + W)$	$\tau_h = 1100 / (OSPUE + PEI - PIAPH + W - 2100 - 2300 - 2400)$
$\tau_k = [\tau_h * (OSPUE + PEI - PIAPH) + 1200 + 2300 + \beta * 2400 + 4000 + 5125 + 5212 + 6100] / (OS - 3000)$	$\tau_k = [\tau_h * (OSPUE + PEI - PIAPH - 2300 - \beta * 2400) + 1200 + 2300 + \beta * 2400 + 4000 + 5125 + 5212 + 6100] / (OS - 3000)$

Source: OECD.

Table 13. **Effect of excluding pension fund and life insurance earnings from household income<sup>1</sup>**  
1994-2000

	Labour income tax ratio		Capital income tax ratio <sup>2</sup>	
	Change in average level <sup>3</sup>	Correlation coefficient	Change in average level <sup>3</sup>	Correlation coefficient
United States	0.69	1.00	-1.66	1.00
Japan	0.32	1.00	-0.90	1.00
Germany	0.33	1.00	-0.87	1.00
France	0.33	0.87	-0.93	1.00
Italy	0.15	1.00	-0.19	1.00
United Kingdom	1.16	1.00	-2.96	1.00
Austria	0.27	1.00	-0.85	1.00
Belgium	0.46	0.99	-1.06	1.00
Denmark	1.97	1.00	-6.59	1.00
Finland	0.39	1.00	-0.87	1.00
Netherlands	1.61	1.00	-3.53	0.97
Portugal	0.09	1.00	-0.19	1.00
Spain	0.17	1.00	-0.31	1.00
Sweden	1.23	1.00	-4.73	1.00
Average <sup>4</sup>	0.66		-1.83	

1. This adjustment is required for all countries but can only be made for the countries shown owing to data availability.

2. Based on net operating surplus.

3. Compared with the revised approach baseline, percentage points.

4. Simple average.

Source: OECD, *Revenue Statistics and National Accounts*.

adjusted and baseline labour and capital income tax ratios are highly correlated for all countries. These results suggest that not making this adjustment is unlikely to matter for empirical results in most countries.

### ***Non-taxation of imputed rentals on owner-occupied housing***

Another form of household income that is often not taxed is imputed rental income on owner occupied housing net of expenses (IROOHN). In countries where IROOHN is not taxed,<sup>44</sup> it should be removed from the household income series used to allocate personal income taxes and unallocated social security contributions to labour and capital income (Table 14).<sup>45</sup>

Adjusting for the non-taxation of imputed rentals on owner-occupied housing reduces the capital income tax ratio (by 4 percentage points, on average) and causes a small increase in the labour income tax ratio (by 1 percentage point, on average) (Table 15). The effect of this adjustment is quite large on capital income tax ratios in Finland, Canada and Australia. It could alter conclusions about shifts in the tax burden in these countries if the effect of the adjustment had been very

Table 14. Non-taxation of imputed rentals on owner-occupied housing

Deductibility of social security contributions/Countries	Modified tax ratios
<b>Not deductible</b> Australia, Canada, Portugal, United Kingdom, United States	$\alpha = W / (\text{OSPUE} + \text{PEI} + W - \text{IROOHN})$ $\tau_h = 1100 / (\text{OSPUE} + \text{PEI} + W - \text{IROOHN})$ $\tau_k = [\tau_h * (\text{OSPUE} + \text{PEI} - \text{IROOHN}) + 2300 + \beta * 2400 + 1200 + 4000 + 5125 + 5212 + 6100] / (\text{OS} - 3000)$
<b>Deductible</b> Austria, Finland, France, Germany, Italy (1995-98), Spain (1999-2000)	$\alpha = (W - 2100) / (\text{OSPUE} + \text{PEI} + W - 2100 - 2300 - \text{IROOHN})$ $\tau_h = 1100 / (\text{OSPUE} + \text{PEI} + W - 2100 - 2300 - \text{IROOHN})$ $\tau_k = [\tau_h * (\text{OSPUE} + \text{PEI} - 2300 - \text{IROOHN}) + 2300 + \beta * 2400 + 1200 + 4000 + 5125 + 5212 + 6100] / (\text{OS} - 3000)$

Source: OECD.

Table 15. Effect of adjusting for non-taxation of imputed rental on owner occupied housing<sup>1</sup>  
1994-2000

	Labour income tax ratio		Capital income tax ratio <sup>2</sup>	
	Change in average level <sup>3</sup>	Correlation coefficient <sup>4</sup>	Change in average level <sup>3</sup>	Correlation coefficient <sup>4</sup>
United States	0.29	1.00	-0.70	1.00
Germany	0.86	1.00	-2.28	1.00
France	1.11	<b>0.30</b>	-3.11	1.00
Italy	1.15	1.00	-1.48	1.00
United Kingdom	1.01	1.00	-2.59	1.00
Canada	2.99	0.99	-7.77	0.99
Australia	2.35	1.00	-5.08	1.00
Austria	1.04	0.99	-3.30	0.99
Finland	4.01	1.00	-9.08	0.96
Portugal	0.46	0.88	-0.83	1.00
Spain	0.93	..	-2.43	..
Average <sup>5</sup>	1.47		-3.51	

1. This adjustment cannot be made in the Czech Republic (1998-2000), Hungary, Iceland (1999-2000), Ireland, Luxembourg (1994-97), Mexico and New Zealand owing to a lack of data.
2. Based on net operating surplus.
3. Compared with the revised approach baseline, percentage points.
4. Correlation coefficients less than 0.8 are bolded.
5. Simple average.

Source: OECD, Revenue Statistics and National Accounts.

small in the late 1970s. The correlation coefficient for the adjusted and baseline tax ratios is high in all cases except for the labour income tax ratio in France. These results may be influenced by different methods of assessing imputed rentals in the national accounts in different countries. For example, the methods adopted in Spain, the United Kingdom and Italy appear to yield lower imputed rentals (adjusted for the proportion of households that are owner-occupiers) than do the methods followed in Canada, France and Germany.

These estimates understate the effect on tax ratios of not taxing imputed rentals in countries where owner-occupiers' housing-related interest expenses are nevertheless deductible.<sup>46</sup> This is because gross (as opposed to net) imputed rentals would need to be deducted from household property income in the equations to allocate household taxes (1100) and unallocated social security contributions (2400) in these countries. Such an adjustment would increase labour income tax ratios and reduce capital income tax ratios by more than in the above calculations. Unfortunately, such an adjustment cannot be made owing to a lack of data on owner-occupiers' housing related interest expenses.

### ***Relief from double taxation of dividends received by resident individuals***

Another form of household income that is often taxed at low rates is dividends (D). Most countries provide relief to residents from double taxation of dividends, either through dividend imputation and/or low flat rate tax systems.<sup>47</sup> In countries with global income tax systems, this can be adjusted for by adding back the tax saving from the imputation-related rate reduction ( $t_{IR}$ ) to household income tax receipts in the household income tax ratio and by deducting this tax saving from capital income taxes in the capital income tax ratio (Table 16).<sup>48</sup>

The imputation-related rate reduction ( $t_{IR}$ ) is calculated as the difference between the normal household tax ratio ( $\tau_{h*}$ ) and the actual tax rate paid by households on dividends ( $t_d$ ). The latter ( $t_d$ ) is calculated as the difference between the normal household tax ratio and the imputation credit rate ( $t_{cr}$ ), all grossed up (by  $t_{cr}$ , the rate used to gross up dividends). This gives the following equations:<sup>49</sup>

$$t_d = (\tau_{h*} - t_{cr}) / (1 - t_{cr}) \quad (1)$$

$$t_{IR} = (\tau_{h*} - t_d) \quad (2)$$

Countries' imputation credit rates ( $t_{cr}$ ) are shown in Table 17.

In countries with scheduler tax systems, dividends are taxed at a different (generally lower) rate than other household income. This can be adjusted for by removing dividend income (D) from household income and by deducting household taxes paid on dividends ( $D * t_{hd}$ , where  $t_{hd}$  is the household tax rate on dividends net of imputation credits) from household taxes and adding them directly to taxes on

Table 16. **Dividend imputation and dividends taxed as ordinary income**

Deductibility of social security contributions/Countries	Modified tax ratios
<b>Not deductible</b>	
United Kingdom	$\tau_h = (1100 + D * t_{IR}) / (OSPUE + PEI + W)$ $\tau_k = [\tau_h * (OSPUE + PEI) - D * t_{IR} + 2300 + \beta * 2400 + 1200 + 4000 + 5125 + 5212 + 6100] / (OS - 3000)$
<b>Deductible</b>	
France, Germany, Spain	$\tau_h = (1100 + D * t_{IR}) / (OSPUE + PEI + W - 2100 - 2300)$ $\tau_k = [\tau_h * (OSPUE + PEI - 2300) - D * t_{IR} + 2300 + \beta * 2400 + 1200 + 4000 + 5125 + 5212 + 6100] / (OS - 3000)$

Source: OECD.

Table 17. **Imputation credit rates ( $t_{cr}$ )**

	Imputation credit rate ( $t_{cr}$ )
France	33.3% in 1994-2000
Germany	25% in 1994-97 48.47% in 1998-2000
Spain	25% in 1994-97 28.57% in 1998-2000
United Kingdom	20% in 1994-99 10% in 2000

Source: OECD.

capital (Table 18). Household tax rates on dividends net of imputation credits  $t_{hd}$  are shown in Table 18.<sup>50</sup>

Adjusting for special tax treatment of household dividend income generally reduces the capital income tax ratio somewhat (by 2 percentage points, on average) and slightly increases the labour income tax ratio (by 1 percentage point, on average) (Table 20); the exceptions are Austria and Portugal, where the flat tax rates imposed on dividends are higher than the household income tax ratio. These effects are particularly great in Germany, the United Kingdom and Norway: indeed, they could alter conclusions about shifts in the tax burden between labour and capital over the last quarter century in Germany and Norway if the effects of this adjustment were small in the late 1970s. The size of the adjustment for Germany has increased greatly since 1998 owing to a jump in the imputation credit rate while the opposite has occurred in the United Kingdom since 2000 (see Table 17). The correlation coefficient for the adjusted and baseline tax ratios is high for all countries except Germany and, in the case of labour income tax ratios, France and Spain.

Table 18. **Dividends taxed separately at flat rates**

Deductibility of social security contributions/Countries	Modified tax ratios
<b>Not deductible</b>	
Portugal	$\alpha = W / (OSPUE + PEI - D + W)$ $\tau_h = (1100 - D * t_{hd}) / (OSPUE + PEI - D + W)$ $\tau_k = [\tau_h * (OSPUE + PEI - D) + D * t_{hd} + 2300 + \beta * 2400 + 1200 + 4000 + 5125 + 5212 + 6100] / (OS - 3000)$
<b>Deductible</b>	
Austria, Belgium, Denmark, Finland, Greece, Italy, Norway, Sweden	$\alpha = (W - 2100) / (OSPUE + PEI - D + W - 2100 - 2300)$ $\tau_h = (1100 - D * t_{hd}) / (OSPUE + PEI - D + W - 2100 - 2300)$ $\tau_k = [\tau_h * (OSPUE + PEI - D - 2300) + D * t_{hd} + 2300 + \beta * 2400 + 1200 + 4000 + 5125 + 5212 + 6100] / (OS - 3000)$

Source: OECD.

Table 19. **Household dividend tax rates net of imputation credits**  
Per cent

Austria	22% in 1994-96 25% in 1997-2000
Belgium	25% in 1994-95 15% in 1996-2000
Denmark	30% in 1994-95 25% in 1996-2000
Finland	0% in 1994-2000
Greece	0% in 1994-2000
Italy	12.5% in 1995-2000
Norway	0% in 1994-2000
Portugal	25% in 1994-2000
Sweden	0% in 1994-97 30% in 1998-2000

Source: OECD.

### **Interest taxed at flat rates**

Many countries offer taxpayers the option of paying a flat tax rate ( $t_{int}$ ) on interest income (INT) that is lower than the taxpayer's marginal rate.<sup>51</sup> This departure from the assumption that all personal income is taxed at the same rate can be taken into account by excluding interest income from household income and by imputing tax on interest income directly to capital (Table 21).<sup>52</sup> Flat tax rates on personal interest income ( $t_{int}$ ) are shown in Table 22.

While these flat tax rates may be considerably lower than top marginal income tax rates, they are often higher than the household income tax ratio. This is so in

Table 20. Effect of adjusting for relief from double taxation of dividends<sup>1</sup>

1994-2000

	Labour income tax ratio		Capital income tax ratio <sup>2</sup>	
	Change in average level <sup>3</sup>	Correlation coefficient <sup>4</sup>	Change in average level <sup>3</sup>	Correlation coefficient <sup>4</sup>
Germany	4.43	<b>-0.39</b>	-11.54	<b>-0.11</b>
France	0.80	<b>0.72</b>	-2.22	1.00
Italy	0.35	1.00	-0.46	0.98
United Kingdom	2.11	0.84	-5.35	0.99
Austria	-0.45	0.99	1.40	1.00
Belgium	0.24	0.90	-0.56	0.98
Denmark	0.44	1.00	-1.52	0.99
Finland	0.52	0.99	-1.11	1.00
Greece	0.14	1.00	-0.10	1.00
Norway	2.45	0.97	-4.76	0.97
Portugal	-0.32	0.80	0.40	1.00
Spain	1.03	<b>0.70</b>	-1.89	1.00
Sweden	0.63	0.99	-2.12	1.00
Average <sup>5</sup>	0.95		-2.29	

1. This adjustment cannot be made in Australia, Canada, the Czech Republic, Hungary, Ireland (1994-98), Korea, New Zealand and Poland owing to a lack of data.

2. Based on net operating surplus.

3. Compared with the revised approach baseline, percentage points.

4. Correlation coefficients less than 0.8 are bolded.

5. Simple average.

Source: OECD, *Revenue Statistics and National Accounts*.

Austria, France, Italy, Japan and Portugal – half of the countries for which this adjustment is necessary and with data available to make it. In such cases, this adjustment increases the capital income tax ratio and reduces the labour income

Table 21. Interest taxed at flat rates

Deductibility of social security contributions/Countries	Modified tax ratios
<b>Not deductible</b>	
Portugal	$\alpha = W / (\text{OSPUE} + \text{PEI} - \text{INT} + W)$ $\tau_h = (1100 - \text{INT} * \tau_{int}) / (\text{OSPUE} + \text{PEI} - \text{INT} + W)$ $\tau_k = [\tau_h * (\text{OSPUE} + \text{PEI} - \text{INT}) + \text{INT} * \tau_{int} + 2300 + \beta * 2400 + 1200 + 4000 + 5125 + 5212 + 6100] / (\text{OS} - 3000)$
<b>Deductible</b>	
Austria, Belgium, Finland, France, Italy, Japan and Sweden	$\alpha = (W - 2100) / (\text{OSPUE} + \text{PEI} - \text{INT} + W - 2100 - 2300)$ $\tau_h = (1100 - \text{INT} * \tau_{int}) / (\text{OSPUE} + \text{PEI} - \text{INT} + W - 2100 - 2300)$ $\tau_k = [\tau_h * (\text{OSPUE} + \text{PEI} - \text{INT} - 2300) + \text{INT} * \tau_{int} + 2300 + \beta * 2400 + 1200 + 4000 + 5125 + 5212 + 6100] / (\text{OS} - 3000)$

Source: OECD.

Table 22. **Flat tax rates on interest income**  
Per cent

Austria	22% in 1994-96 25% in 1997-2000
Belgium	13% in 1994 15% in 1995-2000
Finland	25% in 1994-95 28% in 1996-99 29% in 2000
France <sup>1</sup>	39.4% in 1994 19.4% in 1995 20.9% in 1996 25% in 1997-2000
Italy <sup>2</sup>	30% in 1995-96 28% in 1997 27% in 1998-2000
Japan	20% in 1994-2000
Portugal	20% in 1994-2000
Sweden	30% in 1994-2000

1. These rates comprise a final withholding tax of 35 per cent in 1994 and 15 per cent thereafter and a variety of surcharge taxes, the most important of which is the general social contribution (CSG). These surcharge taxes were 4.4 per cent in 1994-95, 5.9 per cent in 1996 and 10 per cent thereafter.

2. There are no data for 1994.

Source: OECD.

tax ratio (Table 23). For the remaining countries, the adjustment has the opposite effect. This adjustment has a very small effect on tax ratios in all countries except Belgium and Portugal, where the effect on the capital income tax ratio nevertheless remains modest (2 percentage points). The adjusted and baseline tax ratios are highly correlated in virtually all cases (the only exception is the labour income tax ratio in Portugal).

### ***The combined effect of the above preferential arrangements for capital income taxation***

Bringing together the four cases of reduced capital income taxation for households, which concern pension fund and life insurance earnings, imputed rentals on owner occupied housing, relief from double taxation of dividends and flat tax rates on interest receipts gives the modifications to the tax ratios shown in Table 24.

Only five countries – France, Germany, the Netherlands, Spain, the United Kingdom and the United States – have data available to make all the necessary adjustments for preferential tax treatment of personal capital income. Taken together, these adjustments substantially reduce the capital income tax ratio in these countries (by 8 percentage points, on average) and significantly increase the labour income tax ratio (by 4 percentage points, on average) (Table 25). These effects are especially large in Germany and the United Kingdom. The correlation



Table 23. **Effect of adjusting for flat tax rates on interest income**  
1994-2000

	Labour income tax ratio		Capital income tax ratio <sup>1</sup>	
	Change in average level <sup>2</sup>	Correlation coefficient <sup>3</sup>	Change in average level <sup>2</sup>	Correlation coefficient <sup>3</sup>
Japan	-0.38	0.99	1.07	1.00
France	-0.45	0.94	1.26	1.00
Italy	-1.28	0.98	1.63	0.98
Austria	-0.17	1.00	0.55	1.00
Belgium	0.94	0.90	-2.16	1.00
Finland	0.06	1.00	-0.14	1.00
Portugal	-1.02	<b>0.78</b>	2.13	1.00
Sweden	0.06	1.00	-0.23	1.00
Average <sup>4</sup>	-0.28		0.51	

1. Based on net operating surplus.
2. Compared with the revised approach baseline, percentage points.
3. Correlation coefficients less than 0.8 are bolded.
4. Simple average.

Source: OECD, *Revenue Statistics and National Accounts*.

coefficient between the adjusted and baseline tax ratios is low (less than 0.8) in all cases except for the labour income tax ratio in the United States and capital income tax ratios in the United Kingdom and Spain. These results suggest that many empirical results could be affected by using tax ratios that do not make such adjustments for preferential treatment of household capital income.

## CONCLUSION

Tax ratios have been widely used in empirical economic analyses to approximate the taxes that distort key economic decisions, notably in the areas of employment, saving and investment. This paper proposes some modifications to the well-known methodology developed by Mendoza *et al.* (1994) for calculating tax ratios. While these modifications do not deal with many of the criticisms that have been addressed to this methodology, they do make the underlying assumptions more realistic. The main changes are that deductibility of social security contributions is taken into account, labour income is enlarged to include employer contributions to pension funds and the definition of capital taxes is widened to include a number of property taxes. This and the other changes made increase capital income tax ratios relative to the Mendoza approach and reduce somewhat labour income and consumption tax ratios. The revised estimates suggest that

Table 24. **Combined effect of preferential tax arrangements for household capital income**

System/Countries <sup>1</sup>	AETR equations
<b>Global personal income, social security contributions not deductible</b>	
United States	$\tau_h = 1100 / (\text{OSPUE} + \text{PEI} - \text{PIAPH} + \text{W} - \text{IROOHN})$ $\tau_k = [\tau_h * (\text{OSPUE} + \text{PEI} - \text{PIAPH} - \text{IROOHN}) + 1200 + 2300 + 4000 + 5125 + 5212 + 6100] / (\text{OS} - 3000)$
<b>Global personal income, social security contributions deductible</b>	
Netherlands	$\tau_h = 1100 / (\text{OSPUE} + \text{PEI} - \text{PIAPH} + \text{W} - 2100 - 2300)$ $\tau_k = [\tau_h * (\text{OSPUE} + \text{PEI} - \text{PIAPH} - 2300) + 1200 + 2300 + 4000 + 5125 + 5212 + 6100] / (\text{OS} - 3000)$
<b>Dividend imputation, global personal income, social security contributions not deductible</b>	
United Kingdom	$\alpha = \text{W} / (\text{OSPUE} + \text{PEI} - \text{PIAPH} + \text{W} - \text{IROOHN})$ $\tau_h = (1100 + \text{D} * \tau_{IR}) / (\text{OSPUE} + \text{PEI} - \text{PIAPH} + \text{W} - \text{IROOHN})$ $\tau_k = [\tau_h * (\text{OSPUE} + \text{PEI} - \text{PIAPH} - \text{IROOHN}) - \text{D} * \tau_{IR} + 1200 + 2300 + \beta * 2400 + 4000 + 5125 + 5212 + 6100] / (\text{OS} - 3000)$
<b>Dividend imputation, global personal income, social security contributions deductible</b>	
Germany and Spain <sup>2</sup>	$\tau_h = (1100 + \text{D} * \tau_{IR}) / (\text{OSPUE} + \text{PEI} - \text{PIAPH} + \text{W} - \text{IROOHN} - 2100 - 2300)$ $\tau_k = [\tau_h * (\text{OSPUE} + \text{PEI} - \text{PIAPH} - \text{IROOHN} - 2300) - \text{D} * \tau_{IR} + 1200 + 2300 + 4000 + 5125 + 5212 + 6100] / (\text{OS} - 3000)$
<b>Dividend imputation, dividends taxed as ordinary income, flat rate on interest income, social security contributions deductible</b>	
France	$\tau_h = (1100 + \text{D} * \tau_{IR} - \text{INT} * \tau_{int}) / (\text{OSPUE} + \text{PEI} - \text{PIAPH} - \text{INT} + \text{W} - \text{IROOHN} - 2100 - 2300)$ $\tau_k = [\tau_h * (\text{OSPUE} + \text{PEI} - \text{PIAPH} - \text{INT} - \text{IROOHN} - 2300) + \text{INT} * \tau_{int} - \text{D} * \tau_{IR} + 1200 + 2300 + 4000 + 5125 + 5212 + 6100] / (\text{OS} - 3000)$

1. Only countries for which all necessary adjustments can be made are shown.

2. IROOHN (net imputed rentals on owner occupied housing) is set to zero in Spain before 1999, when imputed rentals were taxed.

Source: OECD.

OECD countries have focused the increase in the tax burden during the past quarter century slightly more on capital than on labour, whereas the opposite conclusion is reached using the Mendoza approach. Nevertheless, even though differences between tax ratios in the revised and Mendoza approaches are sometimes quite large, the two sets of tax ratios are in most cases highly correlated,

Table 25. **Combined effect of preferential arrangements  
for household capital income**  
1994-2000

	Labour income tax ratio		Capital income tax ratio <sup>1</sup>	
	Change in average level <sup>2</sup>	Correlation coefficient <sup>3</sup>	Change in average level <sup>2</sup>	Correlation coefficient <sup>3</sup>
United States	1.28	0.98	-2.49	<b>-0.14</b>
Germany	6.68	<b>-0.37</b>	-17.50	<b>0.61</b>
United Kingdom	5.08	<b>0.26</b>	-11.74	0.82
Netherlands	4.13	<b>0.60</b>	-5.86	<b>0.15</b>
Spain	2.23	<b>-0.27</b>	-4.28	0.89
Average <sup>4</sup>	3.88		-8.37	

1. Based on net operating surplus.
  2. Compared with the revised approach baseline, percentage points.
  3. Correlation coefficients less than 0.8 are bolded.
  4. Simple average.
- Source: OECD, *Revenue Statistics and National Accounts*.

suggesting that many empirical results would not be affected by the choice of approach. Relating the revised tax ratios to macroeconomic variables of interest, it is found that labour income (and combined labour income and consumption) tax ratios are inversely related across countries to hours worked per member of the working age population but are not related to structural unemployment. Moreover, the revised capital income tax ratios are not related to either investment or private savings rates.

There are still a number of unrealistic assumptions underlying the revised estimates that could not be systematically relaxed owing to a lack of data for certain countries and/or periods. These are that all unincorporated business net income is capital income, households do not receive government interest (transfer) payments and do not pay tax on social security benefits and that household capital income is taxed at the same rates as other income. Relaxing these assumptions where possible sometimes results in tax ratio estimates that differ substantially from the baseline estimates and/or are not highly correlated with the baseline. In the case of adjustments concerning self-employed income (dividing it into labour and capital components or separating it from labour and capital income), capital income tax ratios generally rise substantially. However, these adjustments have little or no effect on labour income tax ratios and yield tax ratio series that are highly correlated with the baseline series in most cases (but not for capital income tax ratios in a significant minority of countries). While the variety of adjustments made to account for preferential tax treatment of household capital income individually have only small effects, taken together they markedly reduce

capital income tax ratios, increase labour income tax ratios and mostly yield series that are not highly correlated with the baseline. These results reinforce the view that caution is required when using tax ratios to support a given policy stance or to advocate a particular direction for reform. Tax ratio estimates need to be corroborated by a significant volume of other information before conclusions can reasonably be drawn. This applies both to conclusions about a country's tax system and to the relative shifts in the tax burden suggested by the estimates in this paper.

## NOTES

1. This is the terminology used in Volkerink and de Haan (2001), which we follow. Tax ratios are also known as effective tax rates, implicit tax rates and average tax ratios.
2. The OECD takes the view that further work relying on micro-data is required to assess the magnitude of potential biases to tax ratio estimates. In a recent OECD study (Volkerink and de Haan, 2001), the authors conclude that "... average tax rates measured using aggregate data will in a number of cases generate misleading indicators of the tax burdens on taxpayers, on factors of production, and on consumption. At the same time, it is recognised that an examination of such ratios is a useful exercise, if only to identify the substantial shortcomings of these measures. The message of this study is that policymakers should be aware of the measurement problems underlying average tax rate based on aggregate data, should they be fielded to shape public policy debates". In OECD (2000), it is noted that while average tax rates represent a more informative indicator of the burden and impact of tax systems than a simple reliance on nominal (statutory) tax rates or tax revenue as a share of GDP, their calculation raises several potentially significant methodological problems. The Working Party No. 2 on Tax Policy Analysis and Tax Statistics of the OECD Committee on Fiscal Affairs takes the view that average tax rate results relying on aggregate tax and national accounts data are potentially highly misleading indicators of relative tax burdens and tax trends. Work is currently under way by Working Party No. 2 Delegates using micro-data to assess the magnitude of potential biases to average tax rate figures derived from aggregate data.
3. The ease with which such a switch could be effected would depend on legal and labour market practices in the country concerned.
4. This can result in tax data in a given year including revenue from a tax that no longer exists, as occurred in Austria following the abolition of the business tax (*Gewerbesteuer*) at the end of 1993.
5. These countries are Japan, Germany, Italy, Austria and Greece.
6. For ease of comparison with Mendoza *et al.* (1994) and other studies in this field, we retain the variable names based on the definitions in SNA68/ESA79, even though the variables used are in fact from SNA93/ESA95. OSPUE corresponds to "unincorporated business net income" in the new system.
7. PEI corresponds to "interest, dividends and investment receipts" in SNA93/ESA95.
8. The other countries in which employees' social security contributions are not deductible are: Australia, Canada, Hungary, Mexico, Portugal and the United Kingdom. Such contributions are low by OECD standards in all of these countries except Hungary and Portugal. In Germany, Ireland, Poland and Turkey deductions are for a flat amount. Treating employees' social security contribution as not deductible when they are results in too much household tax being allocated to labour (overstating the labour income tax ratio)

- and not enough household tax being allocated to capital (understating the capital income tax ratio).
9. As data on unincorporated business income including imputed rentals on owner-occupied housing are not available in all of these countries, such income was not deducted from household income for the purposes of allocating the remaining household taxes to labour and capital. This tends to overstate the capital income tax ratio (too much of household taxation is allocated to capital) and understate the labour income tax ratio.
  10. Insofar as this tax is paid by households, such a treatment would be consistent with that in countries such as Germany that have resident withholding taxes.
  11. With this change, the denominators of the labour and capital income tax ratios sum to GDP, ensuring that taxes are entirely allocated to one or other of the factors of production.
  12. The inclusion of 3000 in the denominator of the labour income tax ratio follows the suggestion made in Volkerink and de Haan (2001).
  13. There are unallocated social security contributions (2400) in the following countries: Greece (until 1987); Hungary; Mexico; Portugal (1985-87); the Slovak Republic; Switzerland; and the United Kingdom. Note that it is not necessary to include 2400 data for Austria to ensure that the sum of the other components of social security contributions (2100, 2200 and 2300) equals total contributions (2000).
  14. A problem with the consumption tax ratio that cannot be resolved owing to data limitations is that it includes indirect taxes on investment goods in the numerator. In the case of VAT, this occurs for VAT-exempt industries that supply inputs to produce investment goods. Neither the purchasers of these inputs nor the tax-exempt suppliers themselves are able to claim back the VAT paid on the VAT-exempt industries' inputs. This problem mainly concerns the finance industry, which is generally VAT-exempt owing to the difficulty of measuring value added; by contrast, the problem does not affect government or the not-for-profit sector, as their outputs are classified as final consumption in the national accounts. For general indirect taxes other than VAT (such as sales tax and turnover tax), which are only levied in a few countries [the United States, Canada, Australia (until 2000), Hungary, Iceland, Switzerland (until 1995) and Turkey] the problem is more direct, in that such taxes may apply to investment expenditures more generally. Data are not generally available on VAT paid by tax-exempt sectors that supply inputs to produce investment goods or on the proportion of their outputs that are inputs to produce investment goods. With respect to other general indirect taxes, data are not readily available on the proportion of such taxes that relate to consumption goods. Hence, the consumption tax ratio will be overstated because indirect taxes on investment are included in the numerator. However, the degree of overstatement is unlikely to be great, especially as countries tend to have either a VAT or other general indirect taxes, but not both (the exceptions are Canada, Hungary, Iceland and Turkey).
  15. Mendoza *et al.* (1994) excluded customs and import duties on the grounds that they were not significant in G7 countries but noted that these duties should be taken into account in extending the study to other countries.
  16. In other words, we include all taxes on specific goods and services except taxes on exports (5124), taxes on investment goods (5125) and other taxes on international trade and transactions (5127).
  17. This tax has already been allocated to capital.
  18. The inclusion of 1200 in the numerator of the equation for the capital income tax ratio presupposes that this item relates entirely to capital. In fact, there are many small

corporations in some countries that are more comparable to small-unincorporated enterprises, which are considered to pay taxes on both labour and capital income. It would be consistent to treat these corporations in the same way as unincorporated enterprises. However, this cannot be done owing to the lack of aggregate data. In the absence of this adjustment, capital tax ratios tend to be overstated, although the degree of the distortion is unlikely to be great because such companies pay only a small share of total corporate taxes.

19. It is implicitly assumed that all such taxes relate to the income flows appearing in the denominator of the equation for the capital income tax ratio. While this is true for most property taxes (4000), it is not true for taxes on wealth in the form of art, racehorses or foreign property. Accordingly, the revised estimates tend to overstate the capital income tax ratio.
20. Only Norway levies such a tax.
21. *I.e.* other than households.
22. See notes to Table 2 for a list of the countries with full data sets. This includes countries for which other household income (YPE plus OSPUE) was estimated for periods before which SNA93/ESA95 data are available.
23. This does not necessarily mean that international tax competition has not caused a relative shift in the tax burden towards the least mobile factor of production, labour. Capital income tax ratios do not adequately capture the effects of international tax competition because both the numerator and denominator are reduced by it.
24. The methodologies are sometimes based on a variety of sources (lives of capital assets used for tax purposes, lives based on estimates made using company accounts or using survey data). These give rise to very different average lives. For example, estimates of capital consumption allowances are based on an assumed average economic life for equipment of 7 years in Switzerland, 11 years in Japan and 26 years in the United Kingdom (OECD, 1992).
25. Changes in the tax treatment of public enterprises, including through privatisation, will also distort trends in capital income tax ratios. For example, when the Austrian central bank was made taxable in 1994, this increased corporate tax revenue by more than 10 per cent.
26. There are no payroll taxes (Revenue Statistics category 3000) in the United States and Japan.
27. Using a growth accounting model, Prescott (2002) also finds that labour and consumption taxes have a very important negative effect on labour inputs. For example, he finds that the 30 per cent shortfall of output per member of the working age population in France relative to the United States is accounted for by lower labour inputs in France, which in turn can be explained by higher labour and consumption taxes.
28. This is based on the following OLS regressions (with t-values in brackets) based on average values for each country over 1990-2000:

$$\text{NAIRU}_i = 5.43 + 0.05 * \tau_{li} + u_i \text{ and}$$

(2.07) (0.62)      R<sup>2</sup> adjusted = -0.04

$$\text{NAIRU}_i = 4.13 + 0.07 * \tau_{lci} + u_i$$

(1.34) (0.96)      R<sup>2</sup> adjusted = 0.0

where:

NAIRU = non-accelerating inflation rate of unemployment;

$\tau_l$  = labour income tax ratio; and

$\tau_c$  = combined labour income and consumption tax ratio.

29. This is based on the following OLS regressions (with t-values in brackets) based on average values for each country over 1990-2000:

$$(\text{INVB}/\text{GDP})_i = 12.64 - 0.0 * \tau_{ki} + u_i \text{ and}$$

$$(3.84) \quad (-0.02) \quad R^2 \text{ adjusted} = -0.06$$

$$(\text{PSAV}/\text{GDP})_i = 21.95 - 0.05 * \tau_{ki} + u_i$$

$$(5.55) \quad (-0.66) \quad R^2 \text{ adjusted} = -0.03$$

where:

INVB = gross business investment expenditures;

PSAV = private sector saving; and

$\tau_k$  = capital income tax ratio.

30. Only baseline equations that change when an assumption is modified appear in this and the following sections.
31. EU countries with data available from 1975 onwards are: Germany, France, Italy, the United Kingdom, Belgium, Finland, Spain and Sweden.
32. This also ensures that two otherwise identical countries with the same government interest payments net of tax will have the same tax ratios on labour and capital, even if one does not tax such payments at all while the other imposes a very high tax on them. Without this adjustment, the standard tax ratio methodology wrongly suggests that the burden of taxation (on capital) is higher in the country that taxes government interest payments.
33. No adjustment to corporate income tax receipts (1200) is made in respect of residents because government bonds held directly by residents other than households are mainly in the hands of pensions funds and life insurance companies, who generally do not pay tax on earnings. Moreover, insofar as bonds are held by domestic financial intermediaries, the other major holder, tax is effectively shifted back to the household sector as intermediaries borrow from it to finance their bond holdings: interest on such loans is deductible for intermediaries but taxable for households.
34. This rate is 15 per cent in Belgium, Canada and Portugal. It is 10 per cent in Australia, Italy, Japan, Korea, New Zealand, Poland, Spain, and Switzerland and 0 in other countries.
35. EU countries with data available from 1975 onwards are: Germany, France, Italy, the United Kingdom, Austria, Belgium, Finland, Spain and Sweden.
36. The average increases in the baseline capital income tax ratio (based on net operating surplus) between 1975-80 and 1999-2000 in EU and OECD countries for which data were available to make the adjustment were 5.2 and 6.3 percentage points, respectively.
37. Adema (2001) contains combined estimates of direct taxes and social security contributions on government benefits (Table 7, pp. 27-28). These had to be divided into direct tax- and social security components to adjust for this factor in the tax ratio estimates. To do this, direct tax and social security contributions for three household types (single, no children, earning 67 per cent of average production wages (APW); single, two children, earning 67 per cent of APW; and married, two children, household head earns 100 per



cent of APW, spouse earns nothing) were calculated using the OECD Taxing Wages database. The average proportion of each component in total direct tax and social security contributions for the three household types was then used to allocate Adema's series to its direct tax- and social security contributions components.

38. These modifications also ensure that two otherwise identical countries with the same net government benefit payments will have the same labour and capital tax ratios, even if one does not tax such payments at all while the other imposes a very high tax on them. Without this adjustment, the standard approach to calculating tax ratios wrongly suggests that the burden of taxation (on capital and especially on labour) is higher in the country that taxes government benefit payments.
39. Tables in this section listing the necessary adjustments to allow for preferential tax treatment of household income only cover countries for which data are available to make these adjustments.
40. Information on the tax treatment of each of these forms of household capital income comes from the *OECD Tax Database*, which only starts in 1994.
41. The tax on pension benefits that households pay in schemes subject to exempt-exempt-tax (EET) rules is effectively levied on deferred labour income, not the earnings of the pension scheme. The fact that earnings are not taxed when benefits are taxed can be seen by considering the case of a contributor to a scheme subject to tax-exempt-exempt (TEE) rules. If tax rates and gross investment returns are the same, this contributor will get exactly the same net return on pension contributions as the contributor subject to EET rules, despite the fact that pension benefits are not taxed.
42. Such tax is levied only in Australia, Denmark, New Zealand and Sweden.
43. The distinction between corporate income taxes and individual income taxes in *OECD Revenue Statistics* is that corporate income taxes are levied on the corporation as an entity, not on the individuals who own it, and without regard to the personal circumstances of these individuals. Following this logic, "Taxes paid on ... the income of institutions, such as life insurance or pension funds, are classified as corporate taxes (1200) if they are charged on ... the institution as an entity without regard to the personal circumstances of the owners" *OECD Revenue Statistics* (2001, p. 266).
44. These countries are: Australia, Austria, Canada, Czech Republic (1998-2000), Finland, France, Germany, Hungary (1997-2000), Iceland (1999-2000), Ireland, Italy (1994-98), Japan, Luxembourg (1994-97), Mexico, New Zealand, Portugal, Spain (1999-2000), the United Kingdom and the United States.
45. This does not mean that there is no preferential treatment of imputed rentals in countries where they are taxed. As imputed rentals tend to be assessed at less than market values, they still receive favourable treatment. In fact, taxation of imputed rentals can be more favourable to the owner-occupier than tax exemption if he/she is able to offset tax losses (usually owing to high mortgage interest charges) against other income. This is the case in the Netherlands and Switzerland.
46. These countries are the Czech Republic (1998-2000), Finland, Italy (1994-98), Mexico (1994, 2000), Portugal (1994-98), and the United States. Countries with small capped deductions for interest expenses (so that they are mostly not deductible) are not included in this category.
47. The exceptions, which operate a classical corporate income tax system and a global personal income tax system, as assumed in the standard tax ratio methodology, are: Ireland in 2000; Japan; Luxembourg; the Netherlands; Switzerland; and the United States.

48. Countries with dividend imputation systems and that tax dividends as ordinary income but are not included in Table 16 owing to a lack of data are: Australia, Canada, Ireland (1994-99), Korea (1997), Mexico (1996-2000) and New Zealand.
49. As an example of calculating  $t_{IR}$ , consider the case of an Australian resident in 2000 subject to the top marginal tax rate (48.5 per cent). The imputation credit rate is 36 per cent (the corporate tax rate) and the dividend must be grossed up to its pre-corporate tax value for inclusion in the individual's global income subject to tax. Hence,

$$t_d = (0.485 - 0.36)/(1 - 0.36) \\ = 0.195$$

In other words, the individual only has to pay a tax rate of 19.5 per cent on dividend income. Hence, the tax saving from the imputation credit ( $t_{IR}$ ) is 29 per cent, the difference between his marginal income tax rate (48.5 per cent) and the tax rate actually paid on dividend income (19.5 per cent).

50. Countries that tax dividends separately at flat rates but that are not included in Table 18 owing to a lack of data are: Hungary, Mexico (1994-95), the Czech Republic, Iceland, Korea (1998-2000) and Poland.
51. Countries that tax interest receipts separately at flat rates but that are not included in Table 21 owing to a lack of data are: the Czech Republic, Hungary, Iceland, Ireland, Korea, Mexico, and Poland.
52. These adjustments mirror those for dividends in a scheduler household income tax system.

*Annex*

**Table A1. Business and corporate taxes in selected countries**  
Per cent of GDP

	Business taxes in 1100 <sup>1</sup>			Corporate taxes (1200) <sup>2</sup>		
	1975-89	1990-2000	1975-2000	1975-89	1990-2000	1975-2000
Japan	0.04	0.05	0.04	5.62	4.50	5.14
Germany	1.20	1.21	1.20	1.98	1.50	1.78
Austria	0.89	0.52	0.74	1.37	1.74	1.52

1. These countries have business taxes that are included in the 1100 series (taxes on income, profits and capital gains of individuals).
2. The 1200 series in *Revenue Statistics* (taxes on income, profit and capital gains of corporations).

Source: OECD, *Revenue Statistics* and *National Accounts*.

Table A2. Tax ratios – revised approach  
Per cent

	Capital based on net operating surplus				Capital based on gross operating surplus				Labour				Consumption				Combined labour and consumption			
	1975- 80	1980- 90	1990- 2000	Change between 1975-80 and 1990-2000	1975- 80	1980- 90	1990- 2000	Change between 1975-80 and 1990-2000	1975- 80	1980- 90	1990- 2000	Change between 1975-80 and 1990-2000	1975- 80	1980- 90	1990- 2000	Change between 1975-80 and 1990-2000	1975- 80	1980- 90	1990- 2000	Change between 1975-80 and 1990-2000
United States <sup>1</sup>	42.2	37.9	39.5	-2.7	29.2	25.8	27.3	-1.9	20.4	22.1	23.4	3.1	6.7	6.6	6.4	-0.4	25.7	27.3	28.3	2.6
Japan	35.4	47.6	50.0	14.6	24.4	31.1	27.9	3.5	17.3	21.7	24.1	6.8	6.0	5.8	6.4	0.4	22.9	26.8	29.4	6.5
Germany <sup>2</sup>	37.5	38.7	34.9	-2.6	23.6	23.1	21.2	-2.4	32.8	33.2	35.0	2.3	12.5	12.6	13.4	0.9	42.5	42.8	44.9	2.4
France	42.0	51.9	55.9	14.0	25.3	30.0	33.2	7.9	32.7	37.9	40.5	7.8	15.7	15.7	15.1	-0.6	45.3	49.6	51.3	6.0
Italy	21.7	32.7	42.7	21.0	15.2	23.6	31.0	15.8	25.8	32.1	37.7	11.9	10.6	11.7	13.9	3.3	35.0	41.5	47.9	12.9
United Kingdom <sup>1</sup>	64.2	69.9	53.2	-11.1	37.2	40.5	34.0	-3.2	25.5	24.4	22.6	-2.8	13.4	16.0	15.7	2.3	35.4	36.5	34.8	-0.7
Canada <sup>1</sup>	45.2	46.2	59.5	14.2	30.8	31.0	36.8	6.0	21.2	25.0	29.6	8.4	16.0	16.3	13.9	-2.0	33.8	37.2	39.4	5.6
Australia <sup>1</sup>	44.5	46.2	49.4	4.9	27.3	28.4	30.7	3.5	18.8	20.6	20.9	2.1	12.8	13.9	12.1	-0.7	29.2	31.6	30.5	1.3
Austria	45.1	40.3	42.2	-2.9	23.7	22.3	24.3	0.6	33.1	36.0	39.6	6.5	16.8	17.2	16.2	-0.5	46.4	49.1	51.2	4.9
Belgium	49.6	50.0	51.4	1.8	31.5	31.3	32.7	1.3	35.5	39.6	41.3	5.7	14.9	14.3	15.0	0.1	47.1	49.9	51.7	4.6
Czech Republic <sup>3</sup>	..	..	40.7	..	..	..	21.6	..	..	..	41.5	..	..	..	13.0	..	..	..	47.2	..
Denmark	..	87.3	71.9	..	..	46.1	39.5	..	..	36.1	39.9	..	19.4	20.9	20.6	1.2	..	53.8	56.0	..
Finland	36.5	40.2	48.9	12.4	21.5	22.7	26.0	4.5	33.4	35.2	45.0	11.6	17.2	18.7	18.7	1.5	47.4	50.3	58.0	10.5
Greece	..	..	15.1	..	..	..	12.9	..	..	..	34.9	..	13.6	14.4	15.5	1.9	..	..	46.5	..
Hungary <sup>1</sup>	..	..	..	..	..	..	14.7	..	..	..	..	..	..	..	22.2	..	..	..	..	..
Ireland	..	25.1	24.1	..	..	..	..	..	..	25.0	26.3	..	17.6	21.4	21.2	3.6	..	41.0	41.9	..
Korea	9.7	13.2	22.5	12.8	8.3	10.5	16.7	8.4	3.4	4.5	9.9	6.6	13.7	16.3	15.8	0.8	17.9	20.0	24.2	6.3
Netherlands	..	..	52.8	..	..	..	32.7	..	..	..	36.4	..	16.3	16.8	18.0	1.6	..	..	47.9	..
New Zealand	..	..	43.8	..	..	..	..	..	..	..	25.1	..	11.7	15.0	18.5	6.8	..	..	38.9	..
Norway	42.4	50.3	39.4	-3.0	24.6	29.3	24.7	0.1	35.7	35.6	36.2	0.5	23.8	25.7	25.7	1.8	51.0	52.1	52.5	1.5
Poland	..	..	..	..	..	..	20.9	..	..	..	..	..	..	..	17.1	..	..	..	..	..
Portugal <sup>1, 4</sup>	..	..	28.1	..	..	..	17.6	..	..	..	23.9	..	13.3	17.8	19.9	6.7	..	..	39.0	..
Spain	12.8	20.5	28.8	15.9	9.1	14.2	20.0	11.0	24.7	30.0	30.7	6.0	5.2	11.5	14.5	7.6	29.9	38.0	40.8	10.8
Sweden	71.8	70.3	69.9	-1.9	34.1	35.3	35.7	1.6	44.6	47.9	49.6	5.0	18.3	20.6	19.8	1.5	54.7	58.6	59.6	4.8
Switzerland	38.4	47.0	53.2	14.8	24.4	26.5	27.1	2.7	26.9	27.7	30.9	4.0	8.8	9.0	9.3	0.5	33.3	34.2	37.3	4.1
EU-15 <sup>5</sup>																				
Average	42.4	46.0	47.5	5.2	24.6	27.0	28.7	4.1	32.0	35.1	38.0	6.0	15.9	17.3	17.8	1.9	42.6	46.3	48.9	6.3
Standard deviation	19.7	17.4	13.0	-6.7	9.4	8.4	6.2	-3.2	6.6	7.0	8.0	1.4	4.3	3.3	2.0	-2.4	8.1	7.4	7.6	-0.5

Table A2. **Tax ratios – revised approach** (cont.)

Per cent

	Capital based on net operating surplus				Capital based on gross operating surplus				Labour				Consumption				Combined labour and consumption			
	1975- 80	1980- 90	1990- 2000	Change between 1975-80 and 1990-2000	1975- 80	1980- 90	1990- 2000	Change between 1975-80 and 1990-2000	1975- 80	1980- 90	1990- 2000	Change between 1975-80 and 1990-2000	1975- 80	1980- 90	1990- 2000	Change between 1975-80 and 1990-2000	1975- 80	1980- 90	1990- 2000	Change between 1975-80 and 1990-2000
OECD <sup>5</sup>																				
Average	39.9	43.9	46.3	6.4	24.4	26.6	28.1	3.7	27.0	29.6	32.3	5.3	14.6	15.6	15.7	1.1	37.3	40.4	42.6	5.3
Standard deviation	15.9	15.0	12.7	-3.3	8.0	7.4	5.8	-2.2	9.7	10.0	10.3	0.6	5.2	5.5	5.3	0.1	10.8	10.4	10.8	0.0

1. Social security contributions are not deductible.

2. West Germany before 1991.

3. It is assumed that the capital income tax ratio for the Czech Republic in 2000 is the same as in 1999.

4. It is assumed that the capital income tax ratio for Portugal in 1999 and 2000 are the same as in 1998.

5. Simple averages of the above countries with data in 1975.

Source: OECD, *Revenue Statistics and National Accounts*.

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