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**Average Effective Tax Rates  
on Capital, Labour  
and Consumption**

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Harry Tchilinguirian**

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**AVERAGE EFFECTIVE TAX RATES ON CAPITAL, LABOUR AND CONSUMPTION**

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**David Carey and Harry Tchilinguirian**

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## ABSTRACT/RÉSUMÉ

Over the past 15 years, tax reforms have profoundly changed the shape of OECD tax systems and rekindled interest in measuring effective tax burdens. Indeed, in order to understand past reforms or to evaluate the tax policies of particular countries, it is necessary to go beyond statutory rates since these sometimes bear little relation to rates actually paid. This paper updates and extends the Mendoza *et al.* estimates of average effective tax rates (AETRs) and presents new estimates based on modifications to the methodology to make some of the underlying assumptions more realistic. In particular, the assumption that all income from self-employment is capital income is dropped in favour of assuming that the self-employed earn both labour and capital income. This change raises estimates of the AETR on capital and reduces the estimated AETR on labour but does not alter the trends observed in the updated Mendoza *et al.* estimates. Both sets of estimates show that, on average, the relative tax burden has shifted towards labour in OECD countries since the early 1980s. Considerable caution is required when interpreting AETRs as the methodology is subject to a number of limitations, not the least of which result from the difficulty of splitting income tax between capital and labour. Whether for individual countries or for the OECD as a whole, estimates of average effective tax rates should not be used as a basis for policy decisions without more broadly based analysis and corroborating data, including micro-data. Moreover, it should not be forgotten that the initial impact of taxes (between capital, labour and consumption) captured by these indicators may not coincide with final incidence.

*JEL code:* H22, H87, H89

*Keywords:* Average effective tax rates, tax ratios, implicit tax rates

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Au cours des quinze dernières années, diverses réformes ont profondément modifié la structure des systèmes fiscaux des pays de l'OCDE et ravivé l'intérêt pour une mesure de la charge fiscale effective. De fait, pour comprendre les réformes antérieures ou pour évaluer les politiques fiscales de certains pays, il est nécessaire d'aller au delà des taux statutaires, ceux-ci ayant parfois bien peu de relation avec ceux effectivement payés. Cet article actualise et étend les estimations des TIEM (taux d'imposition effectifs moyens) mis au point par Mendoza *et al.* et présente de nouvelles estimations fondées sur des modifications de la méthodologie visant à rendre plus réalistes certaines des hypothèses sous-jacentes. En particulier l'hypothèse selon laquelle l'ensemble des revenus des travailleurs indépendants doit être considéré comme revenu du capital est abandonnée en faveur d'une hypothèse selon laquelle les revenus des travailleurs indépendants représentent à la fois des revenus du travail et des revenus du capital. Ce changement augmente les estimations des TIEM sur le capital et réduit les TIEM estimés sur le travail, mais ne modifie pas les tendances observées dans les estimations révisées de Mendoza *et al.* Ces deux séries d'estimations montrent qu'en moyenne la charge fiscale relative s'est déplacée vers le travail dans les pays de l'OCDE depuis le début des années 80. Les estimations des TIEM doivent être interprétées avec beaucoup de prudence car la méthodologie utilisée comporte un certain nombre de limites, la difficulté de répartir l'impôt sur le revenu entre le capital et le travail n'étant pas la moindre. Que ce soit pour les pays pris individuellement ou pour l'ensemble de l'OCDE, les estimations des taux d'imposition effectifs moyens ne doivent pas servir à orienter la politique économique sans une analyse plus large et des données qui les corroborent (y compris des données microéconomiques). En outre, il faut garder à l'esprit que l'impact initial des impôts (sur le capital, le travail et la consommation) capté par ces indicateurs peut ne pas coïncider avec leur incidence finale.

*Classification JEL:* H22, H87, H89

*Mots-clés :* Taux d'imposition effectifs moyens, coefficient de pression fiscale, taux d'imposition implicites

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## AVERAGE EFFECTIVE TAX RATES ON CAPITAL, LABOUR AND CONSUMPTION

David Carey and Harry Tchilinguirian<sup>1</sup>

### I. Introduction

1. Taxation has increased significantly in OECD countries in recent decades, raising the importance of analyses to determine its effects on major macroeconomic variables such as saving, investment and employment. An obstacle to undertaking such analyses has been the absence of suitable measures of aggregate taxation. As noted by Mendoza *et al.* (1994), various strategies to combine information on statutory tax schedules, tax returns and tax codes with data on income distribution, household surveys, and projections of real present values for investment projects in specific industries have been proposed to measure marginal effective income tax rates.<sup>2</sup> However, in view of the complexity of tax credits, exemptions and deductions in most countries, it is not clear that such tax rates are equivalent to the macroeconomic variables that affect macroeconomic variables as measured in National Accounts.<sup>3</sup> An alternative approach, suggested by Lucas (1990) and (1991) and Razin and Sadka (1993) and developed by Mendoza *et al.* (1994), is to relate realised tax revenues directly to the relevant macroeconomic variables in the National Accounts. The resulting estimates, known as “average effective tax rates” (AETRs), “implicit tax rates” or “tax ratios”, take into account the effective overall tax burden from the major taxes and are consistent with the concept of aggregate tax rates at the national level and with the representative agent assumption.<sup>4,5</sup> According to Mendoza *et al.* (1994), empirical work conducted by the earlier authors

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1. The authors are indebted to Steven Clark, Kathryn Gordon, Jeffrey Owens, Paul Atkinson, Chiara Bronchi, Jorgen Elmeskov, Andreas Woergoetter and several other OECD colleagues for drafting suggestions and comments; to Chantal Nicq and Josette Rabesona for technical support and to Anne Eggimann and Nanette Mellage for secretarial support. The authors would also like to thank members of the Working Party on Tax Policy Analysis and Tax Statistics of the OECD Committee on Fiscal Affairs who provided comments on an earlier draft. All errors and omissions, of course, are the authors’.
  2. Mendoza *et al.* (1994) (p. 2) list the following such studies: for the United States, Auerbach (1987), Barro and Sahasakul (1986), Joines (1981), and Seater (1985); and for international studies, King and Fullerton (1984), McKee, Viser and Saunders (1986), OECD (1991), and Easterly and Rabelo (1993). King and Fullerton (1984), which is perhaps the best known such study, uses statutory tax rates to estimate effective marginal tax rates for a stylised firm. Although extensively used, this methodology is often criticised for its unrealistic assumptions (*e.g.* that firms do not adjust their asset and financial structures in response to tax incentives).
  3. Mendoza *et al.* (1994), p. 2.
  4. *ibid.*
  5. OECD (2000*b*) contains an extensive examination of the conceptual and practical difficulties encountered in the measurement of implicit tax rates as well as suggestions for refinements of the existing approaches in

suggests that these tax rates are useful approximations to the taxes that distort economic decisions in dynamic models. As with the other approaches, this method involves 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.

2. This paper updates the Mendoza *et al.* estimates of average effective tax rates on capital, labour and consumption (Table A1), which end in 1988, and extends coverage from G7 countries to most OECD countries. It also presents new estimates based on modifications to the methodology to make some of the underlying assumptions more realistic. In particular, the assumption that all income from self-employment is capital income is dropped in favour of assuming that the self-employed earn both labour and capital income. This change markedly raises estimates of the AETR on capital and reduces the estimated AETR on labour but does not alter the trends observed in the updated Mendoza *et al.* estimates. Sensitivity analysis is also carried out to see what are the effects of relaxing the assumption that capital income is taxed at the same rate as all other household income. Assessments are made of the impact on the estimates of allowing for preferential tax treatment for pension fund and life insurance earnings, relief from double taxation of dividends, and the possibility that households pay no tax at all on capital income. The latter simulation can be considered as an upper limit for relaxing the other two assumptions at the same time as well as the implicit assumption that imputed rentals on owner occupied housing are fully taxed and that households do not evade taxes on capital income. Relaxing the first two assumptions does not generally have a great effect on the estimates, whereas assuming that households pay no tax at all on capital income does.

3. Even after the revisions to the Mendoza *et al.* methodology presented in this paper, many of the assumptions that underlie the calculations of AETRs are unrealistic. Given the various limitations to AETR methodologies relying on aggregate tax and national accounts data (see Sections II and V below) the OECD takes the view that further work relying on micro-data is required to assess the magnitude of potential biases to average tax rate figures derived from aggregate data.<sup>6</sup> Caution is therefore required when interpreting estimates of AETRs, including those reported in this paper, especially for individual countries since the estimates may be particularly sensitive to underlying assumptions. Furthermore, policy makers should be aware of the methodological problems should AETR estimates be used to shape public debate. Such estimates should not be used on their own to support a given policy stance or to advocate a particular direction for reform. Rather, estimates of average effective tax rates should be used in conjunction with more broadly based analyses and with other tax indicators and information that can corroborate the story they tell.

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the literature. OECD (2000a) also discusses the strengths and weaknesses of implicit tax ratios in the context of an analysis of the different approaches available for measuring tax burdens.

6. The “health warnings” applying to the use of AETR are amplified in OECD (2000a) and OECD (2000b). The authors of OECD (2000b, p. 3) 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 (2000a), 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 AETR 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.

4. The methodology and underlying assumptions used to calculate AETRs are outlined in the next section along with some of the data problems that are encountered. In addition, the Mendoza *et al.* estimates are updated and extended beyond the G7 countries. In the following section, estimates are presented based on revised equations that correct some shortcomings in the Mendoza *et al.* equations. This is followed by an examination of the effects of relaxing some of the underlying assumptions about the taxation of capital income. Finally, limitations of the methodology are discussed in Section V.

## II. Updated Mendoza *et al.* estimates of average effective tax rates

### *Methodology, underlying assumptions and data problems*

5. The Mendoza *et al.* 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. Tax revenue data come from OECD *Revenue Statistics* (OECD, 1999). 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.* 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.

6. 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.* assign all self-employed income to capital. An alternative approach, presented in Section III, is to assign part of this income flow to labour and part to capital. This 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. 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>7</sup> The potential

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7. The ease with which such a switch could be effected would depend on legal and labour market practices in the country concerned.

for switching reduces the reliability and comparability of estimates of the tax bases associated with capital and labour; and

- Revisions to National Accounts data on the basis of SNA 93/ESA 95 are at different stages of progress in different countries. In many countries, National Accounts are partly on the old basis (SNA 68/ESA 79) and partly on the new basis. The data used in this paper reflect the progress that had been made by mid-2000<sup>8</sup>. GDP and operating surplus tend to be higher on a SNA 93/ESA 95 basis, reducing tax ratios.<sup>9</sup>

7. 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 (again, there is no value added). Another problem is that *Revenue Statistics* are on a cash basis<sup>10</sup> whereas National Accounts are on an accrual basis. This means that the timing of the two data sets does not correspond.

### ***AETR equations***

#### *Effective household tax ratio, $\tau_h$*

8. In order to calculate the AETR on labour ( $\tau_l$ ) or on capital ( $\tau_k$ ), it is necessary to calculate the AETR on total household income,  $\tau_h$ . This is used to allocate personal income tax to capital and labour under the assumption that the average tax rate paid on each is the same (that is,  $\tau_h$ ). (The results of sensitivity analysis exploring the importance of this assumption for the estimated AETR on capital and labour are reported in section IV). Thus,  $\tau_h$  can be calculated as follows:

$$\tau_h = 1100 / (\text{OSPUE} + \text{PEI} + W) \quad (1)$$

This equation says that the AETR on household income is personal income tax divided by the household income. Note that in some countries<sup>11</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 unincorporated sector (OSPUE), property income (PEI) 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.

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8. The EO67 database is used. In this database, there are at least some revised data for all countries except the following: Japan; Iceland; New Zealand; Poland; Switzerland; and Turkey. For more information, see <http://www.oecd.org/eco/data/eoinv.pdf>, pp 5-6.

9. The implications of these revisions for reported tax ratios are discussed OECD (1999), *Revenue Statistics* 1965/98, special feature S. 3, pp. 30-33.

10. 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 (Gewerbsteuer) at the end of 1993.

11. These countries are Japan, Germany, Italy, Austria and Greece.



**Box 1. Variable names and symbols used**

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

- 1100 Taxes on income, profit and capital gains of individuals or households;
- 1200 Taxes on income, profit and capital gains of corporations;
- 1300 Unallocated taxes on income, profit and capital gains;
- 2000 Total social security contributions (2100 is paid by employees; 2200 by employers; 2300 by the self-employed; 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; 5126 taxes on specific services; 5128 other taxes);
- 5200 Taxes on use of goods and performances.

The variables from *National Accounts* are:

- CP Private final consumption expenditure;
- EE Dependent employment;
- ES Self-employment;
- CG Government final consumption expenditure;
- CGW Government final wage consumption expenditure;
- IG Investment by general government;
- IP Investment by private sector;
- OSPUE Unincorporated business net income (including imputed rentals on owner-occupied housing);<sup>1</sup>
- PEI Interest, dividends and investment receipts;<sup>2</sup>
- W Wages and salaries of dependent employment;
- WSSS Compensation of employees (including private employers' contributions to social security and to pension funds);
- OS Net operating surplus of the overall economy.<sup>3</sup>

1. The mnemonics for this variable reflect the definition in SNA68/ESA79, "Operating surplus of private unincorporated enterprises".

2. This variable is "households' property and entrepreneurial income" in SNA68/ESA79.

3. This normally includes the statistical discrepancy.

*Effective labour tax ratio,  $\tau_l$* 

9. The AETR on labour ( $\tau_l$ ), which relates labour taxes to labour income, can be calculated using equation (2). The first term in the numerator ( $\tau_h * W$ ) represents labour's share of household taxes. This term allocates household taxes to labour in line with its 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 (2), consists of compensation from dependent employment, including employers' social security contributions (2200) (but excluding employers' contributions to private pension funds).

$$\tau_l = (\tau_h * W + 2000 + 3000) / (W + 2200) \quad (2)$$

*Effective capital tax ratio,  $\tau_k$* 

10. Capital pays a number of taxes including the corporate profits taxes, taxes on household capital income and various property taxes. The formula that is used for the AETR on capital ( $\tau_k$ ) is:

$$\tau_k = [\tau_h * (\text{OSPUE} + \text{PEI}) + 1200 + 4100 + 4400] / \text{OS} \quad (3)$$

The first term in the numerator is the product of the household AETR and household capital income. This allocates household taxes to capital in line with capital income as a proportion of household income. The other terms in the numerator allocate corporate income taxes (1200), 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.

*Effective tax ratio on consumption,  $\tau_c$* 

11. The AETR on consumption ( $\tau_c$ ) is calculated in equation (4) 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. Value added tax, which is by far the largest indirect tax in most countries, is included in the 5110 category. The denominator in (4) is considerably wider than the true tax base 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 AETR, 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 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.

$$\tau_c = (5110 + 5121) / (\text{CP} + \text{CG} - \text{CGW} - 5110 - 5121) \quad (4)$$

*AETR estimates*

12. In 1991-97, the AETR on capital (based on net operating surplus) in OECD countries was on average 34.7 per cent (Table 1). It was high relative to the OECD average (more than one standard deviation above) in the United Kingdom,<sup>12</sup> Canada, Denmark and Sweden (a breakdown of the factors contributing to these high rates is provided in Box 2), and was low in Austria, Greece, Ireland, Korea, Portugal and Spain. The AETR on labour in OECD countries was on average 36.8 per cent over the same period. There were few countries with rates significantly different (more than one standard deviation away) from the mean: only Sweden had a high rate relative to the average and the United Kingdom, Australia and Korea had low rates. By contrast, many countries had AETRs on consumption that were significantly different from the OECD average (16.4 per cent): rates were high in Austria, Denmark, Finland, Iceland, Ireland, Norway, Portugal and Sweden; and low in the United States, Japan, Australia, Mexico and Switzerland. The combined AETR on labour and consumption, which is of interest because both taxes affect labour-market incentives, was on average 46.8 per cent in OECD countries. The combined rate was significantly higher in Denmark, Finland and Sweden and significantly lower in the United States, Japan, Australia and Korea.

**Box 2. Factors contributing to high AETR on capital in some countries**

Of the countries identified as having high AETR on capital (see paragraph 15), net operating surplus as a proportion of gross operating surplus is (at least one half of one standard deviation) below the OECD average in all but the United Kingdom (Table A2). In other words, depreciation charges are large in relation to gross operating surplus in most of these countries. Even so, all of these countries except Denmark are still classified as having high capital tax rates when most depreciation charges are abstracted from by using AETR on capital based on gross operating surplus (see paragraph 13). In all three of the countries (United Kingdom, Canada and Sweden) with high AETR on capital based on gross operating surplus, gross operating surplus as a share of GDP is (at least one half of one standard deviation) below the OECD average (Table A3). Finally, property taxes (4100, 4400) as a share of gross operating surplus are particularly high in the United Kingdom and Canada: these countries have the highest and second highest property taxes as a share of gross operating surplus, with both being more than double the OECD average (Table A4).

13. A problem with using AETRs on capital based on net operating surplus 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>13</sup> Given that many of the differences in service lives are implausibly large, it may be preferable to focus on AETRs on capital based on gross operating surplus, notwithstanding the fact that this means overstating capital income, as this circumvents the problem. On this basis, the AETR on capital in OECD countries was on average 22.0 per cent in 1991-97.<sup>14</sup> All of the countries which had high rates

12. A factor contributing to this outcome is the inclusion of tax revenues on oil and gas production. This factor also boosts the AETR on capital in Norway (see Box 3). On the other hand, the brief replacement of household property tax in the early 1990s by the Community Charge (poll tax), which is not included in the calculations, tends to reduce the average AETR on capital in the United Kingdom over this period.

13. 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 and assumed average economic life for equipment of 7 years in Switzerland, 11 years in Japan and 26 years in the United Kingdom. See Annex Table A2 for net to gross operating surplus ratios.

14. These estimates are made using gross operating surplus instead of net operating surplus in the denominator of the equation for the AETR on capital. Owing to a lack of data, the estimates of the AETR on household

based on net operating surplus except Denmark (depreciation charges are high) continue to have high rates while of the countries which had low rates, only Austria, Greece and Portugal continue to do so. New Zealand now joins the group of countries with high rates (depreciation charges are low) and Germany joins the group with low rates (depreciation charges are high). In the remainder of this paper, discussion of AETRs on capital focuses on estimates based on gross operating surplus, although estimates based on net operating surplus will also be included for information in the tables.

14. There are a number of caveats to bear in mind when comparing AETRs across countries. One is that estimates of the ATER on labour are influenced by the extent to which countries rely on funded pension systems as opposed to pay-as-you-go systems for the provision of retirement income. This is because contributions to funded systems, even if they are compulsory, are (rightly) not considered to be taxes whereas pay-as-you go contributions are considered to be taxes. Switzerland provides an extreme example of the potential importance of this factor. If contributions to the second-pillar of the pension system were instead social security contributions to a pay-as-you-go system, the AETR on labour there in 1996 would have been 12.4 percentage points higher.<sup>15</sup> Another factor to bear in mind is that health insurance arrangements affect cross-country comparisons of AETRs on capital. In particular, the fact that the United States does not have a compulsory social health system but that most other countries do contributes to a lower AETR on labour in the United States relative to those in other countries than would otherwise be the case. As for the retirement income financing arrangements, this does not mean that cross-country comparisons are false. It just means that readers should be aware that differences in AETRs on labour may reflect to a considerable extent differences in social insurance coverage. By contrast, cross-country comparisons of AETRs on capital 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>16</sup> It should also be noted that AETRs on both labour and capital are somewhat overstated in Denmark, the Netherlands and Sweden because most social security benefits are taxed (OECD 2000a, p. 29); this increases the numerator of the AETR on household income without affecting the denominator.<sup>17</sup>

15. The updated estimates of AETRs based on Mendoza *et al.*'s methodology suggests that AETRs on labour since 1980 have on average increased at a faster rate than AETRs on capital and on consumption. The OECD average trend increases in these rates and for the AETR on labour and consumption combined, as indicated by the average annual change, are 0.3, 0.2, 0.2 and 0.3 percentage point, respectively (Table 2). These estimates suggest that, on average, OECD countries have focused the increase in the overall tax burden (Table 3) on the least mobile factor of production, labour. The trend increase in the AETR on labour and consumption was particularly large (*i.e.*, it exceeded the OECD average by more than one standard deviation) in Italy and Portugal. (This and all other discussion concerning countries with trends significantly different from the OECD average abstracts from the Czech Republic, Hungary,

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income used to allocate household taxes continue to be based on the net operating surplus of the household and private unincorporated enterprise sector.

15. Contributions to the second pillar of the pension system in Switzerland were SF 25.4 billion, 6.9 per cent of GDP in 1996 (Federal Statistics Office (1998), 13 Sécurité sociale et Assurances, La Prévoyance professionnelle en Suisse, Table A2.1, columns 3 and 4).
16. Changes in the tax treatment of public enterprises, including through privatisation, will also distort trends in AETR on capital. For example, when the Austrian central bank was made taxable in 1994, this increased corporate tax revenue by more than 10 per cent.
17. Correcting for this factor, the AETR on labour in the Netherlands in 1992 calculated in European Commission (1997) would decline from 52.6 per cent to 43.1 per cent assuming that the average tax rate on social security benefits is the same as on other personal income (OECD, 2000b, p. 29). As the average tax paid on social security benefits is likely to be lower than on other personal income, this is an overestimate of the effect of this factor. The corrected value lies somewhere between the two estimates.

Iceland, Luxembourg, Mexico, Poland and Turkey, which are excluded from the country averages owing to a lack of data). Of the two countries with large increases in the AETR on capital, only Portugal also had a high trend increase in the AETR on capital. New Zealand was the only country to have a significantly lower trend growth rate in the AETR on capital and on labour and consumption than the OECD average: both rates declined. These trends have also involved a narrowing in the distribution of AETRs on capital across OECD countries since 1980-85 but not on labour or on labour and consumption combined (see Table 1).

### III. Estimates based on a modified version of the Mendoza *et al.* methodology

#### *Correcting the treatment of social security and private employers' contributions to pension funds*

16. There are a number of problems with the treatment of social security in the Mendoza *et al.* equations. First, employees' social security contributions (2100) are counted twice in the numerator of equation (2) for the AETR on labour. They are included in the National Accounts series for wages of dependent employment (W) and in total social security contributions (2000). Second, social security contributions of the self-employed (2300) are also included in total social security contributions (2000) in the numerator of (2) whereas all self-employed income, including social security contributions of the self-employed, is allocated to capital (3). Third, the fact that households are normally able to deduct social security contributions from taxable income is not reflected in the denominator of (2), which includes such contributions.<sup>18</sup> Finally, social security contributions (2400) that cannot be allocated to employees, employers or the self-employed have all been allocated to labour whereas they are paid out of both capital and labour income. These problems are corrected in equations (5) - (9). Employees' social security contributions are deducted from W in both the denominator of (5), the new equation for the AETR on household income, and the numerator of (8), the new equation for the AETR on labour. This treatment both eliminates the double counting of employees' social security contributions in (2) and corrects the implicit assumption in (1) concerning the non-deductibility of such contributions. The deductibility of households' social security contributions is further taken into account by deducting the social security contributions of the self-employed (2300) in the denominator of (5) and the numerator of (9), the AETR on capital. As these social security contributions (2300) represent a charge on capital income, which includes all income of the self-employed, they are moved from (8) to (9). Unallocated social security contributions, which are significant in some countries, notably Switzerland, are added to the numerator of (5) as they are paid by households. They are also deducted from the denominator of (5) as, like other social security contributions, they are tax deductible. Consistent with this treatment, unallocated social security contributions (2400) are deducted from the numerators of (8) and (9) in line with the shares of labour income ( $\alpha$ ) and capital income ( $\beta$ ) in household income. This ensures that household income tax (1100) and unallocated social security contributions (2400) are fully allocated to labour (8) and capital (9).

17. A related problem with the Mendoza *et al.* equation for the AETR on labour (2) is that the denominator excludes private employers' contributions to pension funds. Such contributions are a

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18. Employees' social security contributions are not deductible in Australia, Canada, Hungary, Mexico, Portugal, the United Kingdom and the United States. With the exceptions of Hungary and Portugal, such contributions in these countries are considerably lower than the OECD average. In Germany, Ireland, Poland and Turkey deductions are for a flat amount. Treating employees' social security contribution as deductible when they are not results in too much household tax being allocated to capital (overstating the AETR on capital) and not enough household tax being allocated to labour (understating the AETR on labour).

significant part of total labour earnings in a number of countries. Failure to include these contributions in the denominator of (8) means that the denominators of (8) and (9) do not add up to total GDP, as they should. This problem is corrected in (8) by replacing the existing terms in (2) with (the National Accounts series) total compensation of employees (WSSS), which includes such contributions and the existing terms. The modified equations incorporating this and the other changes are as follows:

$$\tau_h = (1100)/(OSPUE+PEI -2300 + W - 2100 -2400) \quad (5)$$

$$\alpha = (W -2100)/(OSPUE + PEI -2300 +W -2100) \quad (6)$$

$$\beta = 1 - \alpha \quad (7)$$

$$\tau_l = (\tau_h *(W -2100 - \alpha 2400) +2100 +2200 +\alpha 2400 +3000)/WSSS \quad (8)$$

$$\tau_k = [\tau_h *(OSPUE +PEI -2300 -\beta 2400) +2300 + \beta 2400 +1200 + 4100 + 4400]/OS \quad (9)$$

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

18. Mendoza *et al.* assume unrealistically that all income from self-employment is a return to capital. This assumption is now dropped in favour of an approach that assigns 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 in this paper is to assume that the self-employed “pay themselves” the same annual salary net of social security contributions as that earned by the average employee. This is given by wages and salaries of dependent employment (W) minus employees’ social security contributions (2100), all divided by dependent employment (EE). 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:

$$WSE = ES * ((W -2100)/EE) \quad (10)$$

19. This change does not affect (5) as it is not necessary to distinguish between the labour and capital components of household income to calculate the AETR on households. However, (6) must be modified so that imputed wages of the self-employed (WSE) are also taken into account when determining the share of labour in household income net of social security contributions (11). The equation for the AETR on labour (8) must also change to include self-employed labour income (WSE) in the expression for labour income in the numerator used for allocating labour’s share of household tax (1100) and unallocated social security (2400). Labour income of the self-employed including social security contributions (WSE + 2300) must also be added to total labour income in the denominator of (8) and deducted from the capital income in the denominator of (9). Finally, with self-employed labour income now included in the denominator of (12), the social security contributions of the self-employed (2300) must be moved from the AETR on capital to the AETR on labour. These changes are reflected in the revised equations (12) and (13)<sup>19</sup> for the AETR on labour and capital, respectively.

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19. The inclusion of 1200 in the numerator of (13) 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, AETR on capital tend to be

$$\alpha = (W - 2100 + WSE) / (OSPUE + PEI - 2300 + W - 2100) \quad (11)$$

$$\tau_l = (\tau_h * (W - 2100 + WSE - \alpha 2400) + 2100 + 2200 + 2300 + \alpha 2400 + 3000) / (WSSS + WSE + 2300) \quad (12)$$

$$\tau_k = [\tau_h * (OSPUE + PEI - WSE - 2300 - \beta 2400) + 1200 + \beta 2400 + 4100 + 4400] / (OS - WSE - 2300) \quad (13)$$

20. This adjustment still underestimates self-employed labour income. Part-time employment is less widespread among the self-employed and many of the self-employed are professionals with high earnings. As higher labour earnings reduces the AETR on labour (the numerator in (12) rises proportionately less than the denominator), this means that it is still overstated, although less so than with the Mendoza et al approach. Concomitantly, the AETR on capital is still understated, although less so than with the alternative approach.

### *Making the consumption tax base comprehensive and comparable to the other tax bases*

21. Mendoza *et al.* exclude government wage consumption expenditures (CGW) from the consumption tax base on the grounds that they are not subject to indirect tax. However, many of the services provided by the government sector, such as education and medical care, are not subject to indirect tax either when they are privately provided. Consequently, failure to include government wages in the tax base would result in the AETR on consumption being overstated in countries where these (labour-intensive) services are publicly provided relative to the AETR in countries where they are publicly provided. In order to enhance cross-country comparability, the AETR on consumption is calculated in (14) using total final consumption expenditures as the base. The other change in (14) is to express the tax base in gross terms (i.e., including indirect taxes). This enhances comparability with the other AETRs. This is particularly important for labour as the relevant tax burden affecting labour supply decisions includes both labour and consumption taxes.

$$\tau_c = (5110 + 5121) / (CP + CG) \quad (14)$$

22. A factor to bear in mind when interpreting estimates of the AETR on consumption based on (4) or (14) is that these expressions include 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,<sup>20</sup> the problem is more direct, in that such taxes may apply to investment expenditures more generally. Unfortunately, it is not possible to adjust (14) adequately for this problem in either case. 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. Allocating such taxes to consumption and investment in proportion to the share of each in GDP is unlikely to be a satisfactory solution because rates are generally lower on

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overstated, although the degree of the distortion is unlikely to be great because such companies pay only a small share of total corporate taxes.

20. These countries are the United States, Canada, Australia (until 2000), Hungary, Iceland, Switzerland (until 1995) and Turkey.

investment goods.<sup>21</sup> Thus, (14) overstates the AETR on consumption by including indirect taxes on investment 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.<sup>22</sup>

### *Reallocating tax data*

23. There are two aspects of classifications of data in *Revenue Statistics* that significantly undermine international comparability. One is that the household tax (1100) series includes business taxes in a number of countries (Table A5). These taxes are akin to corporate taxes and similarly should be allocated directly to capital.<sup>23</sup> The other is that the *taxe d'habitation* in France and Council Tax in the United Kingdom, which are broadly similar taxes,<sup>24</sup> are classified differently: *taxe d'habitation* is included in 1100 while Council Tax appears in 4110. As the base for these taxes is property, the preferred classification is property tax, as in the data for the United Kingdom. In the remainder of this paper, business taxes (Table A5) are deducted from 1100 and added to 1200 (in Japan, Germany, Italy, Austria and the Czech Republic) and *taxe d'habitation* is re-classified as a property tax.

24. A problem of comparability also arises in respect of unallocated social security contributions (2400) in Switzerland. This category includes all medical insurance premiums in Switzerland, whereas in other countries either all medical insurance premiums or voluntary premiums are not included in social security contributions. Owing to a lack of historical data, the Swiss data for 2400 have not been adjusted. However, a breakdown between the compulsory and voluntary components of medical insurance is available since 1996, when basic cover became compulsory. These suggest that the overstatement of social security contributions in Switzerland is modest; voluntary health insurance premiums amounted to 8 per cent of social security contributions (2000) in 1996. (Another point to bear in mind in respect of unallocated social security contributions (2400) is that the data appearing for Austria are not unallocated at all, but merely an alternative classification of total social security contributions.)

25. Mendoza *et al.* ignored taxes on income, profits and capital gains that had not been allocated to households or companies. These taxes (1300) are added to household tax (1100) and/or company tax in the remainder of this paper on the basis of what seems most appropriate. The countries concerned and the treatment adopted in each case are as follows:

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21. Nevertheless, this approach does enable an assessment to be made of the importance of adjusting for general indirect taxes on investment goods. At the same time, it needs to be borne in mind that the resulting estimates underestimate the AETR on consumption because such taxes are normally higher on consumption goods than on investment goods. For the countries that had such taxes in 1991-97, the revised AETR on consumption for 1980-85, 1986-90 and 1991-97 respectively are as follows: United States 4.8, 4.3, 4.6; Canada 10.6, 11.2, 11.2; Australia 9.8, 8.8, 7.2; Iceland 13, 15.7, 21.4; Ireland 24.1, 24.8, 24.1; Switzerland 6.2, 6.6, 7.2; and Turkey 3.2, 6, 8.2. Most of these revised rates are less than one percentage point lower than the unadjusted estimates. In countries that have reduced or abolished such taxes and introduced VAT (Canada and Switzerland), the adjusted AETR on consumption have increased by more than the unadjusted estimates since 1980-85.
22. The exceptions are Canada, Hungary, Iceland and Turkey.
23. 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 AETR on capital (too much of household taxation is allocated to capital) and understate the AETR on labour.
24. Both taxes have a property base and are paid by occupants, regardless of whether they are tenants or owner-occupiers.



- Canada, non-resident withholding tax is added to 1200;
- Austria, tax on interest is added to 1100;<sup>25</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, this category, which mainly consists of taxes on the earnings of pension funds and life insurance, 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.

26. There are also a number of property taxes that Mendoza *et al.* did not take into account, notably wealth taxes and estate, inheritance and gift taxes. Such treatment seems inappropriate as these taxes can be considered as surcharges on capital income. In the remainder of this paper, all taxes on property (4000) are taken into account<sup>26</sup>. Accordingly, the revised AETR on capital is given by (15).

$$\tau_k = [\tau_h * (OSPUE + PEI - WSE - 2300 - \beta 2400) + 1200 + 4000] / (OS - WSE - 2300) \quad (15)$$

27. Mendoza *et al.* also abstracted from a number of indirect taxes that should be taken into account in the AETR on consumption. These taxes include excise taxes (5121), which are mainly levied on tobacco and motor vehicle fuels,<sup>27</sup> profits of fiscal monopolies (5122), customs and import duties<sup>28</sup> (5123), taxes on specific services (5126), other taxes on specific goods and services (5128)<sup>29</sup> and taxes on the use of goods

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25. 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.

26. It is implicitly assumed that all such taxes relate to the income flows appearing in the denominator of (15). 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 AETR on capital.

27. Ideally, only that part of excises or motor vehicle fuels that relates to final consumption should be taken into account. Unfortunately, such disaggregation is not possible. Consequently, the revised estimates will tend to overstate the AETR on consumption as they include excises on motor vehicle fuels used in production.

28. Mendoza *et al.* 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.

29. 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).

and performance activities (5200). Equation (16) for the AETR on consumption includes these amendments.

$$\tau_c = (5110 + 5121 + 5122 + 5123 + 5126 + 5128 + 5200) / (CP + CG) \quad (16)$$

28. Many countries have taxes (6000) that cannot be allocated to any of the categories in *Revenue Statistics*. In most cases, these taxes are small in relation to GDP.<sup>30</sup> As in Mendoza *et al.*, we abstract from these taxes throughout this paper.

### *Revised AETR estimates*

29. With the Mendoza *et al.* methodology revised as described, AETRs on capital and on consumption are somewhat higher and AETRs on labour are lower. The average AETR on capital in OECD countries was 26.6 per cent in 1991-97 (Table 4); as noted above, this rate is understated insofar as self-employed labour income is underestimated, albeit less so than in the Mendoza *et al.* estimates themselves. The group of countries that has high rates relative to the average is now limited to the United Kingdom<sup>31</sup> and Canada: New Zealand and Sweden have dropped out of this group. Germany, Austria and Portugal continue to have low rates but not Greece. Finland and Ireland now join the group of countries with low rates. A considerably larger group of countries is now classified as having AETRs on labour significantly different from the OECD average (33.4 per cent). Denmark, Finland, and Poland now join Sweden in the group with high rates. And the United States, Japan, Greece, New Zealand and Portugal now join the United Kingdom, Australia, and Korea in the group with low rates. By contrast, there are now fewer countries with AETRs on consumption that differ significantly from the OECD average (17.1 per cent). Only the United States, Japan and Switzerland continue to be classified as having low rates; Australia and Mexico have dropped out of this group. The Czech Republic joins Denmark, Finland, Iceland, Ireland, and Norway in the group with high rates but Austria and Sweden leave the group. There are few changes in the classification of countries with AETRs on labour and consumption that differ significantly from the OECD average (42.7 per cent): the United States, Japan and Korea continue to have low rates, but not Australia; Denmark, Finland and Sweden are joined by Hungary in the group with high rates.

30. These results are not greatly affected by cyclical factors. In about half of the countries for which full data sets are available, none of the AETRs is significantly affected by the output gap (Table 5). The countries in which cyclical factors appear to be most important are the United States (the output gap is significant for all AETRs except on consumption), Australia (the output gap is significant for all AETRs except on labour) and Belgium (the output gap is significant for the AETRs on labour and on labour and consumption combined). The AETRs that most depend on cyclical factors are on capital and on labour and consumption, with the output gap being significant in five countries in each case.

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30. Countries where such taxes amount to 0.5 per cent of GDP or more are (percentages in brackets): Turkey (3.7); France (1.7); Hungary (0.8); Korea (0.7); Austria (0.5); Italy (0.5); and the United Kingdom (0.5).

31. As previously noted, a factor contributing to this outcome is the inclusion of tax revenues on oil and gas production. This factor also boosts the AETR on capital in Norway (see Box 3). On the other hand, the brief replacement of household property tax in the early 1990s by the Community Charge (poll tax) tends to reduce the average AETR on capital in the United Kingdom over this period.

31. Average trends in the revised AETR estimates for OECD countries are the same as those found using the updated Mendoza *et al.* equations except for consumption, where the average annual increase (0.1 per cent) is slightly lower (Table 6). (AETR estimates are plotted in Figures 1.a-d). Thus, the revised estimates, consistent with the Mendoza *et al.* conclusions, suggest that, on average, OECD countries have focused the increase in the tax burden on labour. There are few changes in the classification of countries with average growth rates in AETR significantly different from the OECD average. Greece and Korea now join Portugal in the group of countries with a high average increase in the AETR on capital. No country has a large decline in its AETR on capital now that New Zealand has dropped out of this category. With respect to the AETR on labour and consumption combined, Finland joins Italy in the group with a large increase while Portugal drops out of this group. The United Kingdom is no longer in the group with a large reduction in the AETR on labour and consumption combined, leaving New Zealand alone in this category.

32. The trend shift in the OECD average relative tax burden (as indicated by the average annual percentage changes in AETRs) from capital to labour reflects a decline in labour's share of national income that has not been matched by a decline in labour's share of the total taxation (Table 7). Indeed, both labour and capital taxes have increased as a share of GDP over the last two decades.

33. A point to bear in mind with both the Mendoza *et al.* estimates and the revised estimates is that AETRs may not be representative in the context of substantial revenues from resource taxes. For example, the AETR for capital in Norway is estimated to have significantly declined since the early 1980s<sup>32</sup>. However, this reflects the fall in taxes on oil and gas. The AETR for capital in mainland Norway (*i.e.*, excluding North Sea oil) was actually broadly unchanged in the most recent period from the level in the early 1980s (see Box 3).

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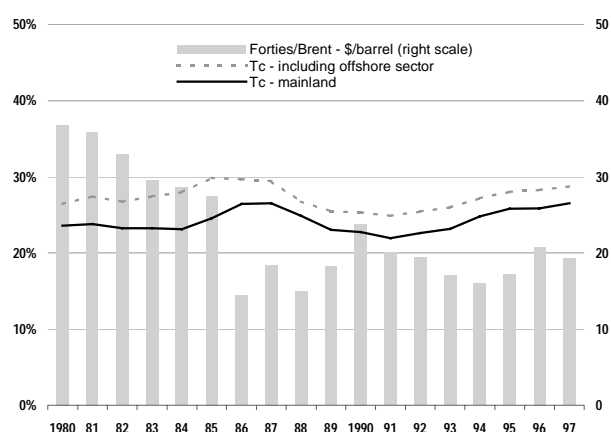
32. As noted above, tax revenues on oil and gas production also affect the estimates for the United Kingdom, although to a lesser extent.

### Box 3. Case study: effective tax rates in Norway

The average effective tax rates (AETR) in this study are aggregate indicators that may not always be suited to an individual country's characteristics. This is particularly true in the case of Norway where the offshore sector (oil industry) accounts for a significant share of overall profits in the economy<sup>1</sup> and is also subject to significant sector specific taxes.

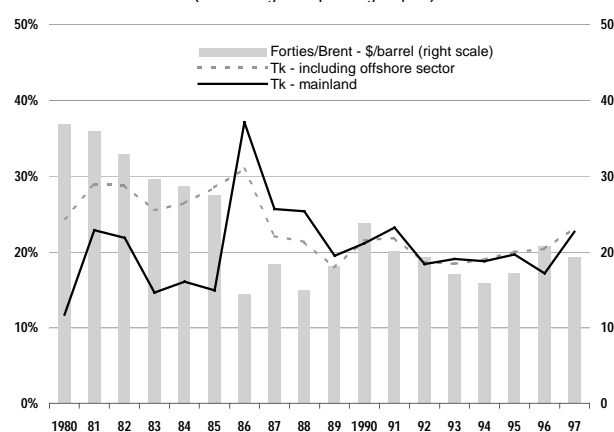
Two estimates of the AETR on consumption are provided (Figure 1). The first estimate (which includes the offshore sector) uses the methodology adopted in this paper -- all indirect (offshore and on-shore) taxes have been attributed to consumption with a weight of unity. The second estimate removes the "oil and gas products" and "CO<sub>2</sub>" taxes from total indirect taxes. The AETR on mainland consumption follows a broadly similar path to the AETR on consumption including the offshore sector, but is about 4 percentage points lower over 1980-97. However this average difference hides trends within the period. Before the 1986 oil-price crisis, the difference between the estimates rose from 2 percentage points in 1980 to a maximum of 5 percentage points in 1985. Firmer oil prices or more favourable exchange rate conditions underpinned increases in this gap. After 1986, this difference narrowed to 2 percentage points.

Figure 1. Effective tax rates on consumption (Tc)



Note: The reference price of crude is a continuous series based on Forties(1980-84) and Brent(1985-87)

Figure 2. Effective tax rates on capital (Tk)  
(based on gross operating surplus)



In order to calculate the AETR on capital (based on gross operating surplus) for the mainland, it is necessary to estimate the operating surplus of the offshore sector. This was calculated as a residual of offshore GDP less compensation of employees in the offshore sector, less indirect taxes related to the oil industry, less operating surplus of the State Direct Financial Interest (SDFI). The operating surplus of state companies such as Statoil, Norsk Hydro, or Saga Petroleum, is included in the offshore estimate. Once again, two estimates are provided (Figure 2). The mainland estimate removes direct taxes on oil-related activities from realised tax revenue flows (this includes ordinary taxes on income and wealth from the extraction of oil as well as a the special income tax) and the estimated offshore gross operating surplus from the capital base.

The new estimate underscores the importance of direct taxes raised on oil-related activities as a share of capital taxes. These taxes peaked in 1985 and subsequently declined sharply, reflecting the combined effects of a fall in oil prices, a weaker dollar, and tax reforms favouring a more generous treatment of the offshore sector. Direct taxes bottomed out in 1988 before they began to trend upwards again. Whereas the AETR on capital for the whole economy has declined since the early 1980s, the AETR for the mainland economy has risen. While there were significant differences in the AETR on capital for whole economy and the mainland economy in the 1980s, this has not been so in recent years. The peaks of 1986 and 1987 on the other hand illustrate the sensitivity of the estimates with respect to the level of profits (the capital tax base) in the economy.

1. The estimated operating surplus in the offshore sector (which excludes "State Direct Financial Interest" - SDFI) has been close to 30 per cent of gross operating surplus in recent years

#### IV. Effects of relaxing some assumptions about capital income

34. The implicit assumption underlying the preceding analysis that all household income is taxed at the same rate is not realistic. Some forms of household capital income receive favourable tax treatment. In particular, pension fund and life insurance earnings, which are imputed to households in the National Accounts (such earnings are included in PEI), are not taxed in most countries or are taxed at low rates. In addition, imputed rentals on owner-occupied housing (included in OSPUE) are not taxed at all in most countries or are taxed at very favourable rates in some other countries. Another problem is that household dividend receipts (included in PEI) are mainly taxed at the corporate level rather than the household level in many countries. In other words, there is relief from double taxation in many countries, reducing or eliminating household taxation of dividends. Yet another problem is that interest on government bonds is included in household capital income (through PEI), yet for the most part such interest is not a distribution of (government) operating surplus (*i.e.*, capital income). Accordingly, most such interest should not be taken into account for allocating household taxes to capital and labour.<sup>33</sup> Another problem still is that households often evade tax on some capital income, notably interest receipts. In the remainder of this section, an assessment is made of the impact on the AETR estimates of preferential tax treatment for the earnings of pension funds and life insurance and of relief from double taxation of dividends. Unfortunately, it is not possible to gauge the effects of preferential tax treatment for imputed rentals on owner-occupied housing or of the inappropriate treatment of interest on government bonds owing to a lack of data. However, an upper limit of allowing for these factors together with preferential tax treatment for pension fund- and life insurance earnings, relief from double taxation of dividends and some tax evasion is to assume that households do not pay tax on capital income. The results of making this assumption are discussed in the last part of this section.

##### *Preferential tax treatment for pension fund and life insurance earnings*

35. As noted above, households' savings with pension funds and life insurance companies receive preferential tax treatment in most countries, contrary to the implicit assumption in the preceding analysis that all household income is taxed at the same rate. In most countries, contributions to pension funds are tax deductible, fund earnings accumulate tax-free but distributions are taxed (Table 8); this treatment is generally referred to as exempt-exempt-taxed (EET). Such treatment is represented in equation (17), where all variables are understood to be expected values:

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33. Apart from over-allocating household taxes to capital, interest on government bonds does not pose much of a problem for AETR estimates. Such interest is not included in the denominator of the AETR on capital equation; rather, this includes government operating surplus. While some tax on interest on government bonds may be included in 1200 (in the numerator of the AETR on capital equation), this is unlikely to be a serious distortion for two reasons. First, most government bonds not held directly by households are held on their behalf by pension funds and life insurance companies and these entities do not pay tax on earnings in most countries. Second, most of the remaining government bonds are likely to be held by banks. As they are highly geared, these bond holdings are largely debt financed. This means that the tax liability on this interest falls not on banks but on lenders to banks. Ultimately, this interest income mainly accrues to households.

$$FV = [C/(1-t)] * (1+r)^n * (1-t) \quad (17)$$

$$= C * (1+r)^n$$

where

FV = final value;

C = after-tax contribution;

t = tax rate;

r = rate of return;

n = the number of periods during which the investment is held.

Provided that the tax rate against which contributions are deducted is the same as that on distributions and that earnings accumulate tax-free, it does not make any difference to the expected final value of the fund whether contributions are tax-deductible and distributions are taxed (EET) or contributions are not deductible and distributions are not taxed (TEE).<sup>34</sup> In these circumstances, the only tax concession is that fund earnings accumulate tax-free. Even so, this represents a substantial tax advantage compared with the standard income tax treatment, as shown in equation (18), which would apply to savings placed in a bank account or used to purchase a bond. For example, assuming a 5 per cent rate of return (before tax) and a 35 per cent tax rate, the return over 40 years from placing funds in a pension fund is 604 per cent compared with 259 per cent for a bank account or bond holding. If the tax rate in retirement is lower than that against which contributions are deducted, as is generally the case owing to declining income after age 50-55, tax deferral on these contributions provides an additional benefit under EET.

$$FV = C * [1+r * (1-t)]^n \quad (18)$$

36. Savings with life insurance companies in most countries benefit from the same principal tax concession as pension fund saving, namely that earnings are not taxed as they accumulate. In general, contributions are made out of tax-paid earnings (*i.e.*, contributions are not deductible) and distributions are tax-free (usually after a minimum holding period) or contributions are tax-deductible and distributions are taxed. Thus, the typical tax-treatment is either TEE or EET (as for pension funds). As noted above, these are equivalent provided that the tax rate applying at the time that contributions are made is the same as that applying when distributions occur.

37. Preferential tax treatment of the earnings of pension funds and life insurance investments results in the AETR on household income being understated in the above estimates because these earnings are imputed to households in the National Accounts.<sup>35</sup> This tax preference is then allocated to both labour and capital, whereas it should be entirely allocated to capital. Thus, the AETR on labour is underestimated and the AETR on capital is overestimated. To avoid these distortions, such earnings should be deducted from the household income tax base in the denominator of the AETR on household income (equation 5) and in the numerator of the AETR on capital (equation 15). Unfortunately, such earnings data are not readily available for most countries. However, data on the financial assets of pension funds and life insurance

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34. However, TEE and EET will not be equivalent in ex post terms unless the outcome equals the expected value. If returns are higher (lower) than expected, taxes will be greater (lower) under EET than TEE. Effectively, taxation reduces rate of return risk under EET but not under TEE.

35. As noted above, such earnings are included in property and entrepreneurial income (PEI).

companies are generally available (Tables 9 and 10). By assuming a rate of return on such assets, we obtain an estimate of such earnings to be deducted from household income in equations (5) and (15). The assumed rate of return for this exercise is 5 per cent. (This happens to be the rate of return, excluding capital gains (which are not recorded as income in the National Accounts), on Swiss pension fund assets over 1990-96). This adjustment is also necessary for countries that tax such earnings because these taxes are not included with household taxes in (5), but rather are included directly in the numerator of the AETR on capital (15). The countries (for which data are available) that tax such earnings are Australia and Sweden, which apply a low rate (15 per cent), and Denmark and New Zealand, where the tax rates are respectively 35.8 per cent and 33 per cent. As data on the taxes paid on the earnings of pension funds and life insurance are available for Denmark and New Zealand, it was possible to obtain a more accurate estimate of such earnings for these countries. These more accurate estimates were used for these countries rather than those based on a 5 per cent rate of return.<sup>36</sup>

38. With these adjustments, the average AETR on capital (based on gross operating surplus) over 1991-96 for OECD countries was about 2 percentage points lower than the unadjusted estimate, and the AETR on labour was about 1 percentage point higher than the unadjusted estimate (Table 11). At the same time, there is considerable variation in the effects of the adjustment on the estimates for individual countries. Adjustments to the AETR on capital range from around 1 percentage point in European countries with large pay-as-you-go pension systems to almost 5 percentage points in the Netherlands, where most of the retirement income system is funded.<sup>37</sup> While these estimates undoubtedly underestimate the effects of savings preferences, notably by abstracting from the benefit of lower marginal tax rates in retirement (owing to a lack of data), the differences from the unadjusted estimates are not so great for most countries as to make the unadjusted estimates misleading.

### ***Relief from double taxation of dividends***

39. Most countries provide some form of relief from double taxation of dividends. This conflicts with the implicit assumption in both the updated and revised Mendoza *et al.* equations that households pay the same tax rate on dividends as on any other income. Relief is provided through dividend imputation systems (Table 12) and/or low-flat rate systems (Table 13); Italy, Finland and Norway provide relief through both systems.<sup>38</sup> Failure to adjust for such relief means that AETRs on household income and on labour are

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36. As it turns out, the rate of return on Danish pension fund and life insurance assets is not much different from the assumed rate of 5 per cent, the rate of return achieved by Swiss pension funds over 1991-96. The rate of return on New Zealand pension fund and life insurance assets cannot be calculated owing to a lack of data on their assets.

37. The magnitude of these adjustments is much smaller than estimated by Ruggeri *et al.* (1997) for Canada. This is because they counted as tax preferences to be assigned to capital not only the exemption of pension fund and life insurance earnings from taxation, but also tax expenditures on deductions for contributions to pension funds net of taxes paid on pension benefits. However, as noted above, to the extent the tax rate applicable when contributions are made is the same as that when benefits are received, there is no tax preference from the deferral of tax on labour income over and above that resulting from the tax-exempt treatment of fund earnings. Most of the difference between tax expenditures on deductible contributions and taxes on pension benefits reflects growth in labour incomes rather than a tax preference to capital.

38. In Finland and Norway, the combination of dividend imputation credits and a flat tax rate on dividends that is the same as the company tax rate means that, typically, no personal income tax is due on dividend receipts. This was also true in New Zealand, where the top personal tax rate (33 per cent) was the same as the company tax rate. Since 1998, personal taxpayers in Italy have been able to choose between a dividend imputation credit, as formerly, or paying a low flat tax rate (12.5 per cent). The dividend imputation credit is more valuable up to a marginal income tax rate of 44 per cent, beyond which point it would be more attractive to opt for the flat tax rate. Dividends are exempt from personal income tax in Greece.

understated and AETRs on capital are overstated. In principle, such relief could be adjusted for by removing dividend receipts from household income in the denominator of the AETR on household income and from the numerator of the AETR on capital and transferring taxes paid by households on dividends directly to the numerator of the AETR on capital. Unfortunately, this cannot be done for most countries owing to a lack of data on taxes paid by households on dividend receipts; by contrast, data on household dividend receipts (including those imputed from pension funds and life insurance) are available in most countries' National Accounts. However, this problem does not arise in Finland, Norway and New Zealand because households pay no extra taxes on dividend receipts; the flat-rate tax (28 per cent) on dividends in Finland and Norway and the top marginal tax rate in New Zealand are the same as the imputation credit rates. Removing household dividend receipts in Finland and New Zealand from the denominator of (5) and the numerator of (15) reduces the AETR on capital in 1991-96 by 1.6 and 1.1 percentage points respectively and raises the AETR on labour by 0.3 percentage point in both countries.<sup>39</sup>

### *Assuming that households do not pay tax on capital income*

40. As noted above, it is not possible to adjust the estimates directly for the fact that households pay little or no tax on imputed rentals on owner-occupied dwellings in most countries. Yet this is clearly an important violation of the implicit assumption underlying AETR estimates that all household income is taxed at the same rate. Similarly, data are not available to remove interest receipts on government bonds from household income. An upper limit for these two adjustments, together with those concerning the preferential tax treatment of pension fund and life insurance earnings, relief from double taxation of dividends and tax evasion is to assume that households pay no tax at all on capital income. This clearly overstates the position but does provide an upper limit for the potential distortions to the estimates caused by violation of the implicit assumption that capital income is taxed at the same rate as other household income. On this basis, the AETR on capital based on gross operating surplus is about 11 percentage points lower on average in the OECD area than in the revised estimates and the AETR on labour is about one percentage point higher.<sup>40</sup>

## **V. Limitations of the methodology**

41. As noted above, AETRs have been developed to analyse the influence of taxes on key macroeconomic variables such as saving, investment and employment. The rates that have been calculated are backward looking average rates whereas marginal expected rates, for which aggregate data are unavailable, would be preferable for this kind of analysis. Accordingly, an assessment needs to be made about how well backward-looking AETR proxy expected marginal rates. Clearly, backward-looking AETR will not be a very good proxy for expected marginal rates when tax policy has recently changed or is expected to do so. The tax treatment of losses may also cause AETR in particular years to be a poor proxy of marginal expected rates. In most tax systems, businesses are able to carry forward non-capital (business) losses to offset tax payable in future years. AETRs on capital will tend to be overstated when losses are incurred but understated when they are subsequently used to reduce tax liabilities. This problem can be attenuated by averaging over the business cycle or by focusing on trends, as has been done in this paper. Differences between expected and past inflation rates also need to be taken into account when assessing

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39. This calculation cannot be done for Norway because National Accounts data on dividend receipts are not available.

40. The OECD averages for AETRs on capital (based on gross operating surplus) assuming that households do not pay tax on capital are for 1980-85, 1986-90, 1991-97 respectively (in per cent): 16.6, 17.4, and 17.6. The corresponding AETRs on labour are: 31.0, 32.9, 34.4.



how well backward-looking AETR proxy expected rates, as inflation tends to increase the AETR on capital<sup>41</sup>.

42. Another point to bear in mind is that in the presence of cross-border capital flows the appropriate coverage of domestic and international sectors in the AETR on capital differs depending on whether saving or investment behaviour is to be analysed. For the analysis of (national) saving behaviour, the numerator should include all taxes paid by residents while the denominator should include residents' world-wide income. The standard definition differs from this "customised" definition in that foreign taxes paid by residents are not included in the numerator and residents' foreign-source income is not included in the denominator. (The fact that the numerator and denominator include, respectively, host country taxes paid by foreigners and host country income accruing to foreigners can be abstracted from as it is assumed that all domestic-source capital income is taxed at the same rate). Compared with the "customised" measure, the standard measure understates (overstates) the tax burden on capital insofar as foreign taxes paid by residents represent a greater (smaller) proportion of the numerator than does foreign-source capital income of the denominator. In the case of tax evasion on foreign-source income, the direction of this bias is unambiguous - the tax burden on capital is overstated because the "standard" measure includes all the taxes paid by residents on their capital income but not all of their income. For the analysis of (domestic) investment behaviour, the numerator of the AETR on capital should include all taxes paid on domestically generated capital income while the denominator should comprise domestic capital income. The standard definition differs from this "customised" definition in that the numerator includes domestic taxes paid by residents on foreign source income but does not include foreign taxes paid by foreign investors on their capital income from the host country. The standard measure overstates (understates) the tax burden on capital insofar domestic taxes paid by residents on their foreign-source income exceed (are less than) foreign taxes paid by foreign investors on their capital income from the host country.

43. Even the "customised" AETR on capital may not be a very good guide to the influence of taxation on investment in the presence of tax planning. This is because tax planning in a context of cross-border economic activities enables companies to separate investment location from earnings location. A given AETR on capital could attract investment but repel earnings if depreciation allowances are generous but nominal tax rates are high, or have the opposite effects if depreciation allowances and nominal tax rates are low. Information about the structure of taxation is also needed in order to assess the influence of taxation on investment behaviour.

44. Another limitation of AETR analysis is that household tax data do not distinguish between capital and labour income. In order to allocate household tax to capital and labour, it is assumed that all household income is taxed at the same rate. However, as noted above, there are a number of instances where personal capital income is taxed at lower rates than labour income. In addition to the cases discussed above, countries frequently have a low flat rate of tax on interest receipts (see Table 13) In view of these considerations, the AETR on capital presented in this paper tend to be overstated and the AETR on labour understated. The calculation in the previous section assuming that households pay no tax at all on capital income indicates the upper limit of this distortion. On this basis, AETRs on capital could be a great deal lower than in the standard calculations and the AETR on labour considerably higher. Trends in AETRs are also distorted by preferential treatment for household capital income insofar as the extent of such treatment has changed. Many countries introduced lower personal tax rates on capital income over the period covered by this study. At the same time, investments in pension funds, life insurance and owner-occupied

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41. The interaction of inflation and nominal tax systems based on historic costs raises AETR on capital because the real value of depreciation allowances is reduced and the real value of inventory gains is overestimated. While corporations benefit from being able to deduct the inflation premium component of interest payments, this benefit is largely at the expense of households, which pay tax on this premium.

housing have grown substantially. Accordingly, there is likely to have been a greater shift in the relative tax burden from capital to labour than indicated in the standard estimates.

45. The other assumption made in this paper to allocate self-employed income to labour and capital is that the self-employed “pay” themselves the same wage as dependent employees. As noted above, this approach underestimates labour income because part-time employment is less widespread among the self-employed and many of the self-employed are professionals with high earnings. Consequently, the AETR on labour tends to be overstated and the AETR on capital understated. If self-employment has grown more rapidly (slowly) than dependent employment, the extent of this distortion will have grown (diminished) over time, overstating (understating) the trend shift in the relative tax burden from capital to labour.

46. It should also be borne in mind that the analysis presented in this paper generally abstracts from tax shifting -- only primary tax burdens are analysed. There is, however, an exception for the AETR on consumption, where tax shifting is implicitly assumed for tax-exempt goods and services; they are included in the denominator on the grounds that suppliers pass on the VAT on their inputs into higher output prices.

47. Finally, trends in AETRs on capital only capture part of the effects of international tax competition. When companies shift their tax base abroad through thin capitalisation, this is reflected in a decline in the AETR on capital because company tax receipts fall but there is no change in domestic operating surplus (which includes interest). By contrast, when companies use transfer pricing or a physical transfer of operations to shift their tax base abroad, this is not generally captured in the AETR on capital because both the numerator and the denominator decline. Hence, the effects of international tax competition on AETRs on capital are likely to be understated in this paper.

## VI. Conclusion

48. Average effective tax rates (AETRs), also known as “implicit tax rates” and “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.* for calculating AETRs. 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 change is that the assumption that all self-employed income is capital income is dropped in favour of assuming that the self-employed earn both capital and labour income. This is done by assuming that they “pay themselves” a wage equal to the average wage for employees. While this adjustment goes in the right direction, it does not go far enough, as micro-data suggest that self-employed labour earnings are higher on average than for employees. In addition, the treatment of social security contributions and employers’ contribution to pension funds is corrected in the revised equations and a wider range of indirect taxes is included in the AETR on consumption. With these changes, AETRs on capital (based on gross operating surplus) and on consumption are somewhat higher and AETRs on labour are lower than in the estimates based on the updated Mendoza *et al.* equations. Nevertheless, AETRs on capital (based on gross operating surplus) remain lower than AETRs on labour in the revised estimates. Estimates based on both the updated and revised Mendoza *et al.* equations indicate that there has been a shift in the relative tax burden from capital to labour in OECD countries over the period 1980-97. This reflects a decline in labour’s share of national income that has not been matched by a decline in labour’s share of total taxation. In common with capital taxes, labour taxes have increased as a share of GDP over the period. In most cases the revised estimates are not greatly affected by cyclical factors.

49. Sensitivity analyses were also carried out to examine the effects of relaxing the assumption that capital income is taxed at the same rate as all other household income. The revised estimates are not

greatly affected in most cases by respectively allowing for preferential tax treatment of pension fund and life insurance earnings and for relief from double taxation of dividends. However, assuming that households pay no tax at all on their capital income has a significant effect on the estimates.

50. Considerable caution is required in interpreting AETRs, for both individual countries and in assessing general trends for OECD countries as a whole. The fundamental problems in splitting income tax between capital and labour are hard to solve. And both sets of estimates presented in this paper rest on the assumption that all capital income is taxed at the same rate. A brief inspection of most OECD countries' tax systems shows that this assumption is unrealistic, particularly for countries with preferential treatment for pension funds and largely funded retirement income systems. Cross-border flows and tax planning also are not taken into account, reducing the usefulness of the estimates for analysing the effects of tax on saving and investment behaviour. In addition, they are not very useful for assessing the effects of international tax competition because this can reduce both the numerator and the denominator of the AETR on capital. For such reasons, AETR 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 shift in the tax burden towards labour suggested by the estimates in this paper.

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Table 1. **Average effective tax rates - using Mendoza *et al.* methodology**  
Per cent

	Capital based on net operating surplus			Capital based on gross operating surplus <sup>1</sup>			Labour			Consumption			Combined Labour and consumption <sup>2</sup>		
	1980-85	1986-90	1991-97	1980-85	1986-90	1991-97	1980-85	1986-90	1991-97	1980-85	1986-90	1991-97	1980-85	1986-90	1991-97
United States	39.5	39.1	40.9	24.9	25.8	27.3	25.3	25.9	26.7	5.5	5.0	5.2	29.4	29.6	30.6
Japan	38.1	46.2	41.8	24.9	29.6	24.1	24.6	28.0	28.3	4.8	5.3	6.0	28.2	31.8	32.6
Germany	29.6	26.5	25.1	17.1	16.2	15.5	38.6	40.6	41.4	15.1	14.7	15.8	47.9	49.3	50.7
France	28.7	26.3	26.8	17.1	16.8	17.0	42.6	45.9	47.2	20.5	20.2	19.1	54.3	56.8	57.2
Italy	24.3	27.8	33.1	17.9	20.8	24.4	37.7	42.2	47.3	12.0	14.2	15.4	45.2	50.4	55.4
United Kingdom	67.8	61.2	48.2	39.4	38.4	31.9	27.5	25.2	23.7	16.5	16.7	16.7	39.5	37.7	36.5
Canada	38.3	43.3	51.3	25.2	28.1	30.6	24.3	28.5	31.9	12.6	12.9	12.3	33.9	37.7	40.3
Australia	41.9	43.7	41.4	24.0	26.2	25.7	21.9	24.3	23.2	10.9	10.2	8.3	30.4	32.0	29.6
Austria	21.4	21.9	23.4	13.7	14.0	14.7	44.1	44.7	47.3	22.2	22.1	20.9	56.6	56.9	58.3
Belgium	37.8	35.0	35.7	27.5	26.1	26.3	45.2	48.3	48.2	16.5	16.2	17.0	54.3	56.6	57.0
Czech Republic	..	..	38.0 <sup>3</sup>	..	..	18.3 <sup>3</sup>	..	..	41.6 <sup>4</sup>	..	..	19.2 <sup>4</sup>	..	..	52.9
Denmark	..	54.0	48.3 <sup>5</sup>	..	26.5	25.8 <sup>5</sup>	..	40.5 <sup>6</sup>	43.2	..	35.8 <sup>6</sup>	33.3	..	61.8 <sup>6</sup>	62.1
Finland	30.3	37.6	39.9	17.4	20.4	20.6	36.4	40.6	47.7	26.1	29.9	27.5	52.9	58.3	62.1
Greece	..	15.0	16.1 <sup>7</sup>	..	12.2	13.3	..	35.2	37.9	11.9	18.1	19.3	..	46.9	49.9
Hungary	..	..	..	..	..	..	..	..	42.9	..	..	20.2	..	..	54.4
Iceland	..	..	..	..	..	..	..	..	..	16.5	19.3	21.5	..	..	..
Ireland	26.6	23.1	22.6	18.7	17.5	17.5	23.3	27.2	27.3	24.1	24.8	24.1	41.8	45.2	44.8
Korea	11.0	14.4	21.7	8.9	11.2	16.3	3.8	5.5	8.6	10.4	11.5	13.8	13.8	16.4	21.3
Luxembourg	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Mexico	..	..	..	..	..	..	..	..	..	6.2	7.2	6.2	..	..	..
Netherlands	27.7	27.9	29.2	18.9	19.4	20.3	48.5	49.3	50.5	16.4	18.3	18.3	56.9	58.6	59.6
New Zealand	..	42.2 <sup>8</sup>	37.2	..	32.5 <sup>8</sup>	31.5 <sup>5</sup>	..	27.9 <sup>8</sup>	26.0	11.1	18.6	19.8	..	41.3	40.6
Norway	39.5	38.5	29.5 <sup>7</sup>	24.5	19.8	17.3 <sup>7</sup>	37.1	38.1	37.8	33.4	32.8	32.6	58.1	58.4	58.0
Poland	..	..	..	..	..	..	..	..	40.6 <sup>7</sup>	..	..	16.8 <sup>7</sup>	..	..	50.6 <sup>7</sup>
Portugal	..	11.2 <sup>9</sup>	16.7 <sup>3</sup>	..	10.0 <sup>9</sup>	11.4 <sup>3</sup>	..	26.2 <sup>9</sup>	29.5	12.9	18.7	20.9	..	40.0	44.2
Spain	13.5	19.9	21.5	9.8	14.9	16.0	32.4	35.4	37.8	7.3	12.0	13.1	37.3	43.1	46.0
Sweden	46.6	62.4	52.7	25.4	32.7	29.2	50.9	54.4	52.3	21.3	24.1	22.8	61.3	65.4	63.2
Switzerland	27.8	36.4	35.0	15.5	17.8	16.4	31.8	32.6	35.5	7.6	8.2	8.0	37.0	38.2	40.6
Turkey	..	..	..	..	..	..	..	..	..	3.2	6.3	10.4	..	..	..
OECD average	32.4	34.9	34.7	20.4	22.1	22.0	33.1	35.4	36.8	14.4	16.1	16.5	43.3	45.7	46.9
G7 average	38.0	38.6	38.2	23.8	25.1	24.4	31.5	33.8	35.2	12.4	12.7	12.9	39.8	41.9	43.3
EU average	32.2	33.6	32.6	20.3	21.6	21.2	38.8	41.2	42.8	17.1	19.2	19.3	49.8	52.6	53.7
OECD Standard deviation	13.4	13.8	10.8	7.4	7.5	6.0	11.7	12.0	12.1	7.9	8.0	7.6	13.1	13.2	12.9
EU Standard deviation	14.5	14.9	10.6	8.0	7.8	5.9	8.6	9.0	9.4	5.4	5.0	3.9	7.9	8.2	8.3

1. These estimates are made using gross operating surplus in the denominator of  $T_K$ . However,  $T_H$ , which is in the numerator of  $T_K$ , continues to be based on the net operating surplus of the household and private unincorporated enterprise sector.

2. The combined labour and consumption figures are the sum of the average labour rate plus average consumption rate net of labour tax (as households can only consume out of net income).

3. 1993-96 <sup>4</sup>. 1993-97 <sup>5</sup>. 1991-96 <sup>6</sup>. 1988-90 <sup>7</sup>. 1991-95 <sup>8</sup>. 1987-90 <sup>9</sup>. 1989-90.

Source: Authors' calculations based on OECD Revenue Statistics and OECD National Accounts.

Table 2. Annual changes in average effective tax rates - using Mendoza *et al.* methodology  
Percentage points, 1980-97<sup>1</sup>

	Net Capital		Gross capital		Labour		Consumption		Labour-consumption	
	Average	Standard deviation	Average	Standard deviation	Average	Standard deviation	Average	Standard deviation	Average	Standard deviation
United States	-0.3	1.8	0.0	1.0	0.2	0.6	0.0	0.2	0.2	0.6
Japan	0.4	2.0	0.0	1.4	0.3	0.9	0.1	0.2	0.4	0.9
Germany	-0.3	1.6	-0.1	0.9	0.2	0.7	0.0	0.5	0.2	0.7
France	0.1	0.8	0.1	0.4	0.4	0.7	0.0	0.6	0.3	0.6
Italy	0.5	2.3	0.4	1.6	1.0	1.2	0.2	0.8	0.9	1.1
United Kingdom	-0.7	5.1	0.0	2.6	-0.2	0.9	0.1	0.4	-0.1	0.9
Canada	0.7	2.7	0.3	1.1	0.6	0.7	0.1	0.9	0.6	1.0
Australia	0.0	3.4	0.1	1.3	0.3	0.9	-0.1	0.5	0.1	1.0
Austria	0.2	1.4	0.1	0.8	0.4	0.8	-0.1	1.1	0.3	1.0
Belgium	1.6	5.6	1.2	4.0	-0.2	2.5	0.0	0.4	-0.1	2.1
Czech Republic	-3.2	4.4	-1.5	0.5	-0.5	0.4	-0.2	0.3	-0.5	0.4
Denmark	-1.2	3.0	-0.1	1.5	0.4	1.1	-0.3	1.1	0.0	1.0
Finland	0.5	6.5	0.4	2.2	0.8	2.3	0.2	1.3	0.7	2.0
Greece	0.6	2.5	0.5	1.9	0.3	2.0	0.6	1.5	0.2	2.2
Hungary	..	..	0.0	..	0.4	3.3	1.2	1.9	1.0	2.2
Iceland	..	..	0.0	..	..	..	0.5	1.6	..	..
Ireland	-0.5	1.8	-0.2	1.3	0.4	1.3	0.4	1.4	0.6	1.7
Korea	0.7	1.6	0.4	1.1	0.3	0.6	0.2	0.6	0.5	0.9
Luxembourg	..	..	0.0	..	..	..	..	..	..	..
Mexico	..	..	0.0	..	..	..	0.1	0.8	..	..
Netherlands	0.0	2.6	0.1	1.6	0.1	1.7	0.1	0.5	0.2	1.4
New Zealand	-1.0	2.8	-0.8	2.3	-0.2	1.3	0.5	2.1	-0.3	1.2
Norway	-0.4	5.2	-0.3	2.7	0.1	0.9	0.2	1.4	0.2	0.9
Poland	..	..	0.0	..	-0.2	1.7	1.8	2.1	1.0	2.2
Portugal	1.3	2.3	1.1	2.0	0.6	0.8	0.6	2.3	0.9	1.6
Spain	0.4	1.7	0.3	1.3	0.4	1.0	0.5	0.8	0.7	1.1
Sweden	0.5	6.5	0.4	2.3	0.4	1.4	0.1	1.0	0.4	1.2
Switzerland	0.5	1.9	0.2	0.6	0.3	0.8	0.1	0.4	0.3	0.8
Turkey	..	..	0.0	..	..	..	0.7	1.1	..	..
OECD										
Average <sup>2</sup>	0.2		0.2		0.3		0.2		0.3	
Standard deviation <sup>3</sup>	0.7		0.4		0.3		0.2		0.3	

1. Estimates for some countries cover shorter periods, as indicated in Table 1.

2. Excluding Czech Republic, Hungary, Iceland, Luxembourg, Mexico, Poland and Turkey.

3. The OECD standard deviation relates to the series of country averages.

Source: Calculated from OECD Revenue Statistics, National Accounts and Analytical Data Base.

Table 3. **Total tax revenue**  
Per cent of GDP

	1980-85	1986-90	1991-97
United States	27.1	27.6	28.5
Japan	26.7	30.0	28.7
Germany	37.8	37.7	37.8
France	43.2	43.5	43.9
Italy	33.6	37.1	42.1
United Kingdom	37.2	36.8	35.0
Canada	33.2	34.9	35.8
Australia	28.2	29.7	28.6
Austria	41.0	41.7	43.2
Belgium	45.4	44.8	45.1
Czech Republic	..	..	40.5
Denmark	46.3	49.8	48.8
Finland	38.5	42.6	46.0
Greece	27.0	29.2	31.7
Hungary	..	..	43.9
Iceland	29.4	30.5	31.6
Ireland	35.4	36.4	34.0
Korea	17.4	17.4	20.2
Luxembourg	45.8	44.0	44.7
Mexico	16.7	16.9	17.2
Netherlands	44.8	45.9	44.5
New Zealand	32.4	36.3	36.5
Norway	43.0	43.1	41.4
Poland	..	..	41.0
Portugal	26.8	29.1	32.9
Spain	26.5	33.0	34.2
Sweden	49.6	54.7	50.3
Switzerland	29.9	31.4	32.7
Turkey	17.1	18.6	23.5
OECD average	33.8	35.5	36.1
G7 average	34.1	35.4	36.0
EU average	38.6	40.4	40.9

Source : OECD Revenue Statistics.

Table 4. Average effective tax rates - revised methodology<sup>1</sup>  
Per cent

	Capital based on net operating surplus			Capital based on gross operating surplus <sup>2</sup>			Labour			Consumption			Combined labour and consumption <sup>3</sup>		
	1980-85	1986-90	1991-97	1980-85	1986-90	1991-97	1980-85	1986-90	1991-97	1980-85	1986-90	1991-97	1980-86	1986-91	1991-97
United States	50.6	48.8	51.0	28.3	29.2	31.1	21.6	22.1	22.6	6.3	5.9	6.1	26.5	26.7	27.3
Japan	108.7	98.8	83.6	39.1	42.4	32.6	20.1	23.1	24.0	6.4	6.2	6.7	25.2	27.9	29.0
Germany	47.6	39.4	36.4	22.9	21.1	19.9	33.1	34.8	35.9	14.8	14.6	15.8	43.0	44.3	46.0
France	53.3	41.5	41.4	24.3	22.9	23.6	35.4	38.5	40.2	18.8	19.0	18.0	47.5	50.1	51.0
Italy	36.0	38.9	49.6	21.7	24.7	31.0	28.6	32.3	36.3	12.2	14.6	16.0	37.3	42.1	46.5
United Kingdom	95.5	90.2	68.6	46.4	47.1	38.4	24.3	22.3	21.0	16.0	16.4	16.9	36.4	35.1	34.3
Canada	53.9	62.4	87.7	29.9	33.6	38.6	22.5	26.3	28.7	16.4	14.9	13.1	35.2	37.3	38.0
Australia	66.2	59.3	56.2	26.1	28.0	28.0	21.4	23.7	22.6	14.0	13.5	11.9	32.5	34.0	31.8
Austria	35.4	34.2	34.4	18.9	18.8	18.9	37.0	37.8	41.8	20.9	21.4	20.0	50.2	51.1	53.5
Belgium	52.4	44.5	47.0	32.5	29.9	30.8	38.5	40.1	39.7	16.7	17.5	18.7	48.7	50.6	51.0
Czech Republic	..	..	63.7 <sup>4</sup>	..	..	23.1 <sup>4</sup>	..	..	36.4 <sup>5</sup>	..	..	22.7	..	..	50.8
Denmark	..	90.1 <sup>6</sup>	67.7	..	32.3 <sup>6</sup>	29.1 <sup>7</sup>	..	40.2 <sup>6</sup>	42.8	25.8	27.9	25.7	..	56.9	57.5
Finland	35.6	46.4 <sup>8</sup>	56.5	14.8	18.4	19.6	33.0	37.5	44.5	22.4	24.7	22.7	48.0	52.9	57.1
Greece	..	38.9 <sup>8</sup>	39.4 <sup>9</sup>	..	23.5 <sup>8</sup>	26.8 <sup>9</sup>	..	20.7 <sup>8</sup>	24.3	15.7	18.3	18.6	..	35.1	38.4
Hungary	..	..	..	..	..	..	..	..	39.6	..	..	25.7	..	..	55.1
Iceland	..	..	..	..	..	..	..	..	..	29.5	26.5	23.6	..	..	..
Ireland	57.4	30.0	27.6	23.9	18.6	18.7	21.2	24.9	25.1	22.3	23.7	22.8	38.8	42.7	42.1
Korea	19.9	25.7	49.0	13.4	16.2	26.8	3.5	5.0	7.7	17.2	17.1	16.0	20.1	21.3	22.5
Luxembourg	..	..	..	..	..	..	..	..	..	14.3	15.9	20.9	..	..	..
Mexico	..	..	..	..	..	..	..	..	..	15.0	13.9	12.6	..	..	..
Netherlands	39.2	38.8	40.7	22.5	23.4	24.7	41.1	42.0	41.0	16.1	18.3	18.7	50.6	52.6	52.0
New Zealand	..	55.4 <sup>8</sup>	50.1	..	38.2 <sup>8</sup>	34.9	..	25.7	24.2	11.9	17.9	19.8	..	39.0	39.2
Norway	49.7	56.3	38.1	27.1	22.8	20.2	33.8	34.7	35.5	27.6	27.4	26.9	52.1	52.6	52.9
Poland	..	..	..	..	..	..	..	..	42.9 <sup>10</sup>	..	..	19.8	..	..	54.2
Portugal	..	18.2 <sup>10</sup>	22.2	..	15.4 <sup>10</sup>	18.3	..	20.0 <sup>10</sup>	22.7	16.7	21.4	20.5	..	37.1	38.6
Spain	24.0	31.4	31.9	12.6	19.7	20.6	24.2	27.7	30.4	8.5	14.1	13.7	30.7	37.9	39.9
Sweden	56.6	80.2	63.5	25.5	35.3	30.5	46.8	51.0	48.5	17.7	20.4	18.7	56.2	61.0	58.1
Switzerland <sup>11</sup>	49.2	71.8	75.6	22.4	25.9	25.1	27.2	28.1	30.2	8.5	8.9	8.4	33.4	34.4	36.1
Turkey	..	..	..	..	..	..	..	..	..	6.0	8.0	11.2	..	..	..
OECD average	51.7	52.2	52.2	25.1	26.7	26.6	30.0	32.2	33.4	16.1	17.2	17.1	39.6	41.9	42.7
G7 average	63.6	60.0	59.8	30.4	31.6	30.7	26.5	28.5	29.8	13.0	13.1	13.2	35.9	37.6	38.9
EU average	48.4	46.9	45.3	24.2	25.1	25.1	33.0	35.3	36.8	16.6	18.6	18.7	44.3	47.3	48.3
OECD															
Standard deviation	21.9	21.2	17.7	8.4	8.6	6.2	8.1	8.3	8.6	6.2	6.0	5.5	10.5	10.9	10.9
EU															
Standard deviation	18.9	19.7	13.2	9.1	8.5	6.2	7.9	8.2	8.3	3.8	3.4	2.6	7.7	7.7	7.7

1. Based on a modified version of the Mendoza et al. methodology, as described in paragraphs 16-28.

2. These estimates are made using gross operating surplus in the denominator of  $T_K$ . However,  $T_H$ , which is in the numerator of  $T_K$ , continues to be based on the net operating surplus of the household and private unincorporated enterprise sector.

3. The combined labour and consumption figures are the sum of the average labour rate plus average consumption rate net of labour tax (as households can only consume out of net income).

4. 1993-96 5. 1993-97 6. 1988-90 7. 1991-96 8. 1987-90 9. 1991-95 10. 1989-90

11. Figures for Switzerland include all (private) medical insurance premiums in household taxation.

Source: Authors' calculations based on OECD Revenue Statistics and OECD National Accounts.



Table 5. Influence of the business cycle on AETRs  
1980-97

	Oupput gap is significant <sup>1</sup>			
	AETR on capital (based on gross operating surplus)	AETR on labour	AETR on consumption	AETR on labour and consumption combined
United States	X	X		X
Japan	X			
Gemrnay				
France			X	
Italy				
United Kingdom				X
Canada	X			
Australia	X		X	X
Austria		X		
Belgium		X		X
Finland				
Ireland				
Netherlands	X			
Norway				
Spain				
Switzerland				

1. The influence of cyclical factors on AETRs was tested using the following regression equation:

$$\tau_{x,t,s} = \alpha + \beta \tau_{x,t-1,s} + \gamma G_{t-1,s} + u_{x,t,s}$$

where:

$\tau$  = average effective tax rate;

$x$  = {capital (based on gross operating surplus), labour, consumption, labour and consumption combined};

$s$  = country;

$G$  = output gap from *OECD Economic Outlook 67*.

The country sample was limited to countries for which full data sets are available.

Source : Authors' estimates.

Table 6. Annual changes in average effective tax rates - revised methodology  
Percentage points, 1980-97<sup>1</sup>

	Net Capital		Gross capital		Labour		Consumption		Labour-consumption	
	Average	Standard deviation	Average	Standard deviation	Average	Standard deviation	Average	Standard deviation	Average	Standard deviation
United States	-0.5	2.9	0.0	1.2	0.2	0.5	0.0	0.2	0.1	0.5
Japan	-1.1	7.2	-0.5	2.1	0.3	0.8	0.0	0.2	0.3	0.8
Germany	-1.1	2.5	-0.4	0.9	0.2	0.6	0.0	0.3	0.2	0.6
France	-0.4	2.3	0.2	0.7	0.4	0.5	0.0	0.3	0.3	0.5
Italy	1.1	4.3	0.8	2.2	0.8	1.1	0.2	0.6	0.8	1.0
United Kingdom	-1.4	9.6	0.0	3.3	-0.2	0.7	0.1	0.3	-0.1	0.8
Canada	2.3	7.4	0.7	1.6	0.5	0.7	-0.1	0.6	0.4	0.8
Australia	-0.4	12.9	0.1	1.9	0.2	0.9	-0.1	0.5	0.2	1.0
Austria	-0.7	5.5	-0.1	1.5	0.5	0.7	0.0	0.8	0.4	0.9
Belgium	-0.1	2.0	0.1	1.1	0.2	1.0	0.1	0.3	0.3	0.9
Czech Republic	-4.6	11.2	-1.9	0.8	-0.3	0.3	-0.5	0.3	-0.6	0.3
Denmark	-5.3	8.6	-0.5	2.4	0.3	1.1	0.0	0.7	0.2	0.9
Finland	0.7	18.5	0.5	2.6	1.0	2.1	0.1	0.7	0.9	1.9
Greece	1.2	9.2	1.1	4.4	0.6	1.2	0.2	1.0	0.4	1.4
Hungary	..	..	..	..	0.2	2.5	0.5	1.3	0.4	2.6
Iceland	..	..	..	..	..	..	-0.3	0.8	..	..
Ireland	-4.5	8.2	-0.6	2.3	0.4	1.2	0.2	0.9	0.5	1.4
Korea	2.6	4.1	1.0	1.7	0.3	0.5	0.0	0.8	0.3	0.9
Luxembourg	..	..	..	..	..	..	0.4	0.7	..	..
Mexico	..	..	..	..	..	..	0.1	1.8	..	..
Netherlands	-0.3	4.2	0.0	1.9	-0.1	1.4	0.1	0.3	0.0	1.2
New Zealand	-0.7	4.8	-0.4	3.3	-0.2	1.1	0.4	1.3	-0.2	1.1
Norway	-0.3	9.2	-0.1	3.2	0.1	0.8	0.1	0.7	0.1	0.7
Poland	..	..	..	..	0.8	1.5	0.9	1.6	1.7	2.3
Portugal	1.1	2.4	0.8	1.8	0.4	0.7	0.2	1.3	0.3	1.2
Spain	0.6	2.4	0.5	1.4	0.5	0.9	0.4	0.8	0.7	0.9
Sweden	0.5	11.5	0.6	3.4	0.4	1.6	0.0	0.6	0.4	1.4
Switzerland	1.5	6.1	0.3	0.9	0.4	1.2	0.0	0.3	0.4	1.1
Turkey	..	..	..	..	..	..	0.5	0.8	..	..
OECD										
Average <sup>2</sup>	-0.2		0.2		0.3		0.1		0.3	
Standard deviation <sup>3</sup>	1.9		0.5		0.3		0.1		0.3	

1. Estimates for some countries cover shorter periods, as indicated in Table 4.

2. Excluding Czech Republic, Hungary, Iceland, Luxembourg, Mexico, Poland and Turkey.

3. The OECD standard deviation relates to the series of country averages.

Source: Calculated from OECD Revenue Statistics, National Accounts and Analytical Data Base.

Table 7. **Decomposition of average annual changes in AETRs - revised methodology**  
Per cent of GDP

	Tax revenue <sup>1</sup>			Tax base <sup>2</sup>		
	Capital <sup>3</sup>	Labour	Consumption	Capital <sup>3</sup>	Labour	Consumption
United States	0.0	0.0	0.0	0.2	-0.2	0.1
Japan	0.0	0.1	0.0	0.3	-0.4	0.1
Germany	0.0	0.0	0.0	0.3	-0.3	0.0
France	0.2	0.1	0.0	0.5	-0.4	0.1
Italy	0.3	0.3	0.2	0.2	-0.5	0.1
United Kingdom	0.0	-0.2	0.1	0.1	-0.2	0.1
Canada	0.1	0.3	-0.1	-0.3	0.0	0.2
Australia	0.1	0.1	0.0	0.1	-0.3	0.1
Austria	0.1	0.2	0.0	0.4	-0.4	0.2
Belgium	0.2	0.0	0.1	0.4	-0.5	-0.2
Czech Republic	-0.8	0.2	-0.4	-1.2	1.2	2.5
Denmark	0.0	0.0	0.0	0.5	-0.6	-0.2
Finland	0.2	0.4	0.1	0.3	-0.5	0.2
Greece	0.2	0.1	0.2	0.0	-0.4	0.6
Hungary	-0.3	-0.9	0.1		-2.2	-1.3
Iceland		0.0	-0.1	0.1	0.0	0.4
Ireland	0.1	0.0	0.0	1.2	-1.2	-1.3
Korea	0.1	0.2	-0.1	-0.5	0.1	-0.6
Luxembourg			0.2			-1.1
Mexico	0.0	0.1	0.1	0.9	-1.0	-0.2
Netherlands	0.1	-0.3	0.1	0.4	-0.5	-0.4
New Zealand	0.1	-0.3	0.3	0.5	-0.6	-0.1
Norway	0.0	-0.1	0.1	0.1	-0.3	0.1
Poland	-0.4	-0.1	0.6		-1.5	4.4
Portugal	0.2	0.3	0.2	0.2	-0.4	0.2
Spain	0.2	0.1	0.3	0.5	-0.7	0.0
Sweden	0.2	0.0	0.0	0.3	-0.4	-0.1
Switzerland	0.0	0.3	0.0	-0.2	0.2	0.0
Turkey			0.3	-0.1		-0.5
OECD average <sup>4</sup>	0.1	0.1	0.1	0.2	-0.4	0.0

1. Numerator of the relevant AETR equation.

2. Denominator of the relevant AETR equation.

3. Gross capital.

4. Excluding Czech Republic, Hungary, Poland, Mexico, Iceland, Luxembourg and Turkey.

Source: Calculated from OECD Revenue Statistics, National Accounts and Analytical Data Base.

Table 8. Tax treatment of private pensions

	Contributions out of taxed income or deductible	Fund income taxed (% rate) or exempt	Pension annuities taxed or exempt	Pension lump sum taxed or exempt
Australia	T	15	T	T/E
Austria	PA(C)	E	PT	
Belgium	C		T	T
Canada	D	E	T	T
Czech Republic	T	E	T	T
Denmark	D	35.8	T	T
Finland	D	E	T	T
France	D	E	T	E
Germany	T/D	E	T	T/E
Greece	..	..	..	..
Hungary	D	E	E	E
Iceland	D	E	T	T
Ireland	D	E	T	E/T
Italy	D	E	T	T
Japan	D	E	T	T
Korea	T	T/E	E	E
Luxembourg	T/D	50	T	T/E
Mexico	D	E	E	E
Netherlands	D	E	T	T
New Zealand	T	33	E	E
Norway	D	E	T	T
Poland	D		T	-
Portugal	D	E	T	T
Spain	D	E	T	T
Sweden	D	15	T	
Switzerland	D	E	T	T
Turkey	D	E	E	E
UK	T/D	E	T	E
USA	D	E	T	T

Key to abbreviations: C = credit, D = deductible, E = exempt, T = taxed, ".." is not available.

Source: OECD Tax Database 1998

Table 9. **Financial assets of pension funds**  
As a percentage of GDP.

	1990	1991	1992	1993	1994	1995	1996	1997
Australia	17.0	21.6	21.3	27.3	27.0	29.1	30.4	30.7
Austria	..	0.5	0.5	0.6	0.7	1.0	1.2	..
Belgium	2.0	2.8	2.5	2.9	2.9	3.7	4.1	..
Canada	28.8	30.7	31.3	34.0	35.9	38.6	40.7	43.3
Czech republic	..	..	..	..	0.1	..	..	..
Denmark	14.6	15.5	14.4	16.8	17.2	16.8	16.9	..
Finland	..	..	..	..	..	..	..	..
France	..	..	..	..	..	..	..	..
Germany	3.1	3.3	2.9	2.5	2.7	2.7	2.8	2.9
Greece	6.5	7.1	6.9	8.0	10.2	10.8	11.9	..
Hungary	..	..	..	..	..	..	..	..
Iceland	37.3	42.1	40.8	46.8	55.0	57.6	62.5	66.5
Italy	3.5	4.3	3.1	3.4	3.5	3.6	3.2	2.9
Japan	..	..	..	..	..	..	..	..
Korea	3.1	2.9	3.2	3.4	3.3	3.1	2.8	1.8
Luxembourg	17.7	18.5	17.2	17.2	18.7	18.2	18.2	..
Netherlands	81.0	83.5	76.0	83.0	87.0	88.3	93.3	102.0
Norway	4.4	4.9	4.5	5.5	6.4	6.4	6.5	..
Portugal	1.6	2.6	2.9	5.0	6.6	8.3	9.1	10.1
Spain	2.9	3.2	2.5	2.6	2.4	2.2	2.0	2.0
Sweden	1.7	1.7	1.6	2.0	2.2	2.4	2.4	..
Switzerland	60.3	..	60.6	..	72.5	..	75.1	..
Turkey	..	..	..	..	..	..	..	..
United Kingdom	55.0	59.4	52.7	72.7	64.7	68.7	77.5	..
United States	44.9	50.6	51.9	54.4	53.3	59.4	64.4	72.5

Source: OECD, DAF/FIN -- *Institutional Investors, Statistical Yearbook 1998*.

Table 10. **Financial assets of insurance companies**  
As a percentage of GDP.

	1990	1991	1992	1993	1994	1995	1996	1997
Australia	24.6	27.7	30.0	36.2	35.0	34.6	38.6	35.7
Austria	15.4	16.3	15.7	17.2	19.3	20.3	21.0	..
Belgium	28.3	29.5	26.5	27.1	30.4	29.9	30.9	..
Canada	24.0	25.7	25.5	27.1	26.8	28.5	29.7	29.5
Czech republic	..	..	..	5.5	6.0	..	..	..
Denmark	38.3	41.0	36.8	41.0	44.2	43.7	45.1	..
Finland	6.5	7.3	7.1	8.8	13.4	12.3	14.0	..
France	22.0	25.0	24.9	31.9	34.3	39.5	45.8	52.6
Germany	24.4	24.9	22.1	23.7	27.1	28.3	29.5	31.9
Greece	..	1.7	1.6	1.9	2.4	3.2	3.5	..
Hungary	..	2.5	2.4	2.5	2.9	2.9	3.8	..
Iceland	4.2	4.5	6.8	7.9	9.3	9.2	9.4	9.2
Italy	6.0	6.8	6.0	7.7	9.8	11.1	12.0	13.4
Japan	36.2	37.0	36.2	37.8	41.0	38.0	37.9	38.1
Korea	18.9	19.6	21.3	21.7	22.1	23.5	24.9	15.9
Luxembourg	..	..	..	..	..	44.5	..	..
Mexico	1.0	1.1	1.2	1.3	0.9	1.2	1.5	1.5
Netherlands	41.1	45.8	43.2	47.5	51.8	54.3	56.6	60.3
New Zealand	..	..	..	..	..	11.1	12.1	10.8
Norway	29.3	30.7	26.3	29.8	32.4	31.2	30.4	..
Poland	..	..	..	..	1.3	1.4	1.6	..
Portugal	2.8	3.4	3.4	4.6	6.1	7.6	9.4	..
Spain	9.9	11.2	10.3	11.8	15.7	17.5	18.6	20.4
Sweden	34.6	39.4	32.7	45.2	46.6	52.2	56.9	..
Switzerland	50.5	52.7	50.8	55.6	61.4	62.9	61.3	71.9
Turkey	0.2	0.3	0.3	0.3	0.4	0.4	0.6	..
United Kingdom	46.6	52.7	49.3	71.0	64.7	73.8	88.6	..
United States	33.9	36.0	36.2	37.8	37.7	39.8	40.9	43.1

Source: OECD, DAF/FIN -- *Institutional Investors, Statistical Yearbook 1998*.

Table 11. Estimated effects of preferential tax treatment for pension and insurance fund earnings, per cent<sup>1</sup> - revised methodology

Assuming an average of 5 per cent return on assets over the period

	Average effective tax rates on labour										Average effective tax rates on capital (using net operating surplus)									
	1990	1991	1992	1993	1994	1995	1996	1997	Average 1991/96	Average 1991/96 unadjusted AETR	1990	1991	1992	1993	1994	1995	1996	1997	Average 1991/96	Average 1991/96 unadjusted AETR
United States	23.0	23.0	22.7	23.0	23.3	23.8	24.5	25.2	23.4	22.4	46.4	48.5	48.6	48.1	47.1	45.7	44.7	44.6	47.1	51.2
Japan	25.6	25.2	24.1	24.7	23.2	23.9	23.7	24.1	24.1	24.0	88.4	81.8	79.2	76.4	82.4	89.7	79.7	79.7	81.5	83.9
Germany	34.5	35.6	36.2	36.1	37.0	37.5	36.1	36.4	36.4	35.9	32.3	33.9	35.9	36.0	31.7	31.9	32.2	29.1	33.6	37.1
France	39.4	40.0	39.9	40.3	40.8	40.7	41.3	41.1	40.5	40.2	38.2	37.4	38.4	38.4	36.7	37.9	39.4	41.4	38.0	40.9
Italy	33.2	33.4	34.3	36.4	35.1	36.3	39.4	40.6	35.8	35.7	41.4	44.1	52.9	56.1	46.0	44.1	45.4	47.3	48.1	49.7
United Kingdom	21.8	22.0	21.6	21.7	22.5	22.9	22.8	..	22.2	21.0	84.4	82.8	64.1	55.6	53.6	59.4	58.8	..	62.4	68.3
Canada	28.6	29.3	29.2	28.8	29.6	29.9	30.6	31.1	29.6	28.5	70.9	84.4	89.4	84.4	73.7	69.9	77.9	85.3	80.0	86.7
Australia	22.8	22.0	21.8	22.8	23.5	24.2	25.0	25.6	23.2	22.3	62.9	57.6	53.1	48.3	49.8	49.9	54.8	52.2	52.3	56.1
Austria	..	38.4	39.8	41.3	42.4	43.2	44.4	..	41.6	41.3	..	31.5	34.3	34.1	28.8	30.0	33.7	..	32.1	34.4
Belgium	40.3	39.6	39.9	39.6	40.6	40.9	40.7	..	40.2	39.6	39.1	40.1	40.7	43.3	46.0	44.8	44.6	..	43.2	46.6
Czech Republic	..	..	..	37.8	36.3	..	..	..	..	36.6	..	..	..	63.0	63.9	..	..	..	..	63.7
Denmark	42.1	42.3	43.5	45.2	47.8	46.3	46.5	45.5	45.3	42.8	57.9	56.0	53.6	55.3	52.6	53.9	54.5	..	54.3	67.7
Finland	39.7	39.7	40.6	43.6	49.0	46.7	47.6	..	44.5	44.4	57.6	113.9	86.8	38.5	31.0	32.9	38.3	..	56.9	59.0
Greece	..	22.1	22.0	24.4	25.3	25.2	25.6	..	24.1	23.8	..	36.6	38.3	32.9	39.7	44.6	..	..	38.4	39.4
Hungary	..	..	..	..	..	..	..	..	..	40.1	..	..	..	..	..	..	..	..	..	..
Iceland	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Ireland	..	..	..	..	..	..	..	..	..	25.1	..	..	..	..	..	..	..	..	..	28.0
Korea	6.6	6.1	6.8	8.1	8.3	8.2	8.6	8.3	7.7	7.6	36.2	36.9	44.2	42.0	43.5	49.8	..	..	43.3	46.7
Luxembourg	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Mexico	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Netherlands	42.3	45.2	44.3	44.9	42.4	41.4	38.9	39.4	42.8	41.5	29.5	31.2	31.8	34.4	30.9	29.9	34.5	35.6	32.1	40.5
New Zealand	27.1	25.3	25.9	26.3	26.5	26.2	24.0	23.8	25.7	24.5	50.8	47.5	47.1	44.6	45.9	49.0	47.8	48.5	47.0	49.9
Norway	36.1	36.5	35.5	34.7	36.1	36.0	36.7	..	35.9	35.4	41.6	40.3	35.3	33.3	33.8	35.2	33.5	..	35.2	37.6
Poland	..	..	..	..	..	..	..	..	..	42.9	..	..	..	..	..	..	..	..	..	..
Portugal	20.4	20.9	23.0	22.4	22.9	23.9	23.3	..	22.8	22.6	18.7	23.5	23.3	19.9	18.6	19.6	22.0	..	21.1	21.7
Spain	28.9	29.6	30.8	30.7	31.2	30.6	30.1	30.5	30.5	30.4	34.4	33.6	34.0	32.6	29.0	27.8	28.3	31.3	30.9	31.9
Sweden	52.0	49.8	48.1	46.1	47.9	49.5	51.7	..	48.8	47.9	87.8	80.2	60.3	56.5	51.2	40.9	55.1	..	57.4	63.2
Switzerland	29.4	29.4	30.1	31.8	33.3	33.0	34.0	..	32.0	30.1	62.4	69.5	71.5	63.5	54.3	53.5	52.4	..	60.8	77.0
Turkey	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Average	31.3	31.3	31.5	32.0	32.7	32.7	32.9	31.0	32.2	31.4	51.6	54.9	52.1	47.7	45.2	45.6	46.9	49.5	48.7	53.5

1. These calculations are made by deducting estimated pension and insurance fund earnings from the household income tax base in the denominator of  $t_h$  and the numerator of  $t_c$ . Fund earnings were estimated assuming an average rate of return on assets of 5% over the period, except for Denmark and New Zealand, where fund earnings were estimated from taxes paid on them. Value of assets was obtained using data from Tables 5 and 6. See paragraph 38 for more details.

Source: Authors' calculations based on OECD Revenue Statistics and OECD National Accounts.

Table 12. Dividend imputation credit rates, 1997

	Per cent of net dividend	Per cent of gross dividend
Germany	42.90	30.00
France	50.00	33.33
Italy	56.00	35.90
United Kingdom	25.00	20.00
Canada	16.67	13.30
Australia	56.25	36.00
Finland	38.90	28.00
Ireland	29.87	21.00
Mexico	51.51	34.00
New Zealand	50.00	33.00
Norway	38.90	28.00
Spain	40.00	28.60

Source : *European Tax Handbook* (1999), Juhuni Kesti (managing editor), Peter S. Anderson and Christina Swanhagen (editors); OECD (DAFFE/CFA/WP2(97)/REV1).

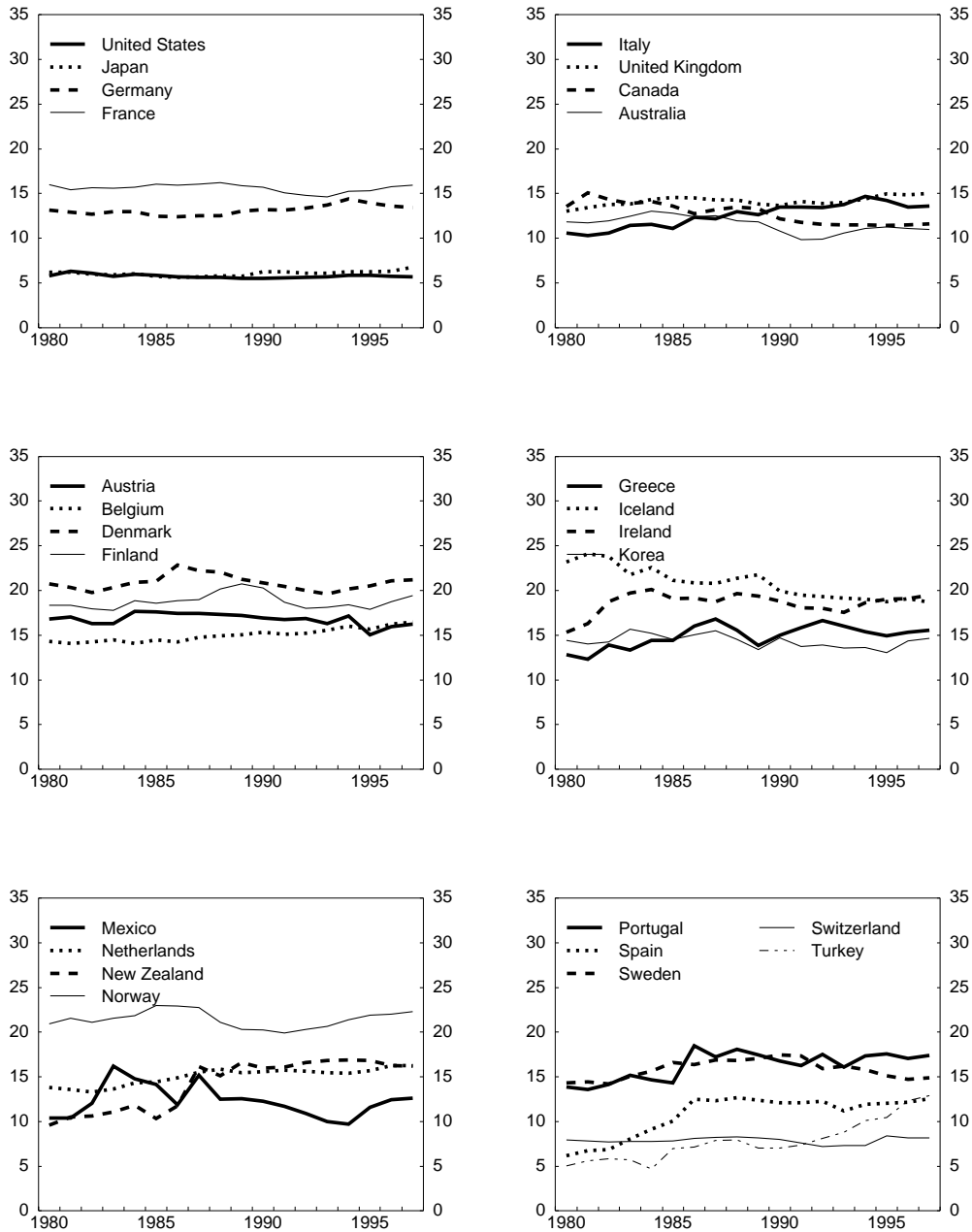


Table 13. Overview of Tax Structures in OECD Countries, 1998

Country	Top marginal tax rates <sup>1</sup>	
	Labour/excl. <sup>2</sup>	Div./int.
Australia	48.5/47	48.5/48.5
Austria	43/cap <sup>3</sup>	25/25
Belgium	66.1/61	15/15
Canada	54.1/cap <sup>3</sup>	54.1/54.1
Czech Republic	47.5/40	25/25
Denmark	62.4/59	40/58.7
Finland	62.8/58.3	28/28
France	61.3/54	61/25
Germany	55.9/cap <sup>3</sup>	55.9/55.9
Greece	45/cap <sup>3</sup>	0/0
Hungary	53.5/42	(20/35)/0
Iceland	46.4/46.4	10/10
Ireland	50.2/48	48/48
Italy	50.8/46	12.5/27
Japan	65/cap <sup>3</sup>	65/20
Korea	45.8/44.5	20/20
Luxembourg	47.4/cap <sup>3</sup>	47.4/47.4
Mexico	35/cap <sup>3</sup>	35/0
Netherlands	60/cap <sup>3</sup>	60/60
New Zealand	33/33	33/33
Norway	49.5/41.7	28/28
Poland	40/40	20/0
Portugal	46.6/40	25/20
Spain	47.6/cap <sup>3</sup>	47.6/47.6
Sweden	61.6/cap <sup>3</sup>	30/30
Switzerland	51.4/43.9	43.9/43.9
Turkey	61.9/55	55/55
United Kingdom	40/cap <sup>3</sup>	40/40
United States	48/46.6	46.6/46.6

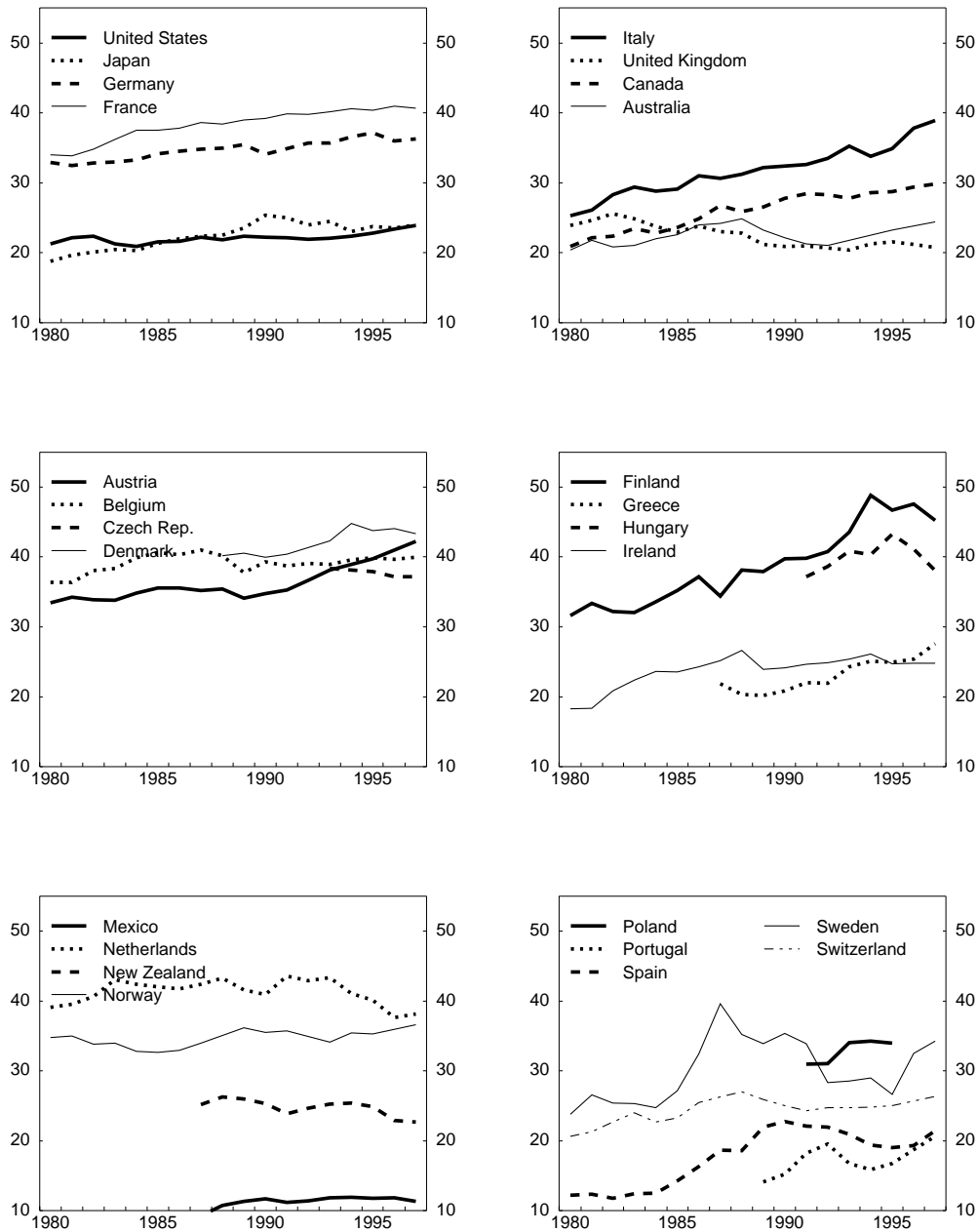
1. Including surcharges and sub-central levels of government.
  2. "Excl." means excluding social security contributions
  3. "cap" means that social security contributions are capped.
- Source : OECD (2000b).

**Figure 1.a. AETRs ON CONSUMPTION (1980-1997)- REVISED METHODOLOGY**  
Per cent



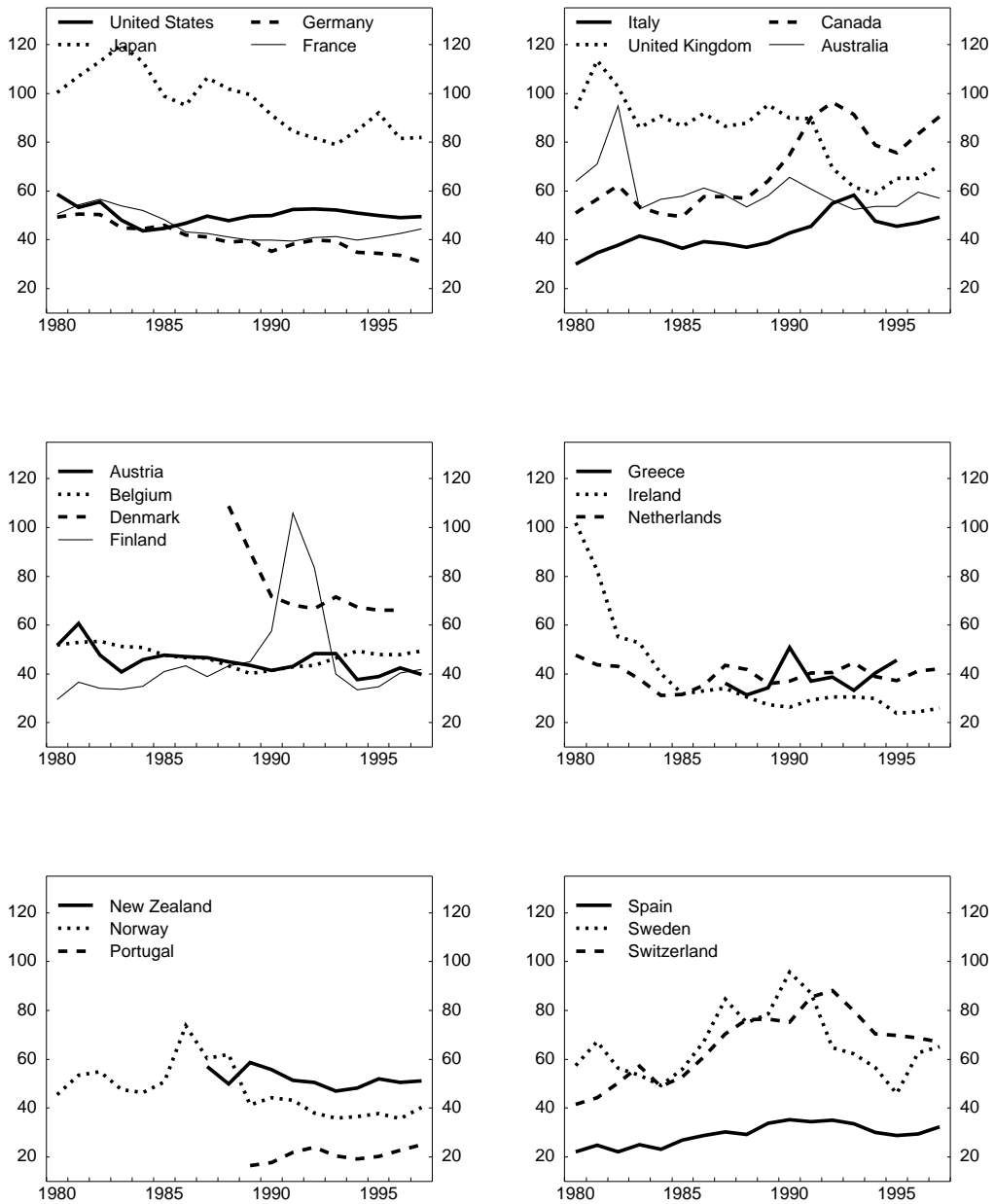
Source : Authors' calculations based on national sources; OECD, Revenue Statistics and National Accounts.

**Figure 1.b. AETRs ON LABOUR (1980-1997) - REVISED METHODOLOGY**  
Per cent



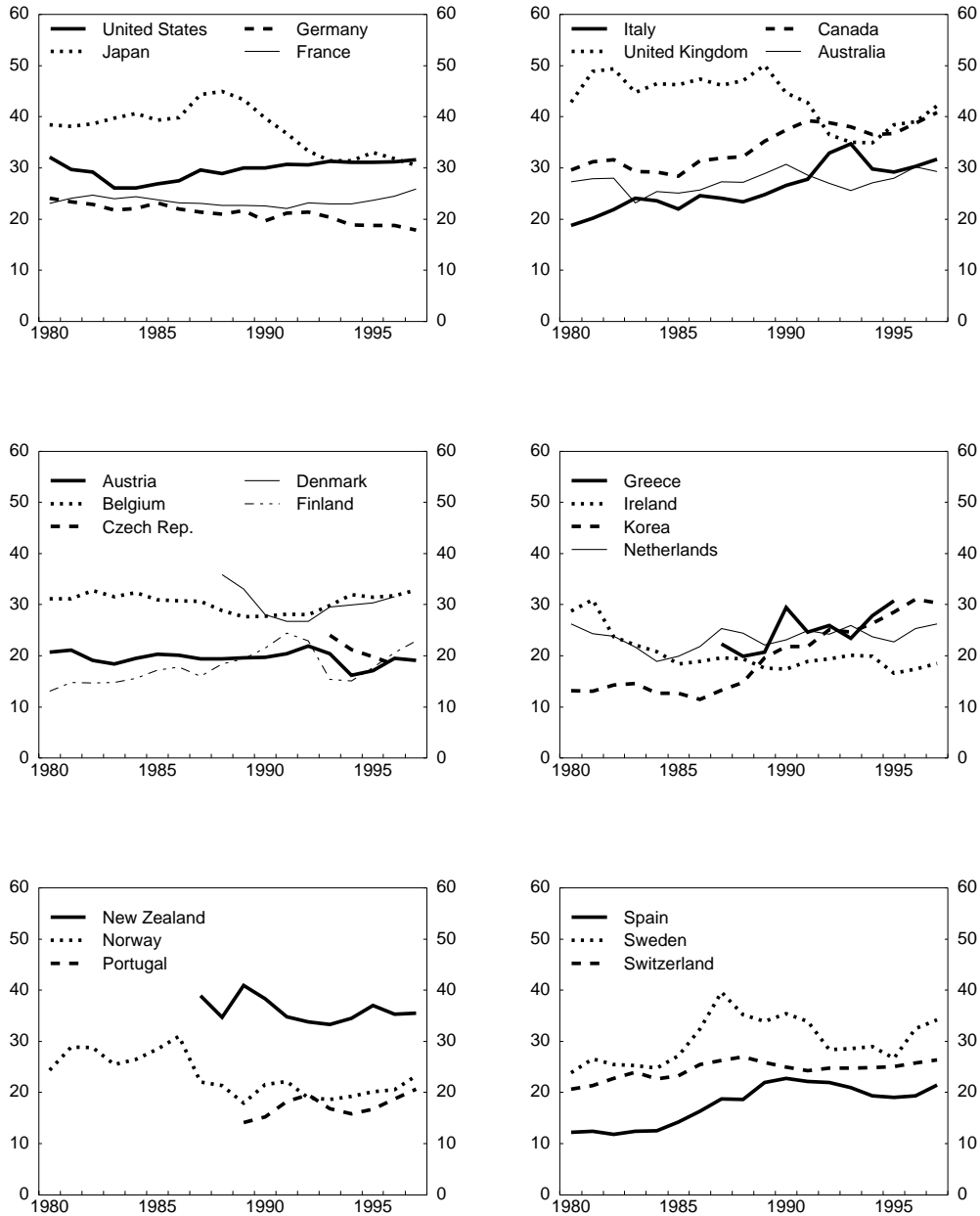
Source : Authors' calculations based on national sources; OECD, Revenue Statistics and National Accounts.

**Figure 1.c. AETRs ON CAPITAL (1) (1980-1997)- REVISED METHODOLOGY**  
Per cent



1. Using all property taxes and net operating surplus.  
Source : Authors' calculations based on national sources; OECD, Revenue Statistics and National Accounts.

**Figure 1.d. AETRs ON CAPITAL (1) (1980-1997)- REVISED METHODOLOGY**  
Per cent



1. Using all property taxes and gross operating surplus.  
Source : Authors' calculations based on national sources; OECD, Revenue Statistics and National Accounts.

**Annex Tables**

Table A1. **Mendoza et al. Estimates of average effective tax rates**  
Per cent

	Capital based on net operating surplus				Labour				Consumption			
	1965-72	1973-79	1980-85	1986-88	1965-72	1973-79	1980-85	1986-88	1965-72	1973-79	1980-85	1986-88
United States	42.5	44.3	42.7	40.9	20.5	24.8	28.3	28.7	6.2	5.7	5.6	5.2
Japan	21.5	31.7	40.2	51.8	16.5	19.4	24.1	26.4	5.7	4.7	4.9	5.2
Germany	21.4	26.7	27.9	25.2	31.7	37.9	38.8	41.0	16.5	15.3	15.5	14.7
France	16.6 <sup>1</sup>	21.4	28.2	26.1	33.5 <sup>1</sup>	37.0	43.8	47.0	..	21.7 <sup>2</sup>	21.5	21.3
Italy	..	..	24.6	27.6	..	..	36.9	41.0	12.7 <sup>1</sup>	11.4	11.9	13.7
United Kingdom	47.4	56.8	65.8	60.7	24.8	27.0	28.4	26.9	13.8	12.3	16.3	16.9
Canada	41.6	41.1	37.8	40.1	18.3	22.3	24.7	28.1	12.9	11.3	12.4	12.6
G7 average	..	..	38.2	38.9	..	..	32.2	34.1	..	..	12.6	12.8

1. 1970-72.

2. 1977-79

Source: Mendoza, E., A. Razin and L. Tesar (1994), "Effective tax rates in macroeconomics : cross country estimates of tax rates on factor incomes and consumption", NBER Working Paper, No. 4864, September.

Table A2. **Net over gross operating surplus**  
Per cent

	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1980-85	1986-90	1991-97
United States	62.4	62.8	60.6	61.9	65.8	66.1	65.0	65.6	66.5	66.2	66.0	65.0	64.6	65.9	66.5	67.6	68.4	68.7	63.3	65.9	66.7
Japan	67.8	66.1	65.3	64.3	64.6	65.1	65.1	64.6	64.9	63.6	62.7	61.8	59.6	58.3	56.7	55.6	56.6	55.5	65.5	64.2	57.7
Germany	58.6	56.5	55.7	57.6	58.4	59.0	60.5	60.1	61.3	61.7	62.4	62.1	61.0	59.5	61.5	61.8	62.8	64.3	57.6	61.2	61.8
France	60.5	59.6	58.9	59.0	60.1	61.2	63.5	63.6	63.9	64.7	63.8	63.2	63.3	62.6	63.7	63.6	63.6	64.0	59.9	63.9	63.4
Italy	75.1	73.3	73.0	73.3	74.1	74.0	75.2	75.3	75.4	75.1	74.3	73.9	73.4	72.8	73.8	74.4	74.4	74.3	73.8	75.1	73.9
United Kingdom	55.2	53.7	57.3	60.5	60.5	62.3	61.1	63.0	63.6	63.8	62.4	61.4	64.3	66.7	68.2	67.8	68.1	68.4	58.2	62.8	66.4
Canada	66.9	65.1	62.8	65.3	67.1	66.8	64.7	65.5	66.6	65.4	62.6	59.3	57.6	58.5	60.5	61.5	60.4	60.7	65.7	65.0	59.8
Australia	58.8	56.6	52.1	58.8	59.5	58.2	57.2	59.7	61.9	61.3	60.0	60.3	61.0	61.7	62.6	63.5	62.8	63.2	57.3	60.0	62.2
Austria	65.2	62.9	63.9	65.4	64.0	63.8	63.8	63.3	63.5	64.2	65.2	64.9	63.7	61.8	61.5	61.7	61.8	62.4	64.2	64.0	62.5
Belgium	72.1	71.6	72.6	72.5	73.5	74.1	74.5	74.3	74.3	75.4	74.2	73.8	73.1	73.3	73.6	73.9	74.3	74.2	72.7	74.6	73.7
Czech Republic	..	..	..	..	..	..	..	..	..	..	..	..	..	53.7	48.8	44.1	51.5	49.1	..	..	49.4
Denmark	47.2	46.5	50.1	51.1	53.1	53.3	52.6	47.7	47.8	49.5	50.3	50.2	50.9	51.5	53.4	54.3	55.7	..	50.2	49.6	52.7
Finland	58.3	56.4	57.8	57.7	58.2	56.3	55.5	55.1	55.5	55.3	51.3	42.8	44.9	50.4	54.7	58.5	59.0	61.8	57.4	54.6	53.2
Greece	83.8	83.4	83.1	81.6	82.0	81.9	81.3	81.0	81.8	81.3	80.5	81.9	82.0	82.6	82.4	82.3	..	..	82.6	81.2	82.2
Hungary	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Iceland	50.1	49.5	45.6	53.1	58.8	54.2	56.3	55.8	53.2	54.8	57.8	54.6	54.8	54.3	56.8	54.7	53.9	55.8	51.9	55.6	55.0
Ireland	66.9	68.8	69.8	69.7	73.1	74.6	74.1	74.2	76.9	77.0	77.6	76.2	76.2	76.9	76.5	77.7	78.2	78.2	70.5	75.9	77.1
Korea	83.0	82.9	81.0	79.7	79.3	79.4	79.9	78.6	77.6	76.5	75.9	76.2	75.9	75.8	76.5	75.3	73.1	72.7	80.9	77.7	75.1
Luxembourg	50.0	47.7	54.2	54.7	56.0	53.6	56.7	55.4	59.9	62.4	60.3	59.4	56.5	59.1	61.7	60.6	60.6	61.8	52.7	58.9	60.0
Mexico	84.7	84.3	82.5	80.7	81.9	81.8	78.3	79.3	81.4	83.7	85.0	85.1	84.6	84.0	83.7	80.8	82.5	82.5	82.7	81.6	83.3
Netherlands	66.9	67.0	66.8	68.3	70.2	71.0	70.2	68.5	68.5	69.8	70.3	69.9	68.9	68.1	70.0	69.9	70.0	70.7	68.4	69.5	69.7
New Zealand	78.9	80.4	80.4	80.8	80.0	78.9	78.8	76.6	77.3	77.3	76.7	76.0	75.5	77.7	78.0	77.9	77.1	76.7	79.9	77.3	77.0
Norway	61.8	62.1	60.9	61.3	63.7	62.7	53.2	48.8	47.0	52.8	56.7	58.4	57.4	58.7	58.9	59.4	62.1	61.6	62.1	51.7	59.5
Poland	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Portugal	89.7	89.7	89.0	89.0	89.6	90.0	89.8	89.8	89.9	89.8	89.3	88.4	87.6	87.8	88.0	88.0	88.0	88.0	89.5	89.7	88.0
Spain	74.5	72.6	73.1	72.3	73.4	72.6	73.8	74.6	74.9	75.3	74.9	74.6	74.2	73.6	74.4	75.2	75.0	75.0	73.1	74.7	74.6
Sweden	52.7	51.1	54.6	55.6	57.5	56.0	55.7	54.4	54.1	51.7	47.2	48.0	51.9	53.5	57.7	63.0	58.4	58.9	54.6	52.6	55.9
Switzerland	58.6	57.6	55.6	53.4	56.2	54.4	53.1	50.2	48.6	47.0	46.6	43.5	43.3	45.0	47.9	48.9	50.0	51.5	56.0	49.1	47.2
Turkey	92.1	92.3	92.6	92.5	92.7	92.7	92.6	90.2	89.5	90.4	90.9	89.5	89.8	90.5	89.5	90.5	90.4	90.4	92.5	90.7	90.1
OECD average <sup>1</sup>	66.3	65.5	65.5	66.3	67.7	67.3	66.8	66.2	66.6	67.0	66.6	65.5	65.4	65.9	67.1	67.4	67.5	68.4	66.4	66.6	66.7
G7 average	63.8	62.4	62.0	63.1	64.4	64.9	65.0	65.4	66.0	65.8	64.9	63.8	63.4	63.5	64.4	64.6	64.9	65.1	63.4	65.4	64.2
EU average <sup>2</sup>	63.8	62.7	64.1	64.8	65.8	65.8	66.2	65.7	66.4	66.8	66.0	64.9	65.0	65.5	67.0	67.9	67.9	69.4	64.5	66.2	66.6
OECD <sup>1</sup>																					
Standard deviation	12.4	12.9	12.4	11.4	10.8	11.3	11.4	11.8	12.0	11.9	12.2	12.8	12.4	11.9	11.0	10.7	10.6	10.1	11.8	11.8	11.3
EU <sup>2</sup>																					
Standard deviation	11.6	12.0	10.6	10.2	10.1	10.6	10.4	11.2	11.0	11.0	11.7	12.4	11.6	10.7	9.6	9.1	9.2	8.3	10.8	11.0	10.1

1. Excluding Czech Republic and Greece.

2. Excluding Greece.

Source: Authors' calculations based on OECD National Accounts.



Table A3. **Gross operating surplus over GDP**  
Per cent

	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1980-85	1986-90	1991-97
United States	29.6	30.7	30.5	30.4	31.7	31.4	30.6	30.8	31.4	31.2	30.5	30.0	29.5	29.7	30.5	31.0	31.5	31.4	30.7	30.9	30.5
Japan	39.7	38.9	38.6	38.2	38.3	39.0	39.4	39.5	39.9	39.8	39.3	39.1	38.3	37.5	36.4	36.0	36.8	36.2	38.8	39.6	37.2
Germany	30.5	30.3	30.8	32.3	33.1	33.5	34.1	33.7	34.5	34.9	35.3	32.4	32.0	32.1	33.3	33.5	34.6	36.1	31.7	34.5	33.4
France	30.6	30.5	30.1	30.5	31.1	31.7	33.8	34.1	34.5	35.1	34.6	34.7	34.7	34.2	35.1	34.9	34.5	34.8	30.8	34.4	34.7
Italy	46.3	45.7	46.2	46.1	47.2	47.4	48.4	48.0	47.7	47.3	45.6	44.9	44.6	45.2	46.9	48.1	47.8	47.3	46.5	47.4	46.4
United Kingdom	27.2	27.1	28.6	30.3	30.4	31.3	30.5	31.1	31.0	30.6	29.4	28.1	28.9	30.7	31.8	31.8	32.2	31.3	29.2	30.5	30.7
Canada	35.6	33.8	32.6	34.2	35.3	35.5	33.9	33.5	33.6	32.5	31.4	29.8	29.2	30.0	31.4	32.5	32.1	32.2	34.5	33.0	31.0
Australia	37.5	35.9	33.3	38.5	37.5	37.7	38.5	39.7	40.7	39.1	37.0	37.7	38.7	38.8	38.5	38.7	37.3	37.3	36.7	39.0	38.2
Austria	32.9	32.0	33.6	34.9	33.8	33.8	33.8	33.5	34.0	34.2	34.6	34.5	33.8	33.3	33.5	34.4	35.2	36.4	33.5	34.0	34.4
Belgium	31.6	31.6	33.1	34.2	35.0	35.9	36.6	37.1	38.5	39.5	38.8	37.7	37.4	37.2	37.4	38.0	38.4	38.4	33.6	38.1	37.8
Czech Republic	..	..	..	..	..	..	..	..	..	..	..	..	..	43.1	40.8	39.5	39.2	37.3	..	..	40.0
Denmark	27.0	27.6	29.0	29.5	30.4	30.2	29.3	27.5	28.2	29.4	29.9	30.2	31.0	31.9	31.5	31.1	30.6	..	28.9	28.9	31.1
Finland	35.0	33.6	34.3	34.8	34.4	33.0	32.6	32.5	32.4	32.4	31.4	28.8	30.5	34.3	36.2	37.4	36.4	37.6	34.2	32.2	34.5
Greece	41.8	42.2	40.5	39.3	39.2	39.2	40.0	39.5	39.2	38.4	36.4	37.3	37.2	38.9	37.4	36.3	..	..	40.3	38.7	37.4
Hungary	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Iceland	24.3	24.1	23.6	29.0	31.0	27.9	27.9	25.4	24.1	26.8	28.4	26.6	28.3	28.8	30.0	28.2	26.8	26.9	26.7	26.5	27.9
Ireland	31.7	31.2	32.1	32.4	34.4	36.3	35.6	36.5	39.1	39.1	41.0	40.5	40.2	41.4	42.2	44.2	45.3	45.2	33.0	38.3	42.7
Korea	48.3	49.0	48.5	46.9	47.8	48.4	49.2	48.3	47.0	44.7	43.2	41.9	40.4	40.2	39.3	38.1	36.1	35.7	48.1	46.5	38.8
Luxembourg	31.5	30.1	32.9	33.6	34.9	33.1	33.8	32.7	34.4	35.3	33.6	33.2	31.1	31.8	32.5	31.8	31.9	31.3	32.7	34.0	31.9
Mexico	52.2	51.0	52.1	58.6	58.8	57.8	59.2	59.1	59.5	60.3	59.7	59.3	57.5	56.6	56.0	59.7	61.6	62.3	55.1	59.6	59.0
Netherlands	30.9	32.6	33.4	35.0	37.0	37.8	36.6	35.3	35.7	37.3	37.3	37.0	35.9	35.5	37.0	36.7	36.9	37.4	34.4	36.5	36.6
New Zealand	40.8	40.8	40.7	41.0	42.3	41.0	35.4	34.1	34.6	38.3	39.8	40.2	39.4	40.5	40.0	39.9	41.0	39.8	41.1	36.4	40.1
Norway	36.0	36.4	36.8	42.1	42.1	40.2	40.6	37.5	38.5	38.9	38.4	39.9	41.1	43.5	43.6	43.3	42.2	42.3	38.9	38.8	42.3
Poland	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Portugal	42.8	41.4	40.0	40.1	42.4	44.0	43.2	43.5	44.5	44.9	43.8	41.5	39.7	41.0	42.6	43.4	43.4	43.4	41.8	44.0	42.2
Spain	42.7	42.1	43.3	43.2	45.7	44.5	43.6	43.6	43.8	43.3	42.2	41.3	40.6	41.6	42.9	44.1	43.7	43.5	43.6	43.3	42.5
Sweden	24.8	24.5	27.0	28.1	28.7	27.9	27.3	26.6	27.0	26.1	24.1	24.6	27.0	29.3	30.6	32.9	28.5	28.4	26.8	26.2	28.8
Switzerland	35.9	35.4	34.3	33.6	35.3	34.9	33.8	32.8	32.8	33.4	33.2	32.2	32.2	33.0	33.8	32.5	32.7	32.6	34.9	33.2	32.7
Turkey	69.9	72.1	74.0	73.0	75.2	74.8	73.6	71.8	70.8	68.7	64.2	59.4	59.8	59.9	66.1	68.2	65.9	65.9	73.2	69.8	63.6
OECD average <sup>1</sup>	36.6	36.3	36.8	38.0	39.0	38.8	38.4	37.9	38.3	38.5	37.9	37.0	36.9	37.5	38.4	38.8	38.5	38.9	37.6	38.2	38.0
G7 average	34.2	33.9	33.9	34.6	35.3	35.7	35.8	35.8	36.1	35.9	35.2	34.2	33.9	34.2	35.1	35.4	35.6	35.6	34.6	35.8	34.9
EU average <sup>2</sup>	33.3	32.9	33.9	34.6	35.6	35.7	35.7	35.4	36.1	36.4	35.8	35.0	34.8	35.7	36.7	37.3	37.1	37.8	34.3	35.9	36.3
OECD <sup>1</sup>																					
Standard deviation	10.0	10.2	10.3	10.1	10.3	10.2	10.3	10.3	10.1	9.6	9.0	8.6	8.2	7.9	8.4	9.2	9.3	9.3	10.1	9.8	8.6
EU <sup>2</sup>																					
Standard deviation	6.4	6.1	5.6	5.2	5.7	5.8	5.8	6.1	6.1	6.0	6.1	5.9	5.1	4.8	5.1	5.5	5.9	5.7	5.7	5.9	5.3

1. Excluding Czech Republic and Greece.

2. Excluding Greece.

Source: Authors' calculations based on OECD National Accounts.

Table A4. Selected property taxes over gross operating surplus <sup>1</sup>

Per cent

	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1980-85	1986-90	1991-97
United States	8.4	7.9	8.3	8.4	7.8	8.0	8.3	8.5	8.4	8.5	8.9	9.5	9.7	9.7	9.3	9.0	8.6	8.5	8.1	8.5	9.2
Japan	4.9	5.3	5.6	6.0	6.0	6.1	6.8	7.3	7.3	6.6	6.1	5.9	6.4	6.9	7.3	7.8	7.4	7.2	5.7	6.8	7.0
Germany	1.9	1.9	1.9	2.0	1.9	1.9	1.8	1.8	1.7	1.8	1.7	1.6	1.6	1.7	1.8	1.7	1.7	1.9	1.9	1.8	1.7
France	4.0	3.9	3.9	4.0	4.3	4.4	4.4	4.5	4.6	4.5	4.5	4.5	4.2	4.3	4.4	4.3	4.3	4.6	4.1	4.5	4.4
Italy	2.3	2.2	2.1	2.0	1.9	1.7	1.9	1.8	1.8	1.7	1.8	2.1	2.1	4.2	3.8	3.7	3.8	3.9	2.0	1.8	3.4
United Kingdom	14.9	16.7	16.7	14.5	14.1	13.6	15.2	15.2	14.9	14.3	8.9	9.6	8.5	11.2	10.8	11.2	11.0	11.5	15.1	13.7	10.6
Canada	7.4	7.8	8.2	8.3	7.8	7.6	8.1	8.1	7.9	8.6	9.3	10.6	11.6	11.3	10.4	9.7	9.7	9.6	7.9	8.4	10.4
Australia	5.7	5.8	6.2	6.0	6.3	6.3	6.6	7.3	7.5	6.9	7.2	7.3	7.2	7.5	7.1	6.9	7.4	7.6	6.0	7.1	7.3
Austria	1.7	1.7	1.6	1.5	1.6	1.6	1.6	1.5	1.6	1.6	1.7	1.6	1.7	1.7	1.7	1.6	1.6	1.5	1.6	1.6	1.6
Belgium	2.1	1.6	1.4	1.5	1.5	1.6	1.7	2.0	2.0	2.3	2.2	2.0	2.1	2.2	2.3	2.0	2.1	2.4	1.6	2.1	2.2
Czech Republic	..	..	..	..	..	..	..	..	..	..	..	..	..	1.1	1.2	1.2	1.3	..	..	..	1.2
Denmark	7.5	6.6	5.6	5.2	5.0	5.2	6.2	7.2	6.4	5.9	5.4	4.7	5.0	5.2	4.9	4.5	4.5	..	5.9	6.2	4.8
Finland	1.5	1.7	1.9	2.0	2.4	2.7	3.1	3.0	3.6	4.0	2.8	2.8	2.5	2.9	2.5	2.2	2.2	2.1	2.1	3.3	2.5
Greece	1.9	1.5	1.5	1.4	1.2	1.3	1.3	1.2	1.3	1.6	2.7	2.1	2.3	2.0	2.0	2.1	..	..	1.4	1.6	2.1
Hungary	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Iceland	5.6	5.9	6.1	4.6	5.0	5.5	5.6	6.4	7.4	6.8	6.8	7.3	7.3	7.2	7.0	7.1	7.0	6.8	5.5	6.6	7.1
Ireland	4.9	4.4	3.8	3.9	3.7	3.6	3.5	4.0	3.5	3.9	3.5	3.5	3.5	3.1	3.4	3.1	3.1	3.2	4.0	3.7	3.3
Korea	2.7	2.7	3.0	3.4	3.1	3.0	2.7	2.9	3.4	4.0	5.1	5.7	6.0	6.6	7.1	7.2	7.3	7.3	3.0	3.6	6.7
Luxembourg	3.2	3.3	3.2	3.4	2.8	2.9	3.4	4.1	4.0	4.2	4.1	3.6	4.1	3.5	2.6	2.7	2.6	2.9	3.1	3.9	3.2
Mexico	0.6	0.6	0.4	0.3	0.2	0.3	0.2	0.2	0.2	0.3	0.4	0.5	0.6	0.7	0.6	0.5	0.4	..	0.4	0.3	0.6
Netherlands	3.3	3.1	3.1	3.0	2.7	2.8	3.1	3.4	3.2	3.2	3.0	3.0	3.2	3.4	3.4	3.4	3.7	3.8	3.0	3.2	3.4
New Zealand	7.1	7.3	7.2	6.3	5.9	6.1	6.2	6.9	6.0	6.4	6.4	5.6	5.2	4.8	4.7	4.7	4.9	4.7	6.7	6.4	4.9
Norway	0.6	0.6	0.6	0.7	0.7	0.8	1.1	1.3	1.4	1.2	1.2	1.1	1.1	1.1	1.1	1.1	1.1	1.1	0.6	1.2	1.1
Poland	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Portugal	0.7	0.7	0.8	0.8	0.6	0.7	0.6	0.7	0.9	0.8	1.5	1.6	1.7	1.7	1.7	1.7	1.7	1.8	0.7	0.9	1.7
Spain	2.0	1.9	1.6	1.7	1.6	1.3	1.3	2.4	2.6	2.9	3.0	2.9	3.1	3.0	3.3	3.1	3.1	3.4	1.7	2.4	3.1
Sweden	0.9	0.8	0.9	1.2	1.7	2.9	3.8	4.7	4.7	5.4	6.5	7.4	5.7	4.4	4.3	3.3	5.4	5.8	1.4	5.0	5.2
Switzerland	1.9	2.1	2.2	2.6	2.7	3.2	3.7	3.9	3.7	3.8	2.9	2.6	2.5	2.7	2.6	2.3	2.4	2.8	2.5	3.6	2.6
Turkey	1.3	1.4	1.2	1.1	0.9	0.9	0.8	0.8	0.7	0.6	0.7	0.7	0.7	0.8	0.6	0.6	0.7	1.1	1.1	0.7	0.8
OECD average <sup>2</sup>	4.0	3.9	3.9	3.8	3.7	3.8	4.1	4.4	4.4	4.4	4.2	4.3	4.3	4.5	4.3	4.2	4.3	4.6	3.8	4.3	4.3
G7 average	6.2	6.5	6.7	6.5	6.3	6.2	6.6	6.7	6.7	6.6	5.9	6.2	6.3	7.1	6.8	6.8	6.7	6.7	6.4	6.5	6.7
EU average <sup>3</sup>	3.6	3.6	3.5	3.3	3.3	3.3	3.7	4.0	4.0	4.0	3.6	3.6	3.5	3.8	3.6	3.5	3.6	3.7	3.4	3.9	3.6
OECD <sup>2</sup>																					
Standard deviation	3.3	3.5	3.6	3.2	3.1	3.0	3.3	3.4	3.3	3.2	2.7	2.9	2.9	3.1	2.9	3.0	2.9	2.9	3.3	3.1	2.9
EU <sup>3</sup>																					
Standard deviation	3.7	4.1	4.0	3.5	3.3	3.2	3.6	3.6	3.5	3.3	2.1	2.3	1.9	2.4	2.3	2.4	2.4	2.6	3.6	3.2	2.3

1. The 4100 and 4100 series in Revenue Statistics (recurrent taxes on immovable property and taxes on financial and capital transactions).

2. Excluding Czech Republic, Greece and Mexico.

3. Excluding Greece.

Source: Authors' calculations based on OECD Revenue Statistics and OECD National Accounts.

Table A5. **Business and corporate taxes in selected countries<sup>1</sup>**  
Per cent of GDP

	Business taxes in 1100			Corporate taxes (1200) <sup>2</sup>		
	1980-85	1986-90	1991-97	1980-85	1986-90	1991-97
Japan	0.04	0.05	0.05	5.49	6.86	4.68
Germany	0.89	0.88	0.69	2.03	2.01	1.37
Italy	0.03	0.07	0.05	2.97	3.75	3.93
Austria	0.87	0.78	0.55	1.33	1.46	1.68

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

2. The 1200 series in Revenue Statistics (taxes on income, profit and capital gains of corporations).

Source: Authors' calculations based on national sources, OECD Revenue Statistics and OECD National Accounts.

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