

Tax Ratios: A Critical Survey

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Abstract

This paper critically reviews the existing literature on tax ratios. These are ratios of aggregate revenue from one or more taxes (e.g. taxes on employed labour, capital income taxes) to some (aggregate) tax base (e.g. total compensation of employees, capital income, etc.). We provide an overview of the tax ratios that have been calculated in the existing literature and the methodologies used to calculate these. Thereafter, we review these methodologies and suggest some refinements. To examine the robustness of the different methodologies, we re-calculate the existing indicators for a large sample of countries and for a long period, and compare the results to those obtained with our suggested methodology. We find that most tax ratios reported in the literature contain methodological flaws. Furthermore, those numbers are not good approximations of actual tax ratios.

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Keywords: tax ratios, implicit tax rates, average effective tax rates.

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Executive Summary

Effective (implicit) tax rates are tax ratios derived using aggregate data on tax revenues and the economy. This report critically reviews the existing literature on such tax ratios. The authors provide an overview of the tax ratios that have been reported in the existing literature and of the methodologies used to measure these ratios. They also address a number of conceptual issues surrounding the measurement of tax ratios.

Section 7.1 reports on attempts to replicate the results reported in seminal papers from the academic literature on tax ratios for personal income, labour income, capital income, corporate income, and consumption. The authors explain that the measurement problems encountered in the exercise are much broader than those discussed in the literature. The measurement of tax ratios is in some cases severely hampered by a lack of adequate data. For example, the authors note problems for a number of countries in the measurement of the operating surplus of unincorporated enterprises, and in the measurement of property and entrepreneurial income. Setting missing values to zero will often distort tax ratios. However, with a few notable exceptions, the labour, capital and consumption tax ratios presented in this study justify some confidence in effective tax rates as a tool evaluating tax policy options. In contrast, corporate income tax ratios reported here appear in many cases unrealistically high and differ significantly from those found by other academic researchers. Figures 1 through 4 summarise the exercise and show in many cases significant differences between the tax ratios reported in Mendoza, Milesi-Ferretti, & Asea (1997) and those reported by the authors. If the line in the figures is flat and at 100%, the tax ratios match; if the line exceeds 100%, the tax ratios of Mendoza, Milesi-Ferretti, & Asea (1997) are lower, and vice versa. Again, the sometimes large discrepancies are suggestive of the wide margins for interpretation and measurement error involved with the calculation of average tax rates using aggregate data.

Section 7 reports detailed results obtained when applying the modified equations to measure average tax rates developed by the authors. These modifications are reviewed in Section 6 (the equations used are presented in Table 9.) Notable adjustments include:

- a revised measurement of personal income tax on labour and capital income;
- the exclusion of social security contributions paid by the self-employed and the non-employed from the numerator of the labour income tax ratio;

- the inclusion of employer's contributions to private pension plans and payroll taxes in the denominator of the labour income tax ratio;
- the inclusion of other taxes paid by business in the numerator of the capital income tax ratio; and
- the inclusion of corporate taxes on immovable property and net wealth in the numerator of the corporate income tax ratio.

These adjustments in themselves raise a number of interesting issues which may need further consideration. It should also be noted that the authors, while recognising the advantages of generating a separate tax ratio for transfer income, as well as for self-employed business, and the need to separate out loss corporations when generating a corporate income tax ratio, are unable to follow these paths in their empirical work due to limitations imposed by the use of aggregate data. The results presented in the study raise various wider issues. In addition to the need to consolidate thoughts on the proper inclusion/exclusion of tax and income/surplus categories in the numerator and denominator of the various average tax rates of interest, future work seems to be warranted to sort out the sources of discrepancy between reported figures to date. In the mean time, policymakers should be fully aware that average tax rates measured using aggregate data in a number of cases generate misleading indicators of the tax burden on taxpayers, on factors of production, and on consumption. Average tax rates for corporate income should be neglected, given the many statistical and conceptual difficulties raised by current estimation procedures. Policymakers should be fully aware of measurement problems and other limitations underlying such figures, should they be fielded to shape the public policy debate.

Figure 1: Labour Income Tax Ratio: our data vs. Mendoza et al. (1997)

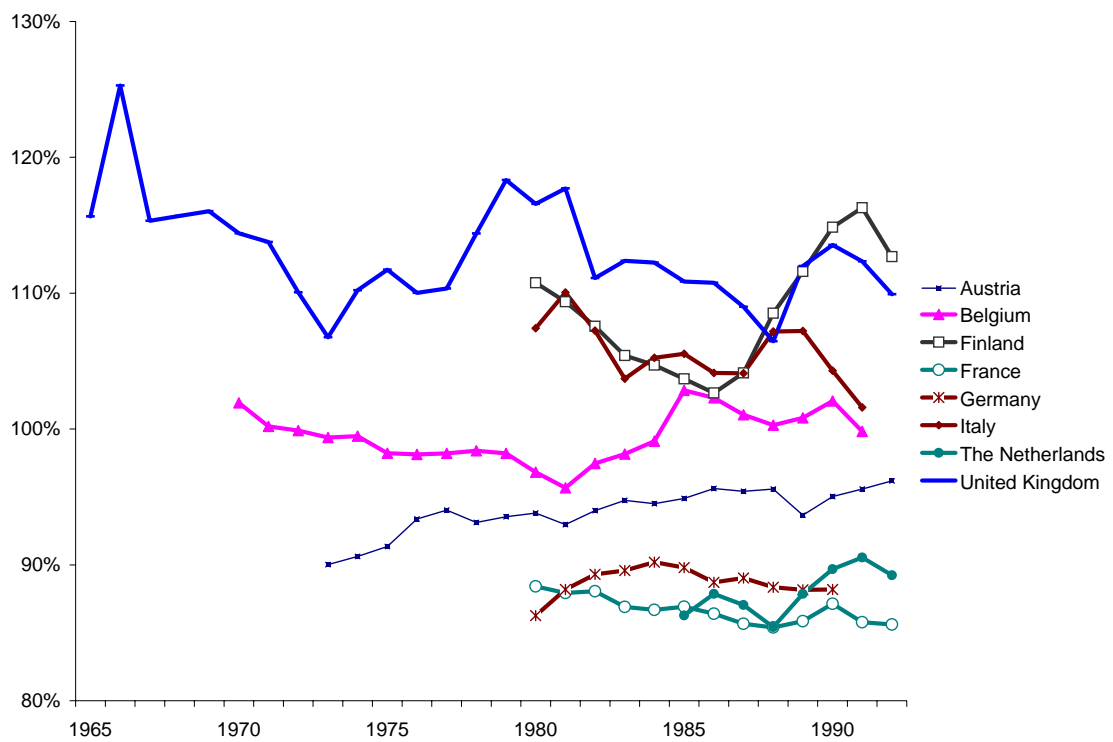


Figure 2: Capital Income Tax Ratio: our data vs. Mendoza et al. (1997)

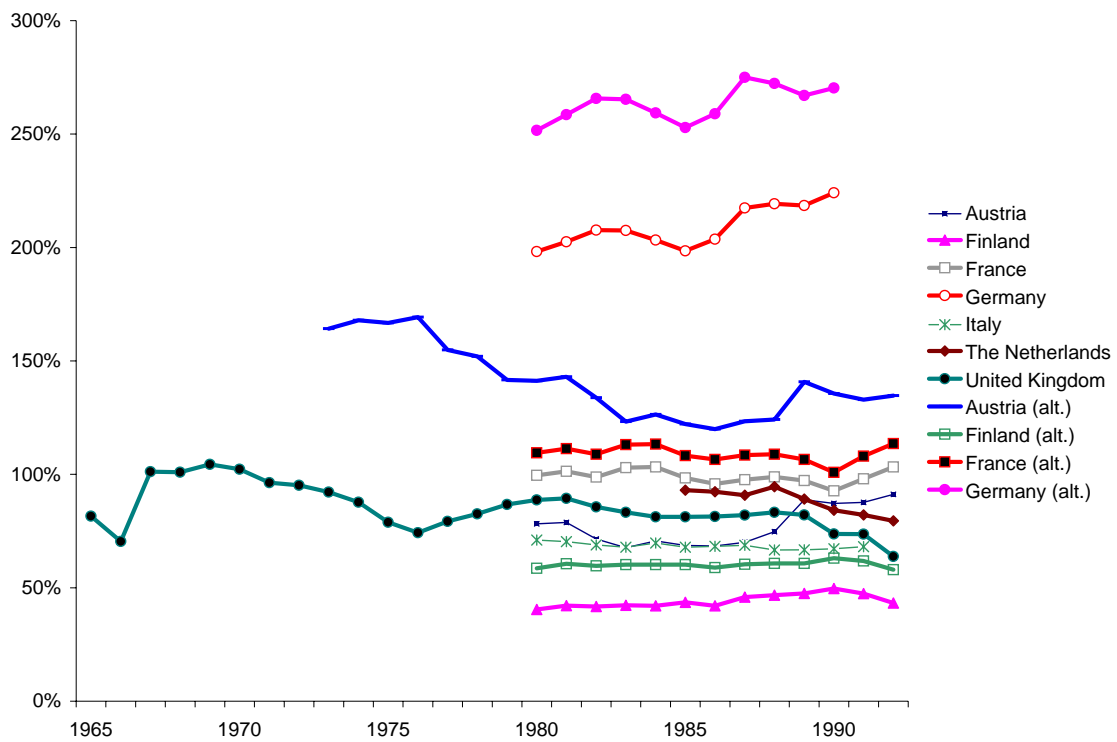


Figure 3: Corporate Income Tax Ratio: our data vs. Mendoza et al. (1997)

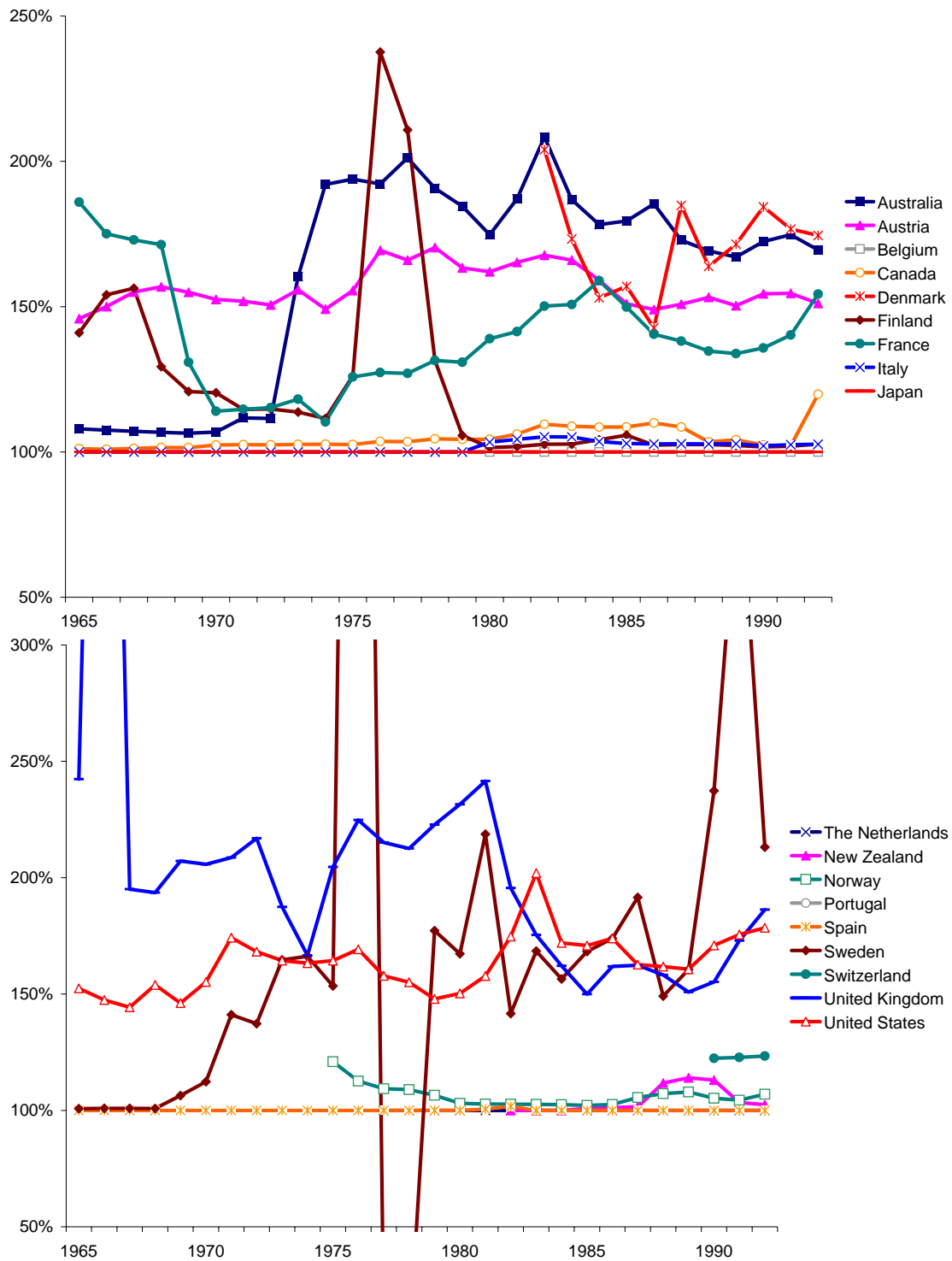


Figure 4: Consumption Tax Ratio: our data vs. Mendoza et al. (1997)

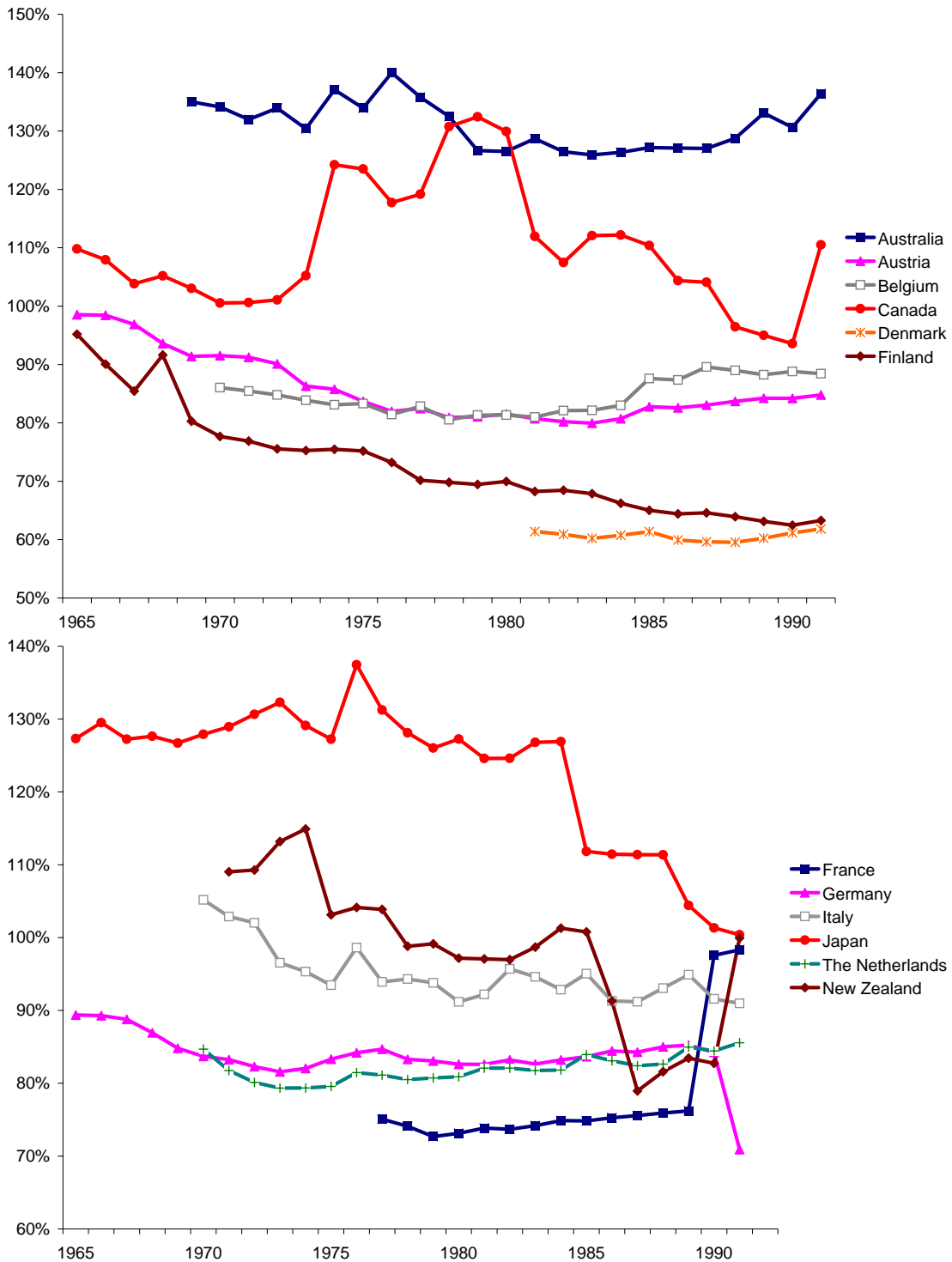
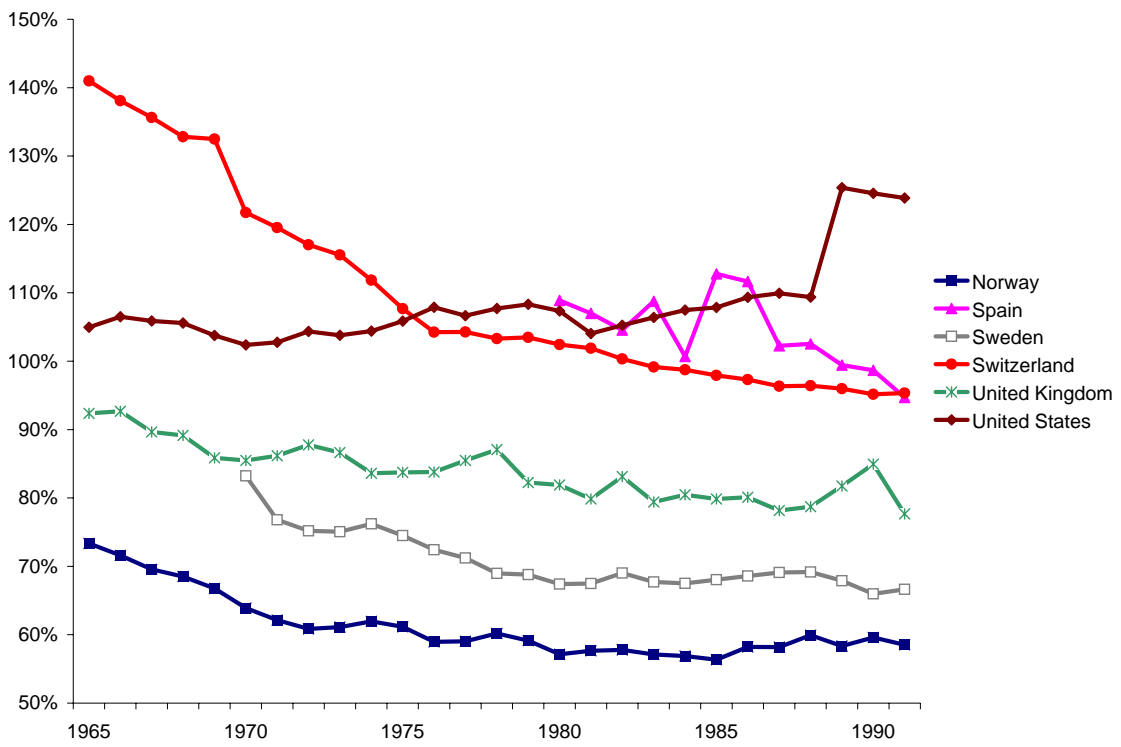


Figure 4: Consumption Tax Ratio: our data vs. Mendoza et al. (1997) (continued)



1 Introduction

Policymakers and policy analysts have a shared interest in the economic effects of taxes. It is widely assumed that a high level of taxes may hamper economic growth. In a well-known study, the OECD (1987, p. 25) stated that “estimates suggest that \$1 raised through taxes may, at the margin, reduce national income by 10 to 15 per cents and possibly considerably more, depending on the tax measures used”.

However, there appears to be less of a consensus about the effects of separate taxes and about the question of whether changes in the tax structure affect economic performance. In recent research the latter issues have been explicitly addressed. In many of these studies tax revenues are expressed as a ratio of some aggregate tax base (for example, labour income, capital income, consumption, corporate income, transfers, and so on). Such ratios are often referred to as *average tax ratios*, also known as *implicit tax rates*.¹ As this terminology is confusing – after all, once a certain tax ratio has been calculated, it is explicit, and the concept of average tax rates might better be restricted to the analysis of tax burdens of individual taxpayers – we will consistently use the term tax ratios.

The results of some of the recent studies reviewing tax ratios are striking and have attracted quite a lot of attention, also from policymakers. This line of research started with the work of Mendoza, Razin, & Tesar (1994). They report that the tax ratio on capital income is generally negatively correlated with investment, whereas high consumption and labour income tax ratios coincide with less hours worked. Similarly, Daveri & Tabellini (1997) find that high labour taxes strongly contribute to current high unemployment levels in Europe. Their analysis suggest that the observed rise of about 9 percentage points in the labour tax rate corresponds to a rise in unemployment of about 4 percentage points. These findings are often used to support a co-ordinated change in the tax mix, that is to reduce taxes on labour in a co-ordinated fashion to stimulate employment growth. For instance, European Commissioner Monti (1998, p. 12) argues that “unbridled tax competition between member states has caused average tax rates on mobile factors of production, notably capital, to fall from 45.5 per cent to less than 35 per cent in the last fifteen years. In the same period, the average tax rate on labour has increased from 34.9 per cent to more than 42 per cent. A growing body of evidence now points to a strong negative effect of high labour taxes on the

¹Sometimes the term effective tax ratios is used.

level of employment . . . in Europe. Without some form of co-ordination, not only will labour continue to be penalised for being less mobile than capital but the levels of tax revenue are liable to decrease.”²

The data reported in Mendoza, Razin, & Tesar (1994) have been used in Razin, Sadka, & Swagel (1998) to test the effect of taxes on migration, in Mendoza, Milesi-Ferretti, & Asea (1997) to test for the impact of the tax structure on economic growth, and Mendoza & Tesar (1998) employ these data to simulate the effect of US tax reforms on US and European welfare in a real business cycle model. Again, some important policy relevant conclusions were drawn on the basis of these studies.

Razin, Sadka, & Swagel (1998) find that a higher share of immigrants in the population leads to a lower tax rate on labour income, even taking into account various control variables. This goes very much against the view that migration may tilt the political balance in favour of heavier taxation and greater redistribution. The explanation provided by the authors is that more native-born individuals from the middle of the income distribution may resist higher taxes needed to finance transfers to migrants, and, as a result, take sides with the high-income anti-tax coalition.

Mendoza, Milesi-Ferretti, & Asea (1997) provide support for the view that tax policy is an ineffective instrument to stimulate economic growth. Panel regressions in which tax ratios are employed show that the effects of changes in the tax structure on private investment are economically and statistically significant, but these effects are not sufficiently strong to produce noticeable growth effects.

Mendoza & Tesar (1998) conclude that unilateral tax reforms in the US induce significant externalities in the rest of the world, which would lead fiscal authorities to engage in potentially damaging international tax competition.

Given the widespread interest exhibited by academics and policymakers alike in tax ratios, a critical assessment seems warranted. As both the methodology and the data of Mendoza, Razin, & Tesar (1994) have been widely used, we take this study, and the update of this study (Mendoza, Milesi-Ferretti, & Asea 1997) as the starting point for our survey.

²Some might argue that the link between (employed) labour income taxation and unemployment is not that obvious. For example, the income tax might be used to target employment in specific sectors, or for specific groups. This might lead to higher income tax revenues, but also to higher employment.

While microeconomic indicators are admittedly the appropriate instrument to investigate the relationship between taxes and individual behaviour, clearly macroeconomic indicators are also widely used, both by academic researchers and policymakers.³ This interest is based on several intriguing properties of such macroeconomic indicators. First, tax ratios include the actual amount of tax collected in the numerator, and thus implicitly take into account the combined effects of statutory rates, tax deductions and tax credits. The effect on the tax base of tax planning, as well as tax relief available, is also taken into account. Thus, tax ratios may be considered useful to explaining the behavioural effects of taxation. Second, tax ratios are much simpler to calculate than marginal effective tax rates, where one has to take into account all kinds of deductions and reliefs that are probably not very representative anyway (OECD 2000b). Third, macroeconomic indicators are much easier to compare by country because they are in most cases constructed in a similar way for each country. Fourth, macroeconomic indicators are an appropriate input for large-scale macroeconomic models (see, for example, Lucas (1990), and Mendoza & Tesar (1998)). Fifth, these indicators may provide a guide to tax reforms as they offer more insight than the traditional distinction between direct and indirect taxes, or a superficial glance at statutory tax rates. Moreover, they indicate real changes in the tax system that might be over- or understated by, for example, a tax-to-GDP ratio.⁴ Last, but not least, tax ratios have attracted and still attract attention, both from policy analysts and academic economists, and therefore it is important to be aware of the associated problems and pitfalls.

Calculating tax ratios is not a straightforward exercise, because several conceptual and practical problems have to be solved. The choice of the denominator – trivial as it may seem – is very important. For instance, using corporate profits instead of GDP to determine the

³See, for example, Lucas (1990), Mendoza, Razin, & Tesar (1994), Mendoza, Milesi-Ferretti, & Asea (1997), Daveri & Tabellini (1997), Eurostat (1997), the Directorate General II of the European Commission (1997), Kramer (1998), Valenduc (1998b), Razin, Sadka, & Swagel (1998), Mendoza & Tesar (1998), and the OECD (2000a).

⁴To see this latter point more clearly, a macroeconomic indicator is defined as

$$T_i/B_i = T_i/GDP_i \cdot GDP_i/B_i,$$

So, the fraction of total taxes (T_i), relative to its base, (B_i), can be decomposed into the fraction of the tax revenue relative to GDP times the fraction of GDP and the base. Suppose we are interested in a tax ratio on transfer income. Two situations may be distinguished. One where benefits are provided (almost completely) net of tax, and one where benefits are paid out gross of tax. Simply calculating the fraction of taxes to GDP overstates the real burden of taxation if benefits are paid out gross of taxes, with net benefits equal. This effect is mitigated if revenues are related to the appropriate base, since this base is larger if benefits are paid out gross of taxes. This in effect lowers the second part on the right hand side of the expression.

corporate income tax ratio may yield an entirely different view as to what happened with tax pressure on profits, as Valenduc (1998a) has shown for Belgium.⁵ Practical issues include the allocation of income of the self-employed as their profits represent a combination of labour and capital income.

Since these indicators are there, and attract attention of both policymakers and academic researchers, it is useful to take stock of the present evidence and to critically evaluate existing practice. The question addressed here is whether the methodology as employed by Mendoza, Razin, & Tesar (1994), which has been closely followed by the Directorate General II of the European Commission (1997), may be improved.⁶ We also discuss whether methodological and/or practical considerations suggest an alternative approach; and in the latter case, which alternative is best suited for the purpose at hand.

The outline of the study is as follows. Section 2 reviews tax ratios that have been calculated and applied in the literature. Section 3 zooms in on the methodology followed by Mendoza, Razin, & Tesar (1994). Section 4 compares their methodology to some alternative approaches. Section 5 discusses various problems associated with each of these methodologies. Section 6 attempts to solve some of these problems, and new indicators are calculated and compared in the Section 7. The final Section concludes.

2 Tax Ratios in the Literature: An Overview

Marginal effective tax rates have been calculated for a variety of income ‘sources’, ranging from (non-) employed labour, as in OECD (1998b), to capital income, in, for example, King & Fullerton (1984). These rates are compiled applying statutory rates and taking into account certain special provisions of the actual tax system, for a – not necessarily representative – taxpayer.

Alternatively, tax structures may be compared by expressing the aggregate revenue of one particular tax or of several taxes as a percentage of GDP – this is done, for example, in the annual OECD *Revenue Statistics* report. An alternative way to highlight differences among tax systems is to compare the impact of statutory tax rates, calculated for individual taxpayers

⁵At a more fundamental level, it should be pointed out that tax ratios are only concerned with initial incidence of taxes, which generally does not coincide with final tax incidence.

⁶One can argue that the goal of the study is such that some more general issues should be considered here. However, most other studies discussed in this study owe much to the study by Mendoza, Razin, & Tesar (1994), therefore it seems appropriate to use this study as a starting point.

Table 1: Overview of published tax ratios

	personal	labour	capital	corporate	consumption	energy
Mendoza, Razin, & Tesar (1994)	x	x	x	x	x	–
Mendoza, Milesi-Ferretti, & Asea (1997)	–	x	x	–	x	–
Directorate General II of the European Commission (1997)	x	x	x	x	x	–
Eurostat (1997)	–	x	x ^a	–	x	–
Jarass & Obermair (1997)	–	x	x	–	x	x
Kramer (1998)	–	x	–	x	–	–
OECD (2000a)	x	x	x	x	x	–
Feldstein & Summers (1979)	–	–	–	x	–	–
Feldstein, Dicks-Mireaux, & Poterba (1983)	–	–	–	x	–	–
Fullerton (1984)	–	–	–	x	–	–

Note: studies are ranked in chronological order, except for the latter three; x: analysed, –: not analysed.

^a Tax ratio on other factors of production, this includes, e.g., taxes on self-employed and non-employed individuals.

– as in the OECD publication *The Tax/Benefit Position of Employees* (OECD 1998b). A third approach is to calculate tax ratios, examples are Mendoza, Razin, & Tesar (1994), the Directorate General II of the European Commission (1997), Eurostat (1997), Jarass & Obermair (1997), and the OECD (2000a). These tax ratios aim to give an easy to compute indication of the tax burden on, for example, different sources of income or production factors. On the basis of limited information – a few entries from both National Accounts statistics and the Revenue Statistics – it is possible to calculate indicators of the tax burden on, for example, consumption, labour, capital and corporate income.

Table 1 shows tax ratios as calculated in the studies that we are aware of, whereas Table 2 provides information for the countries and time periods for which these ratios have been calculated. Our starting point, the Mendoza, Razin, & Tesar (1994) study, distinguishes five tax ratios. A *personal income tax ratio*, a *labour income tax ratio*, a *capital income tax ratio*, a *corporate income tax ratio* and a *consumption tax ratio*. Jarass & Obermair (1997) also develop a *‘natural resources & environment’ tax ratio*. A detailed examination of these tax ratios follows in Section 3 for the Mendoza, Razin, & Tesar (1994) study, and in Section 4 for

Table 2: Scope of published tax ratios

	Countries	Period
Mendoza, Razin, & Tesar (1994)	7: US, UK, F, GER, IT, CAN, JAP	1965-1988
Mendoza, Milesi-Ferretti, & Asea (1997)	18: OECD (excl. GRE, ICE, IRL, LUX, POR)	1965-1992
Directorate General II of the European Commission (1997)	22: OECD	1965-1995
Eurostat (1997)	15: EU 15	1970-1995
Jarass & Obermair (1997)	8: US, JAP, UK, CH, DK, GER, NET, SP	1980-1996
Kramer (1998) (averages)	9/15: EU15/EU9	1980-1996
OECD (2000a)	29: OECD	1980-1996
Feldstein & Summers (1979)	1: US	1977
Feldstein, Dicks-Mireaux, & Poterba (1983)	1: US	1953-1979
Fullerton (1984)	methodological	

all remaining studies. One important conclusion can already be drawn: none of the studies summarised in Tables 1 and 2 examines a tax ratio on transfer payments. As pointed out below, the tax treatment of transfers varies considerably. Policymakers might therefore also be interested in the aggregate tax ratio on transfer payments.⁷

3 Tax Ratios: Methodology of the Mendoza et al. (1994) Study

This section explores the methodology followed by Mendoza, Razin, & Tesar (1994) to calculate tax ratios. We start with the personal income tax ratio, followed by the labour and capital income tax ratios. Next, we review the corporate income and the consumption tax ratios.

Table 3 summarises the methodology. The personal income tax ratio is defined as the ratio of revenues from taxes on income, profits, and capital gains of individuals (1100) to the tax base that consists of wages and salaries (W), the operating surplus of unincorporated enterprises (OSPUE) and the property and entrepreneurial income of households (PEI). Note that income from social security is not included in this particular denominator.

⁷Indeed, the analysis conducted in Adema (1999) suggests to calculate this ratio. The figures reported in the last column of Table 7 indicate the magnitude of such a ratio. There is also a more fundamental reason to construct this tax ratio: taxes on transfers are not taxes on labour or capital. See Section 5 for further discussion.

Table 3: Tax Ratios: Mendoza et al. (1994)

Personal income tax ratio τ_{per}	$1100/(W + \text{OSPUE} + \text{PEI})$
Labour income tax ratio τ_{lab}	$(\tau_{\text{per}} \cdot W + 2000 + 3000)/W + 2200$
Capital income tax ratio τ_{cap}	$(\tau_{\text{per}} \cdot (\text{OSPUE} + \text{PEI}) + 1200 + 4100 + 4400)/\text{OS}$
Corporate income tax ratio τ_{cor}	$(1200)/(\text{OS} - \text{OSPUE})$
Consumption tax ratio τ_{con}	$(5110 + 5121)/[C + G - \text{GW} - (5110 + 5121)]$

Note: the classification system of the OECD is shown in Table 3.

The labour income tax ratio is defined as the product of the personal income tax ratio (τ_{per}) and wages and salaries (W) plus total social security contributions (2000) and taxes on payroll and workforce (3000) over the sum of wages and salaries (W) plus employers' social security contributions (2200).⁸

The capital income tax ratio is defined as the product of the personal income tax ratio (τ_{per}) and the sum of the operating surplus of private unincorporated enterprises (OSPUE) plus taxes on income, profits, and capital gains of corporations (1200) plus taxes on property (4100), and taxes on financial and capital transactions (4400) over the operating surplus of the economy (OS).

The tax ratio on corporate profits is defined as the fraction of taxes on income, profits, capital gains of corporations (1200), to the operating surplus of the economy (OS) minus the operating surplus of private unincorporated enterprises (OSPUE).⁹ Results of these calculations have to be interpreted carefully since figures for the operating surplus are not readily available for all countries and – in addition – are not fully reliable in some cases.¹⁰

The consumption tax ratio is the ratio of taxes on consumption – the sum of general taxes on goods and services (5110), excises (5121), and some other, in terms of revenue almost negligible, taxes – to the consumption tax base. The consumption tax base is the sum of private (C) and public final consumption (G) net of consumption tax revenues (5110 + 5121).

⁸As the Directorate General XXI of the European Commission (1998) points out, in most countries social contributions form the largest share of labour taxes. Strictly speaking, these contributions can only partly be considered as taxes. First, they can constitute an entitlement to certain benefits. Second, they are not necessarily paid because of a legal obligation but may be paid voluntarily or, for example, due to collective bargaining agreements. Mainly for the sake of simplicity and because of lack of reliable statistical information, social contributions are uniformly treated as labour taxes under the primary incidence approach, followed here.

⁹It is not entirely clear whether this presentation is correct since Mendoza, Razin, & Tesar (1994) do *not explicitly* provide the expression for the corporate income tax rate. This presentation, and the one in Table 3, is based on a note to their Table 4, which defines τ_{cor} as "... the ratio of corporate income tax revenue (...) to the operating surplus of corporations (...)" (Mendoza, Razin, & Tesar 1994, p. 309).

¹⁰For Germany OS – OSPUE has to be approximated by OS, for Austria and Switzerland OSPUE has to be set equal to zero, and for Denmark reliable estimates are missing for an extended period.

Table 4: Classification of OECD National Accounts and Revenue Statistics

OECD Revenue Statistics

1000	Taxes on income, profits, and capital gains
1100	Taxes on income, profits, and capital gains on individuals
1110	On income and profits
1120	On capital gains
1200	Taxes on income, profits, and capital gains on corporations
2000	Social security contributions
2100	Social security contributions of employees
2200	Social security contributions of employers
2300	Social security contributions of self- and non-employed
2400	Social security contributions unallocable between 2100, 2200, and 2300
3000	Taxes on payroll and workforce
4000	Taxes on property
4100	Recurrent taxes on immovable property, land taxes etc.
4120	Recurrent taxes on immovable property, land taxes etc. Paid by corporations
4200	Recurrent taxes on net wealth
4220	Corporate recurrent taxes on net wealth
4400	Taxes on financial and capital transactions etc.
5000	Taxes on goods and services
5110	General taxes (on goods and services)
5121	Excises
5122	Profits of fiscal monopolies
5123	Customs and import duties
5125	Taxes on investment goods
5126	Taxes on specific services
5200	Taxes on use of goods and performance of activities
5212	Motor vehicles duties not paid by households
6000	Other Taxes
6100	Paid by corporations

OECD National Accounts

OS	Operating surplus of corporate and quasi-corporate enterprises
OSPUE	Operating surplus of private unincorporated enterprises
W	Wages and salaries
PEI	Property and entrepreneurial income
CoE	Compensation of employees ^a
C	Private final consumption expenditure
G	Government final consumption expenditure
GW	Compensation of employees of producers of government services

^a In contrast to the item Wages and Salaries, the item Compensation of Employees consists of wages and salaries, employers' contributions to social security contributions, and employers' contributions to private pension and social welfare plans.

Furthermore, the compensation of employees of providers of government services (GW) is excluded.

4 Tax Ratios: A Comparison

In this section, we compare the other studies listed in Table 1 with the Mendoza, Razin, & Tesar (1994) study. The main differences are identified in Table 5. The expressions for the ratios calculated by Eurostat (1997) are not included here since they refer to their own statistics, which classifies taxes in a way that is not directly comparable to the OECD, and more importantly, because the use of revenue categories and correction factors in the Eurostat study differs between countries. One conclusion that immediately follows from Table 5 is that the Directorate General II of the European Commission (1997) study has almost literally followed the approach of Mendoza, Razin, & Tesar (1994). The only differences are that the EC study includes category 4200 (recurrent taxes on net wealth) in the numerator of the capital income tax ratio, includes category 5123 (customs and import duties) in the expression for the consumption tax ratio, and adds category 4220 (corporate recurrent taxes on net wealth) in the corporate income tax ratio.

4.1 Personal Income Tax Ratios

Both the Directorate General II of the European Commission (1997) and the OECD (2000a) use the same detour as Mendoza, Razin, & Tesar (1994) of first calculating a personal income tax ratio in order to calculate labour and capital income tax ratios. The EC study uses the same methodology as Mendoza, Razin, & Tesar (1994), whereas the OECD study includes category 2400 (social security contributions not allocable to any specific group) in the numerator.

4.2 Labour Income Tax Ratios

The calculation of the tax ratio on labour income by Mendoza, Razin, & Tesar (1994) was copied by the Directorate General II of the European Commission (1997).

The OECD (2000a) study has also used this concept, albeit with different components. As shown in Table 5, the expression for τ_{per} is different, this factor is not multiplied by W , but by W minus employee's social security contributions ($W-2100$). It is thus assumed that

Table 5: Tax Ratios: Mendoza et al. (1994) versus other studies

Directorate General II of the European Commission (1997)	
τ_{per}	same method
τ_{lab}	same method
τ_{cap}	$(\tau_{\text{per}} \cdot (\text{OSPUE} + \text{PEI}) + 1200 + 4100 + 4200 + 4400)/\text{OS}$
τ_{cor}	$(1200 + 4220)/(\text{OS} - \text{OSPUE})$
τ_{con}	$(5110 + 5121 + 5123)/[\text{C} + \text{G} - \text{GW} - (5110 + 5121 + 5123)]$
Jarass & Obermair (1997)	
τ_{lab}	$(\lambda \cdot 1100 + 2100 + 2200 + 3000)/\text{CoE}$
τ_{cap}	$(1000 - \lambda \cdot 1100 - \text{'transfer'} + 4000 + 6000)/\text{OS}$
τ_{con}	$(5000 - \text{parts of}^a 5121 + 5122 + 5126 + 5200)/\text{C}$
τ_{nre}	$(\text{parts of}^a 5121 + 5122 + 5126 + 5200)/\text{energy costs}$
Kramer (1998)	
τ_{lab}	$(\text{income/wage tax})/\text{CoE}$
τ_{cor}	$1200/(\text{OS} - \text{OSPUE})$
OECD (2000a)	
τ_{per}	$1100/(\text{W} - 2100 + \text{OSPUE} + \text{PEI} - 2300 - 2400)$
τ_{lab}	$(\tau_{\text{per}} \cdot (\text{W} - 2100 + \text{WSE}) + 2100 + 2200 + 2300 + \alpha 2400 + 3000)/(\text{CoE} + \text{WSE} + 2300)$
τ_{cap}	$(\tau_{\text{per}} \cdot (\text{OSPUE} - \text{WSE} + \text{PEI} - 2300) + 1200 + \beta 2400 + 4000)/(\text{OS} - \text{WSE} - 2300)$
	(gross or net operating surplus)
	$\text{WSE} = \text{ES} \cdot ((\text{W} - 2100)/\text{EE})^b$
	$\alpha = (\text{W} - 2100 + \text{WSE})/(\text{OSPUE} + \text{PEI} - 2300 + \text{W} - 2100), \quad \beta = 1 - \alpha$
τ_{con}	$(5110 + 5121 + 5122 + 5123 + 5126 + 5128 + 5200)/[\text{C} + \text{G}]$

Note: τ_{nre} : tax ratio on natural resource and environment.

^a: as far as referring to energy products, transport, water or polluting materials. See the detailed description in Section 4.5.

^b: ES denotes dependent employment, and EE denotes the number of self-employed.

the self-employed ‘pay’ themselves a salary that equals the average employment wage. This income is proxied by multiplying labour income, excluding social security contributions ($\text{W} - 2100$), by the share of the self-employed (SE) to the number of dependent employees (EE). The numerator of the labour income tax ratio furthermore includes both employee (2100) and employer’s (2200) social security contributions as well as part of non allocable social security

contributions ($\alpha \cdot 2400$). The tax base consists of total compensation of employees plus the ‘income’ of the self-employed plus social security contributions by the self- and non-employed (CoE+WSE+2300).

Jarass & Obermair (1997) use a different approach to calculate their labour income tax ratio. They refine the estimate of labour income taxation by differentiating, if possible, between taxes on wages, income, dividends etc. from category 1100. Also, entries of type 2300, that is social security contributions paid by self-employed or non-employed, are not taken into account. The exact expression is specified in Table 5. The main difference to the approach taken by Mendoza, Razin, & Tesar (1994) is the factor λ , which is the share of all taxes on income, profits, and capital gains of individuals that is to be classified as taxes on labour (Jarass & Obermair (1997) p. 7). The value of λ can be calculated in three ways. First, there is a group of countries where category 1100 is divided into category 1110 (taxes on income and profits) and 1120 (taxes on capital gains). If category 1110 in turn is further divided, the amount of taxes on wages and salaries can be identified and used. The value of λ is chosen as the ratio of taxes on wages and salaries to all tax revenues reported under category 1110. Items that cannot be assigned to either capital or labour are assigned to either capital or labour by the ratio $(1 - \lambda)/\lambda$. The second category is the group of countries where national authorities explicate the value of λ (e.g. Denmark). The third category comprises the group of countries where λ cannot be estimated in the same way as for group 1. In this case λ is proxied by the ratio of compensation of employees over the sum of compensation of employees and operating surplus of private unincorporated enterprises from the National Accounts statistics.¹¹ Another difference to the other studies is the basis for the tax ratio. Jarass & Obermair (1997) use ‘compensation of employees’ from the national accounts instead of the sum of wages plus salaries and employers’ social security contributions as the tax base. This ‘compensation of employees’ equals the sum of wages and salaries, employer’s contributions to social security and employers’ contributions for private pension and welfare plans. In short, there are three main differences between the approach by Jarass & Obermair (1997) and the approach by both Mendoza, Razin, & Tesar (1994) and the Directorate General II of the European Commission (1997). These are: the way to circumvent the use of τ_{per} , the exclusion of social security contributions paid by self-

¹¹For Switzerland, OSPUE is not available, therefore PEI is used to approximate this.

and non-employed (category 2300), and the inclusion of employers' contributions for private pension and welfare plans in the denominator of the labour income tax ratio.

Kramer (1998) uses tax ratios to explain differences in employment in various European countries. The effective tax burden on labour income is very simple and computed straightforwardly as the sum of income tax of individuals, which includes income tax on capital income, profits and taxable income transfers or wage taxes (subentries of 1100) plus social security contributions (2000) plus payroll taxes (3000) over the compensation of employees.¹²

Eurostat (1997) has also constructed a tax ratio on employed labour. The ratio is defined as the fraction of taxes on employed labour and the compensation of employees – which includes gross wages, wage taxes, and social security contributions of both employees and employers. Eurostat uses its own data, however, so that the exact construction of the tax ratios differs significantly from the EC approach. The approach is more or less comparable to that of Jarass & Obermair (1997). The calculations are for the EU 15. National authorities in some cases have indicated the percentage of taxes on income that can be attributed to labour or other income. For example, for Belgium, the tax ratio on employed labour is constructed by using only a part of 'income tax' revenues.¹³ Similar corrections are made in the cases of Denmark, France, Ireland, Italy, The Netherlands, Sweden and Finland.¹⁴ Table 6 shows, for illustrative purposes, the quotas as used in the 'Structures of Taxation in the European Union' (Eurostat 1997).

4.3 Capital Income Tax Ratios

The Directorate General II of the European Commission (1997) uses, like Mendoza, Razin, & Tesar (1994), the personal tax ratio to compute the tax ratio on capital income. Since no distinction can be made between the labour and capital components of income, the rates are

¹²For Belgium, France, and Italy the revenue from individual income taxation is used, for the other countries wage taxes. These categories are not comparable. For example, some people in The Netherlands pay income tax instead of wage tax over their income. This is not taken into account by Kramer (1998).

¹³For 1995, according to the Belgian Ministry of Finance, 75.6% of the revenues from advance payments of tax on earnings, advance payment of tax on self-employed, income tax by assessment, special contributions to social security funds, tax on non-residents, income tax, supplement to industrial accident insurance premiums, and employer's and employees' actual social security contributions (where the latter are corrected for payments of social contributions paid by recipients of transfer payments, which is a tax on transfers) are taxes on employed labour (Eurostat 1997).

¹⁴In the case of The Netherlands, the correction is only made with respect to social security contributions, and in the case of Finland the correction is based on the fraction of personal income to personal and corporate income.

Table 6: Quotas for income tax split presently used in the Structures of the taxation systems in the European Union (1996 edition)

	Employed labour	Self- and non-employed labour	Capital	Transfers
Belgium	0.74	0.14	0.12	0.00
Denmark	0.81	0.11	-0.12	0.20
France	0.83	0.11	0.06	–
Ireland	0.81	0.12	0.07	–
Italy	0.72	0.08	0.20	–
Finland	0.85	–	0.15	–
Sweden	0.93	0.07	–	–

Note: these quotas are available for the period 1970-96, except for Finland and Sweden (1980-96). Source: Directorate General XXI of the European Commission (1998).

assumed to be equal.¹⁵ The tax ratio on capital income is almost equivalent to the one from Mendoza, Razin, & Tesar (1994), except for the presence of corporate taxation on net wealth (4200) in the numerator.

The OECD (2000a) study has also used a rather similar expression as the Directorate General II of the European Commission (1997), albeit with a different expression for τ_{per} , and a correction of the tax base for imputed salaries from self-employment. The personal income tax ratio is multiplied by the sum of property and entrepreneurial income (minus social security contributions from the self- and non-employed (item PEI – 2300)), and the operating surplus of private, unincorporated enterprises, minus the income of the self-employed that is attributed to the labour income tax ratio (OSPUE – WSE). In addition to revenues related to categories 1200, and 4000, social security contributions from self- and non-employed persons and some part of unallocable social security contributions ($\beta \cdot 2400$) are added to the numerator (2300). The study furthermore calculates both a gross and a net capital income tax ratio by dividing the relevant taxes either by gross and net operating surplus, respectively. The tax base furthermore excludes imputed labour income by the self-employed (WSE) and social security contributions by the self- and non-employed (WSE).

Jarass & Obermair (1997) also refine the capital income tax ratio. It is compiled by using as the numerator the share of category 1000 taxes that are not included in the ratio on labour

¹⁵According to Mendoza, Razin, & Tesar (1994), this is not an unrealistic assumption. The statutory rates tax rates do not differ that much. We disagree in this respect. One reason is that statutory rates sometimes do differ a lot between income components, see the overview in Table 7. Secondly, it can be argued that people receiving capital income are on the right part of the Lorenz curve, and therefore, fall in a higher tax bracket, even assuming equal tax rates.

income and categories 4000 (taxes on property) and category 6000.¹⁶ The denominator for the ratio is the ‘operating surplus’ of the economy, as shown in the National Accounts.

Eurostat (1997) has not constructed a tax ratio on capital but on all other factors except employed labour. This ratio relates taxes on self- and non-employed labour and taxes on other factors of production to the *net* operating surplus of the economy.

4.4 Corporate Income Tax Ratios

Feldstein & Summers (1979) estimate the ‘effective tax rate’ on corporate source income as the ratio of the total tax paid on such income – including the tax paid by shareholders and lenders as well as by the corporations – to the total real income available before tax for the shareholders and creditors (Feldstein & Summers 1979, p. 459) for the United States. The tax base consists of the total pre-tax corporate sector income (corrected for inflation) available for shareholders and creditors. The tax payments are made up of five components: (1) the corporate income tax, (2) the dividend tax, (3) the tax on retained earnings, that is capital gains taxation, (4) the taxation of additional assets due to inflation, and (5) the tax imposed on nominal interest payments.

Feldstein, Dicks-Mireaux, & Poterba (1983) refine the method used by Feldstein & Summers (1979). They include state and local taxes in the total tax burden. The concept of real capital income of non-financial corporations is also expanded by including state and local property taxes. The resulting total effective tax rate is a percentage of the ‘adjusted real capital income’ of the non-financial corporations, which is the total pretax capital income of non-financial corporations adjusted for the corporations’ losses on non-interest bearing financial capital. The taxes levied on this income are the federal corporate tax, state and local corporate taxes, state and local property taxes, taxes on dividends, taxes on capital gains, taxes on nominal capital gains, and taxes on interest.

Fullerton (1984) divides the effective tax rates into four categories. Of these four, given the scope of the present study, the two average effective rates are of interest. The average rates studied are the average effective corporate tax rate and the average effective total tax rate. The corporate rate is the ratio of observed corporate taxes divided by corporate income. The effective total rate also takes into account property taxes and personal taxes on interest and

¹⁶As they state, the use of category 4000 could be further refined because taxes on privately owned real estate might be attributed to the taxation of consumption.

dividends, as in the approach adopted by Feldstein & Summers (1979) and Feldstein, Dicks-Mireaux, & Poterba (1983). Auerbach & Poterba (1987) show that the average corporate tax rates are very sensitive to economic conditions.

All these studies cover only the case of the United States, and focus on a limited time-period. The main purpose of the studies is to trace the effect of various factors like, for example, depreciation methods and inflation on effective tax burdens. Since the scope of this study is to compare tax ratios for a large number of countries in a relative straightforward way, these studies fall outside the limits of this study.

Kramer (1998) defines the burden on corporate income as the ratio of taxes on corporate profits over the operating surplus of the economy. This is the same measure as used by Mendoza, Razin, & Tesar (1994). The Directorate General II of the European Commission (1997) definition includes taxes on net wealth of corporations (4220) in the numerator of the expression.

4.5 Consumption Tax Ratios

The tax ratio in this case is taxes on consumption paid by the private sector divided by private consumption. Consumption tax revenues may include taxes paid by the government on goods and services for intermediate consumption. This is just a book-keeping exercise as far as the government is concerned, whereas there is an economic impact for consumers. This has been accounted for by using final national consumption as a base for the consumption tax ratio so government consumption is included in the denominator of the tax ratio.¹⁷

The consumption tax ratio derived by the Directorate General II of the European Commission (1997) is almost equivalent to the one from Mendoza, Razin, & Tesar (1994), who do not include customs and import duties (5123) in the numerator and thus do not subtract this component from the denominator either.

The OECD (2000a) study uses broadly the same concept as the Mendoza, Razin, & Tesar (1994) study, except that government wages are not excluded from the tax base. Thus, a gross tax ratio is calculated. Furthermore, a number of additional revenue items are included (5122, 5123, 5126, 5128, and 5200).

¹⁷The Directorate General XXI of the European Commission (1998) has examined various options and concludes that when different bases are used, the level of the tax ratios varies, but the general trend remains remarkably stable.

Eurostat (1997) has also computed a consumption tax ratio. It is constructed by dividing all taxes on consumption by final national consumption of households and general government. Again, for every country there is a classification schedule. In some instances taxes/excises/duties on fuel are assigned to consumption and in other cases to energy, and in some cases to both tax ratios. This would lead to double counting if the tax ratios are summed up. It is hard to give a general definition of the ratio, especially so because the classification system of Eurostat and the OECD are different.¹⁸

The consumption tax ratio of Jarass & Obermair (1997) differs considerably from the other definitions. They also calculate a natural resources & environmental tax ratio (as from now τ_{nre}), as a complement to the consumption tax ratio. The taxes included in this ratio are subtracted from the revenues from taxes on goods and services (category 5000). The taxes classified to τ_{nre} are excises (5121) and taxes on fiscal monopolies (5122) that refer to energy products, transport, and water or polluting materials; taxes on specific services (5126) that refer to energy or transport; and taxes on use of goods and perform activities (5200) that refer to motor vehicles, waste or pollution. The base for the ratio is private final expenditure (C).

5 Methodological and Practical Problems

5.1 General Comments

The fundamental methodological problem in constructing tax ratios is that most tax categories as distinguished in the OECD Revenue Statistics relate to more than one macroeconomic category (labour, capital, etc.).¹⁹ Consequently, it is impossible to calculate tax ratios without using some technique to artificially separate out the amounts to be allocated to various macroeconomic categories. This is most evident for the personal income tax. The category taxes on income, profits and capital gains on individuals (1100) includes taxes on labour, taxes on capital and – at least in some countries – taxes on transfers. This problem becomes most evident for personal taxes paid by the self-employed. Other revenue categories as distinguished in the OECD *Revenue Statistics* are plagued by the same problem. Social

¹⁸The labelling of variables is different, but more importantly, Eurostat sometimes provides more detailed information, for example, on the split of income tax revenues.

¹⁹This problem could be partly solved if taxes are classified on a tax to tax basis. This would lead to problems regarding international comparability, however.

security contributions (category 2000) are, for example, paid by employees (labour) and – in various countries – also by recipients of social security benefits and by the self-employed, whose income is partly earned by employing capital. Section 5.2 discusses several major issues that arise as a consequence of the current classification of taxes in the OECD *Revenue Statistics*. The choices in this respect made by Mendoza, Razin, & Tesar (1994) and others are critically examined. Several other major issues are also addressed. Section 5.3 discusses various smaller problems.

5.2 Fundamental Issues

Both the Mendoza, Razin, & Tesar (1994) and the Directorate General II of the European Commission (1997) study the personal income tax ratio (the ratios of personal income tax revenues (category 1100) over the sum of wages and salaries, the operating surplus of private unincorporated enterprises and property and entrepreneurial income) as an intermediate step in calculating labour and capital income tax ratios. This is not without problems since income from labour, capital income and transfers is included in the ‘tax base’ of personal income. Furthermore, both studies assume the same average tax rates apply to all these income categories. This assumption is intuitively implausible, since some income components are largely exempted from taxation, and furthermore, most OECD countries apply different statutory tax rates to different sources of income. The first two columns of Table 7 are illustrative. In Sweden, for example, the top marginal tax rate on labour income is 61.6%, whereas the top marginal tax rate on dividends is 30%. The OECD (2000a) study goes somewhat in the right direction by refining the personal income tax ratio to control for, for example, the (lower) income tax rates on social security. This still does not correct for the fundamental problem caused by different tax rates on labour and capital income, however.

To avoid this problem, Eurostat (1997) and Jarass & Obermair (1997) have opted for a different approach. Jarass & Obermair (1997) introduce a factor λ that distinguishes between labour and capital income taxation. The value of λ can be obtained, depending on the data available, in three different ways, which were reviewed in Section 4.2. Eurostat (1997) follows a similar approach. The correction factors Eurostat uses for 1995 are shown in the fourth column of Table 7. The initial problem remains unsolved, however, since this approach still assumes that average tax rates on both types of income are more or less the same.²⁰

²⁰A closer look at the exposition in footnote 13 shows that the revenues from different taxes are assigned

Table 7: Overview of Tax Structures in OECD Countries, 1998

Country	Tax Structure ^a			Social Benefits		
	labour/excl.	div./int.	correction ^b	gross	net	perc. ^c
Australia	48.5/47	48.5/48.5		–	x	0.6%
Austria	43/cap	25/25	100%	x	–	–
Belgium	66.1/61	15/15	75.6%	–	x	6.0%
Canada	54.1/cap	54.1/54.1		–	x	7.2%
Czech Republic	47.5/40	25/25		–	x	–
Denmark	62.4/59	40/58.7	100% ^d	x	–	16.2%
Finland	62.8/58.3	28/28	^e	x	–	–
France	61.3/54	61/25	100%	–	x	–
Germany	55.9/cap	55.9/55.9	100%	–	x	3.2%
Greece	45/cap	0/0	100%	–	x	–
Hungary	53.5/42	(20/35)/0		–	x	–
Iceland	46.4/46.4	10/10		–	x	–
Ireland	50.2/48	48/48	81%	–	x	1.9%
Italy	50.8/46	12.5/27	71.6%	–	x	8.7%
Japan	65/cap	65/20		–	x	–
Korea	45.8/44.5	20/20		–	x	–
Luxembourg	47.4/cap	47.4/47.4	100%	–	x	–
Mexico	35/cap	35/0		–	x	–
The Netherlands	60/cap	60/60	– ^f	x	–	17.6%
New Zealand	33/33	33/33		–	x	–
Norway	49.5/41.7	28/28		–	x	8.6%
Poland	40/40	20/0		–	x	–
Portugal	46.6/40	25/20	100%	–	x	–
Spain	47.6/cap	47.6/47.6	100%	–	x	–
Sweden	61.6/cap	30/30	93% ^g	x	–	14.3%
Switzerland	51.4/43.9	43.9/43.9		–	x	–
Turkey	61.3/55	55/55		–	x	–
United Kingdom	40/cap	40/40	100%	–	x	1.5%
United States	48/46.6	46.6/46.6		–	x	1.8%

^a The labour and dividend/interest income tax rates are marginal tax rates for top income earners, including surcharges and sub-central, for excl.: exclusive of social security contributions.

^b This column states the correction factor applied by Eurostat (1997) to assign ‘income’ taxes to employed labour, the numbers are for 1995, if available.

^c This percentage is the ratio of direct taxes and social security contributions paid on public cash benefits/transfers to gross public social expenditure.

^d Social security contributions paid by non-employed labour are a different category in the Eurostat Accounts. Income taxes are also split up between employed and non-employed labour.

^e Correction factor for income taxation is the share of personal income to personal and corporate income.

^f 75% of employees’ social security contributions are assigned to taxes on employed labour, all income taxes are assigned to taxes on self- and non-employed labour.

^g 93% of income tax of households, other taxes are fully assigned to employed labour.

Sources: OECD Secretariat, OECD Tax Data Base (1998) and Eurostat (1997) (for ^b).

Furthermore, as shown in the fifth and sixth column of Table 7, and also in Adema, Einerhand, Eklind, Lotz, & Pearson (1996), there are three countries in the OECD area that tax (most) social security benefits: The Netherlands, Denmark, and Sweden. Therefore, ideally, either the tax base of the personal income tax ratio has to include social security contributions in these countries in order to be comparable to the one in other countries, or the income tax paid by benefit recipients has to be separated out of the tax that is allocated to labour and capital income. The seventh column shows the average burden of income tax and social security contributions on public social expenditure in 15 OECD countries, as an indication of the size of the problem. When calculating labour and capital income tax ratios one should first exclude the personal income tax paid by recipients of social security benefits, even if one (falsely) assumes identical (average) tax rates on labour and capital income.²¹

Due to lack of data, the problem identified here is hard to overcome. Based on the OECD *Revenue Statistics*, for only three countries, a (global) split in revenues from income taxes by different sources of income can be made. These countries are the Czech Republic, Germany, and Luxembourg (see OECD (1997) p. 103, 115, and 136). However, sometimes further information can be used (Directorate General XXI of the European Commission 1998). In several cases, withholding taxes on certain kinds of income (for example, wage taxes) can be identified which may serve to approximate the parts of the income tax attributable to income from labour, capital, etc.²² Another possibility is to split the income tax revenues following to employed labour with the same percentage, with the implicit assumption that the average tax rate is the same for this income source.

²¹For example, in The Netherlands, by far most social security benefits are subject to income taxation. Therefore the revenues from income taxation include tax revenues from social security benefits. The definition of the Directorate General II of the European Commission (1997) would imply a labour income tax ratio of 52.6% in 1992. Since income taxes are also levied on social security benefits recipients, the average income tax, as represented by the ratio of category 1100 over the sum of the operating surplus of private unincorporated enterprises, property and entrepreneurial income, and wages and salaries, has to be modified to include social security benefits (old age pensions, unemployment benefits, widowers benefits, and invalidity and illness benefits) in the denominator. This correction lowers the labour income tax ratio to 43.1%. As the average tax imposed on social security benefits is probably lower than on regular income, the real value is probably higher than 43.1%, but certainly lower than 52.6%.

²²This is still not a satisfactory solution, however. In Germany, for example, the tax on wage and salaries – a withholding tax – does not reflect the total tax burden on labour income for several reasons. First, the child tax credit for all tax payers is paid from wage tax revenue (underestimation of tax burden on labour income); second, in the income tax assessment wage earners get repayments (overestimation of tax burden on labour income), furthermore it is not clear to which source of income the repayments correspond (the repayment may also be related to capital income taxation); third, the tax credit for owner-occupied housing is paid from the income tax revenue although the bulk of payments goes to wage earners (overestimation of tax burden on labour income); and fourth, the major part of the solidarity surcharge falls on labour income (underestimation of tax burden on labour income). Thus, and this probably also holds for the other countries specified here, using the revenue from the wage tax for calculating the tax burden on labour income and the rest of category

the key provided by Member States concerned. This is done in the *Structures of the Taxation Systems* in the EU for some countries (see Table 6). Third, a rough split can be obtained by using National Accounts data on main aggregates (for example, gross salaries divided by gross salaries plus the net operating surplus). If this differentiated approach is followed, however, this, implies that a uniform approach can no longer be applied to all countries under review.

Next, a number of detailed comments regarding various ratios are in order. A difficulty with respect to the *labour income tax ratio* is the *choice of the correct tax base*. The Directorate General II of the European Commission (1997) and Mendoza, Razin, & Tesar (1994) use the items wages & salaries and employers' social security contributions. Kramer (1998), Jarass & Obermair (1997) and Eurostat (1997) use the item compensation of employees. This includes employers' contributions for private pension and welfare plans. Since the taxes are assigned to total labour costs of employers, the second approach seems preferable. A significant part of the employer contributions may be voluntary, but they undoubtedly are part of total labour costs. This is also in line with National Accounts conventions. This would mean for the *capital income tax ratio* that taxes on payroll and workforce (3000) should be subtracted from OS, for reasons of consistency. These taxes are paid on labour inputs. The same holds, with a similar argument, for the corporate income tax ratio.

The OECD (2000a) study uses an artificial adjustment factor (the inverse of the fraction of non-self-employed to the total number of employed) to add to labour income a part of the income of self-employed individuals (capital income is similarly corrected in the opposite direction). One can criticise this split, since the relative number of self-employed persons is not likely to be related to the income they receive and to the part that should be attributed to labour and capital inputs. The construction of a separate self-employed (or: entrepreneurial) income tax ratio is a more plausible approach.

With respect to *corporate income tax ratios*, Kramer (1998) and Mendoza, Razin, & Tesar (1994) do not include category 4220 (corporate – recurrent taxes on net wealth) in the taxes allocated to corporate income, in contrast to the Directorate General II of the European Commission (1997). We suggest to include these taxes as bearing on corporate

1100 for calculating the tax burden on capital and corporate income is likely to lead to a flawed estimate of the actual tax burden. In the case of Germany, evidence seems to suggest that following this approach would lead to an overstatement of the labour income tax ratio and an understatement of the capital income tax ratio.

income. Furthermore, we suggest to include category 4120 (other – recurrent taxes on immovable property) since these constitute taxes that are paid by corporations (and also by unincorporated enterprises, but a split is hard to make).²³ Also, the corporate operating surplus (OS-OSPUE) is gross, in the sense that it includes interest expenses, rents, royalties, and some other amounts that can sometimes be deducted from taxable income. Ideally these components should be subtracted from the corporate tax base, but, with the available data from the OECD *Revenue Statistics*, this is not possible.²⁴

With respect to the *consumption tax ratio*, the Directorate General II of the European Commission (1997), and Mendoza, Razin, & Tesar (1994) use a net base. Instead, we would defend the position that this should be gross consumption – that is expenditures plus taxes paid – following Jarass & Obermair (1997). It should be gross for reasons of consistency – in case of the labour income tax ratio, the tax base includes all taxes paid on labour, consistency then requires to include all taxes paid on consumption in the tax base of the consumption tax ratio as well – and because net bases are sometimes hard to compute. Jarass & Obermair (1997) use private final consumption expenditure (C), but they do not include government final expenditure. Eurostat (1997) uses gross national final expenditure as the tax base. This approach appears to be preferable. Gross final consumption includes final government consumption expenditure (wages of government employees). These expenditures are not subject to VAT, but represent consumption spending by households according to National Accounts conventions, so they should be included in the consumption tax base.

Another problem is that some goods and services are exempted from VAT (for example, financial services and health care). In this case, producers cannot reclaim their pre-paid VAT. So, technically, this VAT is not levied on final consumption. Exempted goods and services form a considerable part of aggregate consumption expenditure. One way to solve this problem is to assume that the producers of these goods and services shift the burden of these taxes to their customers via higher prices, so it does become a tax on final consumption. Note, however, that the analysis normally disregards any shifting of taxes.

²³These taxes do not have to be included in the denominator of the ratio. OS-OSPUE is a gross entity, which includes all taxes that have to be paid by corporations, thus also 3000 (which has to be subtracted), see the explanation above.

²⁴Alternatively, one could use the sum of the net saving of enterprises, distributed profits, and the consumption of fixed capital as the basis of the corporate income tax ratio. The main argument against this indicator is data availability. The relevant accounts in this respect are not (or only for some years) readily available for a large group of countries.

Furthermore, in the OECD (2000a) study, an adjustment is made to VAT and other general consumption tax revenues. Both revenue categories are multiplied by a factor (< 1) that reduces revenues allocated to consumption by assigning parts of consumption taxes to fixed capital accumulation. It is not entirely clear why this approach is taken. It suggests that general consumption taxes (and only these) are paid over fixed capital accumulation, be it from the government or the private sector. If so, the argument above on exempted goods holds here as well. Thus, it might be assumed that the final incidence of these taxes is on consumption.

A potential bias of the calculations, especially with respect to the corporate and capital income tax ratios, lies in the effect of the business cycle. There are several issues in this respect. One is that there is a timing problem. NA figures are compiled on a transactions basis, whereas RS figures are generally compiled on a cash base. This is a source of mismatch that also is very hard to solve. The Austrian ‘Gewerbsteuer’, for example, was abolished in 1993. For a number of subsequent years, however, revenues from this tax were still reaped. This issue cannot be resolved, however, without using more detailed microdata. Those data are unfortunately not available on the scale relevant to this study, and more importantly, this goes beyond the scope of analysis of this study.

Another aspect of the business cycle problem is that, it would be, in principle, possible (and for analytical reason probably useful) to correct for the business cycle, but several problems pop up then. One is that it is rather straightforward to calculate filtered GDP figures, but then the question is which ‘filter’ to use, this goes beyond the scope of the analysis. Especially since the length of some of the series does not validate the application of a filter on those data.

Finally, OECD Member countries have open economies. Therefore, dividends, interest payments and labour income flows across borders. Furthermore, foreign tourists consume in the country and national residents consume part of their income abroad. Should a correction be made for these cross-border transactions, and if so, how? For consumption this does not appear to be a problem, domestic consumption can be separated.

The Directorate General XXI of the European Commission (1998) argues that consumption should be corrected as follows: take consumption by residents, add consumption of non-residents on the economic territory, subtract consumption of residents in the rest of the

Table 8: Effects of transaction with the rest of the world on tax ratios

		Principle of taxation	
		Tax on factor use	Tax on residents
Factor Inflow	Tax base: income earned on the ter- ritory	Tax ratio (TR) reflects taxation of productive activities	TR underestimates taxation of residents
	Tax base: Income of residents	TR overestimates tax- ation of productive ac- tivities	TR reflects taxation of residents
Factor Out- flow	Tax base: income earned on the ter- ritory	TR reflects taxation of productive activities	TR overestimates tax- ation of residents
	Tax base: Income of residents	TR underestimates taxation of productive activities	TR reflects taxation of residents

world. This equals consumption on the economic territory. In general, measured as a percentage of final national consumption, the external balance of consumption transactions is generally small (between plus and minus 1 percent of GDP). In the EU only Spain, Portugal, Greece, Austria, and (for some years) Italy show a larger surplus (2 to 5 percent of GDP) of non-resident consumption, due to the greater importance of tourism in these countries (Directorate General XXI of the European Commission 1998). There is a similar problem in the case of income flows. Table 8 (taken from (Directorate General XXI of the European Commission 1998)) illustrates the problem at hand.

The Directorate General XXI of the European Commission (1998) shows that for most EU member states, the effects of the different principles of taxation are minor. However, for smaller member states, and in particular for Luxembourg, the differences are quite substantial. We propose not to make a correction, because of the limited impact of this item on the economy of most countries.

5.3 Smaller Problems

In general, inconsistencies between the base of the tax ratio and the numerator are likely to arise. Government interest payments, for example, are (partly) taxed. Therefore, one could argue to include the sum of government interest payments in the base of the capital income tax ratio. To a large extent these interest payments are exempted from taxation, however, because these interest payments are paid out to pension funds, which are, generally, not subject to taxation, or flow abroad. The magnitude of this problem is hard to approximate,

however. Therefore it seems justified, not to correct for this bias.

With respect to the *labour income tax ratio*, it is, in some instances, not possible to readily collect all data. A notable problem is, for example, the revenue from income taxation in Portugal, the split between 1100 and 1200 cannot be made for the period preceding 1990.

With respect to the *capital income tax ratio*, for The Netherlands category 1120, taxes for individuals on capital gains could be attributed to taxes on consumption since this tax is a tax on games of chance. The same holds for Denmark (tax on winnings from lotteries, pools etc.), Finland and Sweden (tax on lottery prizes), and Luxembourg (tax has been abolished though). Similar problems arise, for instance, in the case of church taxes.

Following Jarass & Obermair (1997), can all taxes on property (4000) and other taxes (6000) be included when calculating the capital income ratio? These authors argue that these taxes are mostly levied on businesses, thus on capital, but some part of revenues from taxes on property – for example taxes on immovable property paid by households – can just as well be attributed to consumption (or to consumption and capital investment). Jarass & Obermair (1997) actually argue that the share of taxes on real estate paid by home-owners should be considered a tax on consumption (like the taxable imputed rent – ‘huurwaardeforfait’ – in The Netherlands, which represents over 1% of GDP). This approach shifts part of the burden on capital (part of entry 4100) to consumption. However, in National Accounts, private homeownership is treated as an investment in a capital good. With respect to other taxes (6000), the argument partially holds. Category 6000 sometimes includes fines and taxes paid by households, these taxes should not be attributed to capital income. The preferable choice appears to include only 6100 – other taxes paid by businesses in the capital income tax ratio.

Moreover, revenue category 1100 includes taxes on (net) capital gains. These taxes bear on realised (net) capital gains, and are thus counted in the numerator, but the corresponding tax base is not included in the denominator. National income does not include capital gains. These capital gains are not included in the tax base of the capital income tax ratio. Ideally, a correction should be made, either by eliminating capital gains tax from tax revenues or by adding realised capital gains to the tax base, but due to the limitations of the aggregate data sets, this is not feasible. However, it is important to note that revenues from capital gains taxation generally are (far) below 1% of total personal income tax revenues.

With respect to the *corporate income tax ratio*, as Valenduc (1998a) notices, corporate

income tax is levied over the sum of dividends and net saving. Corporations not booking profits, or recording losses, reduce the aggregate tax base since their operating surplus (OS) or net saving is negative and is thus subtracted from the overall OS. As a consequence, the actual tax burden on corporate income is overstated. Valenduc has corrected this for Belgium by only taking into account the OS of profitable firms. He shows that the tax burden on corporate income is overstated by more than 5 percentage points without this correction being made. An alternative way to address the problem is to filter out the impact of the business cycle over the years by taking an average value of the numerator and the denominator over several years (see Fullerton (1984, p. 26)).

Some other items that are deductible from pre-tax corporate income are also included in the tax base for the corporate income tax ratio. One could argue that this should be corrected for, but apart from the fact that this is not possible without more detailed information at the level of the individual firms, the purpose of calculating tax ratios is to sidestep this issue and calculate ex-post the average tax burden on some base without explicitly taking into account all kinds of special reliefs, exemptions etc. The same argument applies to differences in tax regime between industries.

Furthermore, most countries impose a dividend withholding tax on corporate earnings distributed to non-resident shareholders. Given widely different shares of corporate profits accruing to non-resident share holders, these taxes should ideally be taken into account. In some countries the revenues from non-resident withholding taxes are not included in category 1100 but in category 1300. These countries are, amongst others, Canada and New-Zealand. For Denmark and Greece this probably also holds, but this cannot be inferred from the Revenue Statistics.

Moreover, the data do not allow to take into account integration relief. The problem is that integration relief materialises as a reduction in personal income tax liabilities, whereas it could also be regarded as a reduction in corporate income tax liabilities.

Yet another difficulty is that countries differ in the part of all businesses that is organised in corporate rather than unincorporated form. Furthermore, the build-up of corporate tax loss pools carried forward and used to offset corporate tax liabilities in the countries differs both over time and between countries at one time (see De Kam & Clark (1997)). These institutional differences will influence reported corporate income tax ratios. The impact of

cross-country and cross-time differences reflect mainly past policy choices, and to a lesser extent current tax policy, whereas the latter is the focus of the analysis.

Additionally, tax ratios are influenced by income components that are both included in taxable income and in deductibilities, if these are subject to different marginal rates. This yields differences, both within one year, and intertemporarily. Examples in this respect are the treatment of pension payments, which are, in most instances, deductible and taxed at different marginal rates, and, similarly interest payments and deductions. Tax ratios are furthermore influenced by the way in which countries differ in using tax instruments for policy goals. In Denmark, for example, the tax revenues reported under item 3000 (taxes on payroll and workforce) are paid by corporations and directly redirected towards (other) corporations in order to subsidise employment of trainees. In general this tax revenue is, however, allocated to the labour income tax ratio, whereas it could be argued that both the tax revenue and the related subsidy should be attributed to the corporate income tax ratio. Such an arrangement would then have to be made for all taxes and for all countries, which complicates the analysis to a great extent, and which would go beyond the scope of the study.

With respect to the *consumption tax ratio*, Valenduc (1998a) has observed that the categories 5125 (taxes on investment goods) and 5200 (taxes on use of goods and perform activities), as far as they are not paid by households, are in fact not taxes on consumption but taxes on capital.

6 Suggestions for Improvement

According to Mendoza, Razin, & Tesar (1994) tax ratios, as discussed in this study, might serve as useful approximations of marginal tax rates. The calculation of marginal tax rates requires a host of detailed information, which poses severe problems for international comparisons. But tax ratios are also useful indicators in their own right for the analysis of tax policy and to support policy recommendations (Directorate General XXI of the European Commission 1998). In this section, we offer an amended outline for calculating tax ratios. Before we do so, some remarks about the interpretation of (developments of) tax ratios are in order. As pointed out in the Introduction, tax ratios only concern initial and not final incidence of taxes. Furthermore, a change in the tax ratio should not automatically be equated with a change in tax policy. For instance, if the share of profits in GDP increases,

ceteris paribus, the capital income tax ratio will rise (with tax policy held constant). For other reasons as well, the interpretation of changes in tax ratios may be complicated. Suppose, for instance, that the statutory tax rate on profits is reduced. This does not necessarily lead to a lower capital income tax ratio. If at the same time profits fall substantially due to an economic recession, the tax ratio might even rise.

For a start, we suggest not to assign all taxes – one way or another – when calculating tax ratios.²⁵ On the other hand, it may be useful to increase the number of ratios, for example by calculating *tax ratios on transfers* or on income from *self-employed labour*.

As far as *social transfers* are concerned, there is a huge variation, both between countries and even in one and the same country in how transfers are organised and treated for tax purposes. Social transfers include unconditional transfers like social aid, transfers which are based on some kind of ‘insurance’ arrangements (unemployment benefits), transfers to certain groups, and old age pensions (Directorate General XXI of the European Commission 1998). Furthermore, these transfers exist in very different forms, ranging from cash transfers, to benefits in-kind, and tax relief. For the analysis of tax systems it is of interest to know to what extent tax revenues arise from the taxation of gross transfer payments. As pointed out by the Directorate General XXI of the European Commission (1998), these revenues have to be identified and shown separately and can certainly not be subsumed under one of the other ratios. The share of taxes on transfer income is quite substantial in some OECD Member Countries (Adema 1999). Generally, the tax revenues concerned are not (fully) identifiable in available tax statistics, but are included in total income tax revenues. It is important to identify the amounts involved more exactly, also for the past, which can best be done on the basis of information from Member Countries.

Some of the information is available, see, for example, Adema, Einerhand, Eklind, Lotz, & Pearson (1996) and Adema (1999). These studies look at the level of taxation on social benefits across OECD member states. The collected data might also be used to identify taxes on transfers and the appropriate tax base for relevant tax ratios. Due to the current status of the project – that is explorative rather than exhaustive – we do not consider this issue any further here.

²⁵However, the Directorate General XXI of the European Commission (1998) argues that a distribution of all tax revenues would stimulate acceptance of the new approach by potential users.

As far as *income from self-employment* is concerned, this income is typically earned by combining labour and capital. As the Directorate General XXI of the European Commission (1998) points out, the capital input can be almost zero (an opera singer) or very high (farmers) and it is difficult, if not impossible, to split income taxes paid by the self-employed into a labour and capital part. Therefore it seems desirable not to subsume these taxes under labour or capital taxes but to present them as a separate category.

A major shortcoming of the approach adopted in the Directorate General II of the European Commission (1997) study, and by Mendoza, Razin, & Tesar (1994), is that revenue from personal income tax should ideally be split and allocated to (employed) labour income, capital income, but also to income from self-employed individuals, and income in the form of transfer payments received. What is the most appropriate approach here? More detailed data to identify capital and labour income revenues are sometimes available, for example, see Eurostat (1997). This information is either available from national sources or it has to be estimated. If these data are available, more accurate calculations can be made.

Departing from the methodology applied by Mendoza, Razin, & Tesar (1994), we suggest, apart from the remarks above, the following amendments.

Labour income: The denominator might be re-defined to include the compensation of employees and all taxes on payroll and workforce. These are the total labour costs of employees to employers. Under this approach, the following items have to be lumped together: gross wages, employers' social security contributions (2200), category 3000 and employers' contributions for private pension and welfare plans. The numerator should then include employers' and employees' social security contributions (2100 and 2200, excluding social security contributions paid by self- and non-employed), taxes on payroll and workforce (3000), and all income taxes paid on labour income. For some countries the data needed are readily available in the Revenue Statistics, for other countries, national authorities could be asked to provide information as to which part of revenue from taxes on income may be attributed to labour (for all separate taxes since otherwise there is still the implicit assumption of equal average tax rates). The impact of foreign earned income, and likewise income paid out to foreigners is relatively limited, except in the case of Luxembourg, and might be neglected.

Capital income: For reasons of consistency, taxes on payroll and the workforce (3000) have

to be eliminated from the tax base, the operating surplus of the economy. The numerator (that is all taxes paid on capital) might include all taxes paid on capital income including part of the personal income tax (1100, with the same procedure as for the labour tax ratio), 1200 (corporate income taxation), 4000 (taxes on property), and category 6100 (other taxes paid by businesses). The preferred approach seems to be to follow the National Accounts conventions in this respect.

Corporate income: The tax base is slightly modified to exclude taxes on payroll and workforce that are attributed to the labour income tax ratios. Thus OSPUE and 3000 taxes should be taken out of OS to arrive at corporate OS. Ideally, a correction has to be made with respect to the treatment and extent of losses. Another issue is the choice of the correct base year for the calculation of the tax ratio. Tax revenues in a given year are not necessarily related to profits earned in that same year, for example, due to losses carried forward.

Consumption: The tax base might be changed to gross final consumption expenditure, thus consumption taxes and the compensation of employees of producers of government services should not be included in the base. Some items from taxes on goods and services can be easily attributed (like VAT) but in other cases (see the discussion of the capital income ratio) it requires further checking whether certain items should be attributed to capital income taxation or to consumption taxation (for example, housing). Again the best way to proceed seems to be to follow National Accounts conventions. For a limited number of countries, a correction could be made with respect to the net international balance of VAT and other consumption based payments.

Table 9 summarises our recommendations on how tax ratios on (employed) labour income, capital income, corporate income, and consumption might be calculated.

The numerator of the tax ratio on *labour income* consists of the part of the revenues from personal income tax that can be attributed to labour plus employees' (2100) and employers' (2200) social security contributions, plus taxes on payroll and workforce (3000). The denominator is the sum of the compensation of employees (CoE) and taxes on payroll and workforce (3000).

The denominator of the tax ratio on *capital income* is the total operating surplus of the economy (OS) minus taxes on payroll and workforce (3000), whereas the numerator consists of the sum of the part of personal income tax revenues that should be attributed

Table 9: Tax Ratios: Suggested definitions

Labour income tax ratio τ_{lab}	$(\alpha \cdot 1100 + 2100 + 2200 + 3000) / (CoE + 3000)$
Capital income tax ratio τ_{cap}	$(\beta \cdot 1100 + 1200 + 4000 + 5125 + 5212 + 6100) / (OS - 3000)$
Corporate income tax ratio τ_{cor}	$(1200 + 4120 + 4220) / (OS - OSPUE - 3000)$
Consumption tax ratio τ_{con}	$(5000 - 5125 - 5212 - other) / (C + G)$

Note: α : the fraction of the revenues from personal income taxation (1100) that can be attributed to (employed) labour income. β : the fraction of the revenues from personal income taxation (1100) that can be attributed to capital income. other: other revenues from category 5000 that cannot be attributed to taxes on consumption. α and β are figures that are comparable to the correction factors used by Eurostat (1997), that is, the figures indicate which part of the revenue reported under category 1100 should be attributed to labour income tax revenue, to capital income tax revenue, and, where applicable, to transfer income tax revenue. This may materialise as a simple number to split the revenue reported under category 1100, or as a specification of subitems of category 1100 that should be attributed to the various tax ratios.

to capital income, plus corporate income taxation, plus property taxes (4000), plus taxes on investment goods (5125),²⁶ and motor vehicle charges paid by others (5212) plus other taxes paid solely by businesses (6100).²⁷ A careful check of the Revenue Statistics (and of the National Accounts conventions) should reveal whether other revenues are to be taken into account when calculating this ratio, especially in comparison to the consumption tax ratio.

The denominator of the *corporate income tax ratio* equals the operating surplus of the economy (OS) minus the operating surplus of private unincorporated enterprises (OSPUE), and minus taxes on payroll and workforce (3000). The numerator is the sum of corporate income tax revenues (1200) and corporate taxes on immovable property (4120) and net wealth (4220).

The numerator of the *consumption tax ratio* consists of all revenues from taxes on goods and services minus taxes on investment goods (5125) minus taxes on motor vehicles not paid by households (5212). The denominator equals the sum of private (C) and government (G) final consumption expenditure.

7 New Calculations of Tax Ratios

In this section, we calculate various tax ratios. A more recent publication by Mendoza and co-authors, (Mendoza, Milesi-Ferretti, & Asea 1997), extends the calculations performed for

²⁶After 1980, only Norway levies taxes that fall under this category.

²⁷Note that categories 4120 (recurrent taxes on immovable property not paid by households) and 4220 (recurrent taxes on net wealth paid by corporations) are included in the calculations for the capital income tax ratio even though both are already taken into account in the corporate income tax ratio.

their 1994 study by including more countries (1994: G7, now 18), and covers a somewhat longer time-period. Calculations cannot be made for Greece, Iceland, Ireland, Luxembourg, and Portugal due to lack of data over extended periods. This is in sharp contrast to the sample of tax ratios presented in the internal EC report. However, some of the data underlying the EC study are approximations of the real – and missing – data. Our main goal is to get *reliable* calculations, using correct data. Therefore, we abstain from estimating missing data to broaden the sample.²⁸ In the present section we calculate tax ratios for the period 1965-1996, for as many OECD countries as possible, to compare the results with those reported by Mendoza, Milesi-Ferretti, & Asea (1997). Still this particular time-period and selection of countries presents us with problems due to missing data. Details on how these data-related problems have been handled may be found in the Appendix.

The section is organised as follows. First the calculations by Mendoza, Milesi-Ferretti, & Asea (1997) are replicated, as far as possible. In the next part the ratios are recalculated, following the specifications in Table 9 and the adjusted approach outlined in Section 7.2. The last part compares the results obtained by applying both approaches.

7.1 The Mendoza et al. (1994) Methodology

Following the approach adopted by Mendoza, Razin, & Tesar (1994), we have re-calculated the tax ratios on personal income (Table 14), labour income (Table 15, the original data are shown in Table 11), capital income (Table 16, the original data are shown in Table 12), corporate income (Table 17), and on consumption (Table 18, the original data are shown in Table 13). As stated in Mendoza, Milesi-Ferretti, & Asea (1997), not all data needed to calculate the tax ratios are available. The authors mention particular problems in the cases of the Netherlands, New Zealand, and Spain, apart from problems with the countries excluded from their sample. A closer inspection of the data shows, however, that there are

²⁸As has been noted before, there is a problem with the data on the operating surplus of private unincorporated enterprises (OSPUE) in three countries (Austria, Germany, and Switzerland). This problem stems from the fact that these countries differ from the other countries in the sample due to the relatively high fraction of unincorporated enterprises. In our calculations, we have assumed that OSPUE equals zero for these countries. This biases the results for the corporate income tax ratio, for these countries, significantly. On average the fraction of OSPUE to OS is 59% (for all countries, except Austria, Germany, Switzerland, and some other instances in which the data are missing (See Table 10 for more details). Given the generally negligible impact of category 3000 (on average the revenue form 3000 taxes in total taxation is around 1%), this would indicate that by setting OSPUE to zero, the corporate income tax ratio for these countries is understated by a factor close to 2.5 ($1/(1-0.59)$).

more problems.²⁹ In some instances, we were able to extend the range since more data have recently become available.³⁰

Ratios have been computed using definitions and data sources as given in Table 5. If data are missing, this is shown by a – sign. Some observations are not reliable and thus have to be ‘approximated’ in the spirit of Mendoza, Razin, & Tesar (1994) and Mendoza, Milesi-Ferretti, & Asea (1997). The most notable problems occur in case of OSPUE (operating surplus of private unincorporated enterprises) for Austria, Denmark, Germany, Greece, Ireland, Luxembourg, and Switzerland, where it has to be set to zero;³¹ in case of PEI (property and entrepreneurial income) for Denmark and Ireland, where it has to be set to zero; and in case of W (wages and salaries) for Australia, Denmark, Greece, New Zealand, Portugal, and Spain, where W is approximated by CoE–2200 (see Section A for more details). For Denmark, reliable data prior to 1981 are absent. Since many observations are missing from the Mendoza, Milesi-Ferretti, & Asea (1997) sample and the sample covers the period to 1992, we have been able to add a few years and to fill some gaps. In case of the *consumption tax ratio*, we were able to extend their sample substantially. The most notable problem occurred, however, in the case of Switzerland, where we obtained observations for GW only for three (non-successive) years. Therefore, we have also used the data reported by Mendoza, Milesi-Ferretti, & Asea (1997) instead of our own calculations.³²

The results for the corporate income tax ratio reported by Mendoza, Milesi-Ferretti, & Asea (1997) and in this study are wide apart. In some cases, differences are due to unreliable

²⁹The data as used in Mendoza, Milesi-Ferretti, & Asea (1997) are accessible at <http://www.econ.duke.edu/~mendozae/taxdata.pdf>. There are three tax ratios available, a consumption tax ratio (with data ranging from 1965-1991), and a capital and labour income tax ratio (both ranging from 1965-1992). These series have substantial gaps, more so than suggested by Mendoza, Milesi-Ferretti, & Asea (1997). The gaps are, for the consumption tax ratio: Australia (1965-1968), Belgium, Italy, The Netherlands, and Sweden (1965-1969), Denmark (1965-1980), France (1965-1976), New Zealand (1965-1970), and Spain (1965-1979). For the labour and the capital income tax ratio the following observations are missing: Australia (1992), Austria, France, and Sweden (1965-1969), Belgium (1965-1969, 1992) Denmark (1965-1980), Italy (1965-1979, 1992), The Netherlands (1965-1984), New Zealand (1965-1981, 1992), Norway (1965-1974, 1992), Spain (1965-1979, 1987-1992), and the US (1992).

³⁰Since we have used more recent OECD data, there might be some differences with the results obtained by Mendoza, Milesi-Ferretti, & Asea (1997). Especially the end of the sample period statistics are often revised after one or more years. More specifically, the data we have used for the calculations are taken from the 1998 edition of the *Revenue Statistics*, which have undergone considerable revisions. The data underlying the calculation from Mendoza, Milesi-Ferretti, & Asea (1997) are probably based on the 1993 or 1994 edition.

³¹In most cases OSPUE and PEI are lumped together in the National Accounts, so this is just a practical problem, since only the sum of these items is taken into account.

³²Our own calculations for Switzerland only covered the years 1985, 1990, and 1991. The calculated ratios for these years were almost equivalent to the ones reported by Mendoza, Milesi-Ferretti, & Asea (1997), therefore it seems acceptable to use their data for the remaining years.

date (for example, in the case of Denmark). Revenues from the corporate income tax are also very responsive to the business cycle. Furthermore, for a lot of countries, the values of OS and OSPUE are quite close, which explains why the tax ratio (which is tax revenue over the difference between OS and OSPUE) is extraordinarily high.³³ So, it is not easy to draw conclusions from the data.

The values for the tax ratios we report here are in some instances equal or close to the tax ratios in Mendoza, Milesi-Ferretti, & Asea (1997). However, both consumption tax ratios show considerable differences at the end of the period, which is obvious since both National Accounts and Revenue Statistics data are often revised after one or two years. Still, large differences are also found for earlier years in the order of 5 percentage points for an extended period in the case of Canada, Norway, and Switzerland. With respect to the labour income tax ratio, large differences are found in the cases of Australia, Austria, Finland, Spain, Sweden, Switzerland, the United Kingdom, and the US.³⁴ For the capital income tax ratio, significant differences exist in the cases of Austria, Belgium, Denmark, Finland, Norway, Spain, Switzerland, and the United Kingdom.

7.2 New Calculations Following our Suggested Methodology

In this section we incorporate the suggestions made in Section 6. For example, as mentioned in Section 5, the most fundamental problem lies in the calculation of the *personal income tax ratio*. As has been shown in Section 5.2, in some countries social benefits are subject to income taxation, while top marginal rates for various categories of income differ widely. Furthermore, the same problem applies to the splitting of income tax revenues from capital, labour, and self-employed income. There are two ways to deal with this problem. One is to correct the base, that is, include everything in the base that is subject to personal income taxes, like social security benefits, and parts of capital income in some countries. A second

³³An important reason for the difference between the actual tax base (corporate profits) and its proxy (corporate OS) is that the first is generally 'reported' on a cash basis, whereas the second is 'reported' on a transactions basis. This can lead to some cyclical fluctuations, apart from fluctuations due to the business cycle. There are several other reasons why corporate OS can be lower than the actual tax base. One is that foreign source income is treated differently across countries, which creates a source of incomparability between countries. A second reason is that the treatment of compensable losses might differ between countries. A third reason could be the use and range of tax instruments. If the use is limited, for example, the revenues from the tax are higher, while the 'tax base' remains unchanged.

³⁴For Australia, Austria, and Spain this is not really surprising since W is missing for these countries, and was approximated by CoE-2200, see Table 10 for more details.

approach is to avoid the calculation of the personal income tax ratio, by splitting item by item the appropriate part of total revenues related to a certain base. The first type of calculation is rather straightforward, whereas the second type requires more detailed information, but is also more accurate, albeit not perfect, since the assumption of equal average taxation of different sources of income is relaxed.

This latter approach is followed by Eurostat (1997), as explained in considerable detail in Directorate General XXI of the European Commission (1998), and is also applied in the country reports summarized in Valenduc (1998b). We have used both the data on split income tax revenues as provided by the Directorate General XXI of the European Commission (1998) and data from the various country reports summarised in Valenduc (1998b), see Section B.1 for more details.³⁵ The calculations follow the definitions given in Table 9.

A few further remarks regarding the calculations are in order here. With respect to the distinction between taxes bearing on either capital income or on consumption, we have closely followed the guidelines set out in the 1993 SNA to distinguish between both. Thus taxes on the housing stock etc. are considered taxes on capital (since houses are considered an investment in a capital good).

The *corporate income tax ratio* is corrected by taking into account both recurrent taxes on immovable property not paid by households (4120) and recurrent taxes on net wealth paid by corporations (4220) in the numerator. Also, taxes on payroll and workforce (3000) are subtracted from the denominator. As has been already noted, the data do not seem to be particularly reliable for some countries.

With respect to the denominator of the *consumption tax ratio*: the basis is final consumption expenditure by resident households and the government. An alternative specification would consider final consumption expenditure in the domestic economy, that is consumption abroad is eliminated and consumption by foreigners is added. This affects the resulting ratios only for countries with high tourist expenditures. Thus it is no surprise that the differences between both measures are notable for Austria, Greece, Portugal, and Spain. The rankings and trends hardly change, however, see Directorate General XXI of the European Commission (1998). For the consumption tax ratio, taxes on investment goods (5125, taxes on investments goods, allocated to the capital tax ratio), and recurrent taxes not paid by households (5212,

³⁵The data used to split the income tax revenue over the different 'sources' is, except for Italy, not constant over time.

allocated to the capital income tax ratio) are subtracted from the revenues from taxes on goods and services (5000), and are thus excluded from the numerator. All other taxes and levies are supposed to be shifted onto consumers, in line with National Accounts conventions.

The results of our calculations are shown in Tables 19 to 22.

7.3 Discussion

Figures 1 to 4 compare our ratios with the tax ratios reported by Mendoza, Milesi-Ferretti, & Asea (1997). If the line is flat and at 100%, the tax ratios match; if the line exceeds 100%, the tax ratios of Mendoza, Milesi-Ferretti, & Asea (1997) are lower, and vice versa.

Some remarks about the original calculations are in order. As has been noted in Section 7.1, there are, in some cases, significant differences in the numbers presented in Mendoza, Milesi-Ferretti, & Asea (1997) (shown in Tables 11 to 13) and our own calculations (shown in Tables 14 to 18). These can largely be explained on the basis of differences in the underlying datasets. The problem is, to a large extent, alleviated because the countries for which the largest differences occur are not in our sample of ‘new calculations’.

Figure 1 clearly shows that – following our revised framework – both the trend and the level of the *labour income tax ratio* are not well represented by the Mendoza, Milesi-Ferretti, & Asea (1997) data. For Finland, Italy, and the United Kingdom, the tax ratios are understated, whereas the tax ratio is overstated for Austria, France, Germany, and The Netherlands. Furthermore, the trend is not well captured, especially in case of the United Kingdom.

Figure 2 tells a similar story for the *capital income tax ratio*. Finland and Germany are large outliers here. The difference exceeds 50% for some years. That is, the data used by Mendoza, Milesi-Ferretti, & Asea (1997) are an inadequate approximation of the actual taxation of capital income for these countries. Even if it is assumed that capital income taxes paid by the self-employed fall on regular capital income, the gap is still very substantial.³⁶ Only for France, both the trend and the level are well captured by Mendoza, Milesi-Ferretti, & Asea (1997). The data for the United Kingdom are only slightly overstated in Mendoza, Milesi-Ferretti, & Asea (1997). This is surprising since, for some years, the capital income tax ratio exceeds 70% in the UK.

³⁶More details are provided in Section B.1.

The observations for the *corporate income tax ratio* are, for some countries, similar. This stems from the fact that revenue categories 3000, 4120 and 4220 – that are taken into account in our revised method, and are not taken into account by Mendoza, Milesi-Ferretti, & Asea (1997) – are sometimes equal to zero, making the expressions materially equal. For Australia, Austria, Denmark, Finland, France, Sweden, Switzerland, the United Kingdom, and the United States, the corporate income tax ratio in Mendoza, Milesi-Ferretti, & Asea (1997) is too low and does not capture the trend correctly. As noted, however, the data do not seem to be very reliable, as a check of Tables 17 and 21 shows. For some countries and for some years, the tax ratio is either negative or over 100%. This, rather absurd, result is mainly due to the volatility of the base. This base varies widely over time, and in some cases even becomes negative.

The *consumption tax ratios* are reasonably well captured for most countries, as far as the trend is concerned. Australia, Canada, Denmark, France, Japan, New Zealand, and Switzerland are outliers. The levels are not captured well. In most cases, Mendoza, Milesi-Ferretti, & Asea (1997) misstate the consumption tax ratio by about 20% in either direction.

In conclusion the tax ratios calculated by both Mendoza, Milesi-Ferretti, & Asea (1997) and the Directorate General II of the European Commission (1997) inaccurately capture both the levels and the trend in tax ratios for the sample of countries and for the time-period analysed here. The ratios may be simple to calculate, but apparently it is difficult to get the ‘numbers’ right. Furthermore, any estimates for the corporate income tax ratio should be mistrusted at the moment.

8 Concluding Remarks

In this study, we have critically reviewed the construction of tax ratios, as pioneered by Mendoza, Razin, & Tesar (1994), and in recent years adopted by various other authors. Tax ratios are tax revenues expressed as a ratio of some aggregate tax base (for example, labour income, capital income, consumption, corporate income, etcetera). One advantage of tax ratios is that they are relatively easy to calculate. They have other advantages too. In comparison to microeconomic indicators, they are, for instance, much easier to compare because they are in most cases constructed in a similar way for each country. The results of studies in which these tax ratios are calculated have attracted attention from both researchers

and policymakers. For instance, the findings of Daveri & Tabellini (1997) are often cited in support of a co-ordinated change in the tax system in the European Union. It is believed that lowering taxes on labour will stimulate employment growth. Of course, the conclusions of this type of studies depend critically on the data used. It is therefore helpful to critically assess the reliability and usefulness of tax ratios.

Indeed, given the widespread interest in tax ratios exhibited by academics and policymakers alike, a critical assessment seems warranted. As both the methodology and the data of Mendoza, Razin, & Tesar (1994) have been widely used, we take this study, and the update of this study (Mendoza, Milesi-Ferretti, & Asea 1997) as starting point in this study. The question addressed in the present study is whether the methodology as employed by Mendoza, Razin, & Tesar (1994) may be improved upon. We also discuss whether methodological and/or practical considerations suggest an alternative approach; and in the latter case, which alternative is best suited for the purpose at hand.

Mendoza, Razin, & Tesar (1994) distinguish between five tax ratios: a personal income tax ratio, a labour income tax ratio, a capital income tax ratio, a corporate income tax ratio and a consumption tax ratio. None of the studies discussed in our survey examines a tax ratio on transfer payments. The tax treatment of transfers varies considerably. Policymakers might therefore also be interested in the aggregate tax ratio on transfer payments.

Calculating tax ratios is not a straightforward exercise, because several conceptual and practical problems have to be solved. The fundamental methodological problem in constructing tax ratios is that most tax categories as distinguished in the OECD *Revenue Statistics* relate to more than one macroeconomic category (labour, capital, etc.). Consequently, it is impossible to calculate tax ratios without using some technique to artificially separate out the revenue amounts to be allocated to various macroeconomic categories. This is most evident for the personal income tax. The category taxes on income, profits and capital gains of individuals includes taxes on labour, taxes on capital and – at least in some countries – taxes on transfers. This problem becomes most evident for personal taxes paid by the self-employed. Other revenue categories as distinguished in the OECD Revenue Statistics are plagued by similar problems. Social security contributions are, for example, paid by employees (labour) and – in various countries – also by recipients of social security benefits and by the self-employed, whose income is partly earned by employing capital.

Various studies use the same detour as Mendoza, Razin, & Tesar (1994) of first calculating a personal income tax ratio. The personal income tax ratio is defined as the ratio of revenues from taxes on income, profits, and capital gains of individuals to the tax base that consists of wages and salaries, the operating surplus of unincorporated enterprises and the property and entrepreneurial income of households. The personal income tax ratio is subsequently used to calculate labour and capital income tax ratios. This is not without problems since income from labour, capital income and transfers are all included in the ‘tax base’ of personal income. Furthermore, it is assumed that the same average tax rates apply to all these income categories. This assumption is intuitively implausible, since some income components are largely exempted from taxation, and furthermore, many OECD countries apply different statutory tax rates to different sources of income.

Due to lack of data, the problem identified here is hard to overcome. However, sometimes further information can be used to get more accurate – but still imperfect – figures. First, in several cases withholding taxes on certain kinds of income (for example, wage taxes) can be identified which may serve to approximate the parts of the income tax attributable to income from labour, capital, etc. Second, one may split the income tax revenues following the key provided by OECD Member States concerned. Third, a rough split can be obtained by using National Accounts data on main aggregates (for example, gross salaries divided by gross salaries plus the net operating surplus). If this differentiated approach is followed, however, this implies that a uniform approach can no longer be applied to all countries under review. This is the price to be paid to get a more accurate view of tax ratios.

Following the ordering of options as outlined in the previous paragraph and using available information from various sources – including national ones – about the part of revenue from taxes on income that may be attributed to labour and capital, we have recalculated the various tax ratios. Although we have used all information that was available to us, there are still some important caveats to be made. One potential bias of our calculations, especially with respect to the corporate and capital income tax ratios, lies in the effect of the business cycle. There is also a timing problem: Taxes received in one year are influenced by profits or losses made in previous years. As a consequence, annual tax ratios may show huge fluctuations. Furthermore, OECD Member countries have open economies. Therefore, dividends, interest payments and labour income flows across borders. As a consequence, the nominator and

denominator of some tax ratios are not fully consistent.

In our calculations of the labour income tax ratio we have also adjusted the tax base by including employers' contributions for private pension and welfare plans. Our conclusion is that both the trend and the level of the labour income tax ratio are not well represented by the Mendoza, Milesi-Ferretti, & Asea (1997) data. The same conclusion holds for the capital income tax ratio in at least some countries. As far as the corporate income tax ratio is concerned we find that for some countries, including the US, the trend and level as reported by Mendoza, Milesi-Ferretti, & Asea (1997) may also be questioned. We have also some reservations concerning the way the consumption tax ratio has been calculated by Mendoza, Milesi-Ferretti, & Asea (1997). For instance, consistency requires to include all taxes paid on consumption in the tax base of the consumption tax ratio. Our calculations suggest that the data of Mendoza, Milesi-Ferretti, & Asea (1997) reasonably capture the trend, but that the levels are not captured well.

In conclusion, there are significant problems associated with calculating labour and capital income tax ratios. The major limitation of existing methodologies for calculating tax ratios is that techniques applied to allocate tax revenues to selected aggregate tax bases are underdeveloped. Some studies have come a long way, however, to correct for this. Still, this does not solve another important problem though, data availability. Some data (e.g. the operating surplus of unincorporated enterprises in some countries) are just not there, or are unreliable. These problems are not likely to be solved easily. Although it seems possible and useful to calculate tax ratios and examine differences between these ratios, across various countries and over time, when interpreting the results the underlying methodological and data problems should be recognised. The previous conclusion also implies that the results and policy implications of empirical studies in which tax ratios are used should be handled very carefully. One useful suggestion for future research would be to examine the robustness of the findings of these studies, employing the data presented in the present study.

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A Data

Most data are taken from various issues of the OECD *National Accounts* and from the electronic version of the 1998 edition of the OECD *Revenue Statistics*³⁷. In some instances, the National Accounts data are not available from the OECD. In those cases, data from Eurostat have been used. More specifically, see Table 10, for an indication of the problems we encountered in gathering the data.

B Remarks to the Calculations Underlying the Results in Section 7

B.1 Country Reports

The data taken from Eurostat (1997) and the Directorate General XXI of the European Commission (1998) are confronted with several country reports as a check. These reports are: for Austria: Koman & Wörgötter (1995); for Finland: Epaulard & Valenduc (1995); for France: Epaulard (1995); for Germany: Beauchot, Gérard, & Jamaels (1995a); for Greece: Georgakopoulos (1995); for Ireland, Sweden, and the United Kingdom: McCarthy (1995); for Italy: Bontempi, Giannini, & Golinelli (1995); for Luxembourg: Beauchot, Gérard, & Jamaels (1995b); for The Netherlands: Beauchot, Gérard, & Jamaels (1995c); for Portugal: Brandts, Caminal, & Del Mar Racionero (1995a); and for Spain: Brandts, Caminal, & Del Mar Racionero (1995b). Valenduc (1998b) summarises these reports. All these country reports are based on the Eurostat statistics, which in most instances are comparable to the data provided by the OECD. If these data are not comparable, it is noted in the subsequent country parts. Since we have not included Ireland, Portugal, and Luxembourg in the previous parts, we also do not include them here. Unless noted otherwise, the split data are not constant throughout time.

B.1.1 Austria

The OECD tax statistics were confronted with the report by Koman & Wörgötter (1995) to split personal income taxes over employed labour income and capital income. Wage taxes are only paid by employed workers, whereas the revenue from the personal income tax reflects capital income earned by self-employed and all other persons. Therefore, the calculation of the labour income tax ratio is rather straightforward. We applied the definition stated in Table 9, with the item $\alpha \cdot 1100$ given by the revenues from the wage tax. The capital income tax ratio posed somewhat more complicated problems since part of the income taxes are paid by self-employed persons. Koman & Wörgötter (1995) split both the revenues and the appropriate tax base (operating surplus) into two parts: capital income and entrepreneurial

³⁷Breaks and the like in the data are not corrected for. We assume that the data provided (in all cases the most recent electronic data) are consistent. In case of additions to these sources, no breaks were noticeable.

Table 10: Data Problems

Country	Problems
Australia	W is approximated by CoE-2200 (note that 2200 is zero in Australia and New Zealand), GW is approximated by the cost component of GDP by kind of activity for the years 1965-1968.
Austria	OSPUE is set to zero, W (1965-1971) is approximated by CoE-2200, GW is approximated by the cost component of GDP by kind of activity for the years 1965-1971.
Belgium	no problems.
Canada	GW missing for 1994 and 1995.
Denmark	OSPUE missing and set to zero for 1965-1981, PEI set to zero for 1965-1980. For the other years, NA statistics are not reliable.
Finland	no problems.
France	no problems.
Germany	OSPUE set to zero.
Greece	OSPUE set to zero, and W approximated by CoE-2200 for the whole sample period.
Iceland	OSPUE, W, and PEI missing for the whole sample period, GW missing up to 1980. Tax data up to 1980 only available once every five years.
Ireland	OSPUE and PEI set to zero. GW missing up to 1970 and for 1996. W approximated by CoE-2200 for 1970-1991, rest is missing.
Italy	no problems.
Japan	no problems.
Luxembourg	W, OSPUE, and PEI missing. GW missing for 1965-1969 and 1996.
The Netherlands	data on OSPUE and PEI do not seem to be reliable for the period 1965-1976.
New Zealand	data on OSPUE, W, PEI, and GW are missing for 1965-1972. Furthermore data for OSPUE for 1973-1981 are set to zero. W is approximated by CoE-2200 (same remark as for Australia applies here).
Norway	OSPUE and PEI are set to zero for 1965-1974. For this period W is approximated by CoE-2200.
Portugal	W, OSPUE, PEI, and GW missing for 1965-1976 and 1996. For the rest of the period, W is approximated by W-2200. As from 1994, W, PEI and GW are missing. 1100 and 1200 can only be distinguished as from 1989.

Table 10: Data Problems (continued)

Spain	PEI set to zero for 1965-1971, W approximated by CoE-2200.
Sweden	no problems.
Switzerland	OSPUE set to zero for 1965-1989, GW missing for the whole time period except for 1985 and 1990-1991.
United Kingdom	no problems.
United States	no problems.
All	Several end of period observations of some variables missing.

income. Since our aim, at the moment, is to construct just a more refined capital income tax ratio, we have constructed two ratios, one which includes only income taxes paid by non self-employed persons, and one which includes those income tax revenues, and some other items (the revenues from the directors tax, individual contributions to chambers, the revenues from taxes on industry and trade by all persons and institutions, and all income tax revenues – thus only social security contributions paid by self-employed are excluded here). Relevant levies furthermore include all taxes on property, taxes on investment goods, motor vehicle duties paid by others, and some other taxes from category 6000, namely taxes on financial institutions, and category 6100 (zero for the whole period). The reason we need the country report is that it provided a split of the income tax revenues over capital income and entrepreneurial capital income. If this split is not made, the calculations can be made for a longer period (1973-1996), similarly to the labour income tax ratio.

B.1.2 Belgium

For the split of income tax revenues by components, data from Eurostat (as shown in (Directorate General XXI of the European Commission 1998)) are used. Eurostat does not calculate a capital income tax ratio, so, only an alternative employed labour income tax ratio can be calculated. Due to rounding, the calculated figures are not perfect estimations. More detailed: we have taken the split provided by Eurostat (1997) to correct the following items: *précompte immobilier*, *précompte mobilier*, and *précompte professionnel*. The other items (including item 1110) are included fully.

B.1.3 Finland

Epaulard & Valenduc (1995) provide fractions to divide income tax revenues over labour income, transfer income, entrepreneurial income, and capital income. The same remarks as stated for Austria apply here. It is rather arbitrary, if one does not split the base too, to separate capital income tax revenues from entrepreneurial income. Therefore, two time series are provided. Rather surprisingly, Eurostat reports that a split between the different sources

of tax revenues cannot be made, the fractions are approximated by taking the fraction of the different sources over the sum of the sources, which is equivalent to assuming that the average tax rates are equal. Furthermore, the fractions provided do not confirm the data provided by Epaulard & Valenduc (1995).

B.1.4 France

Eurostat (1997) and the Directorate General XXI of the European Commission (1998) provide conflicting data on the split of income tax revenues over labour income and capital income. The data provided by Epaulard (1995) are also different. We have used the latter data to split the revenues from income taxation in order to calculate the tax ratios on labour income and capital income. Item 1300 is not included in the calculations.

B.1.5 Germany

With respect to the employed labour income tax ratio, Beauchot, Gérard, & Jamaels (1995a) note that, even though the *Revenue Statistics* report wage taxes, these wage taxes are also levied over old age pensions, so the revenues from this source should ideally be subtracted from wage tax revenues. Furthermore, the wage tax is a withholding tax, that is corrected by the personal income tax, therefore some share has to be added or subtracted. These numbers are given by Beauchot, Gérard, & Jamaels (1995a) for 1980-1991 (where 1991 is excluding the GDR), but one has to note that these data are based on Eurostat statistics, which are not fully interchangeable with OECD data. Note that Eurostat (1997) does not correct for these items. The same approach holds for the capital income tax ratio. As noted before, we have constructed two indicators, one assuming away taxation of entrepreneurial income, and one including all taxation of entrepreneurial income except social security contributions. A correction of the base, like taking OS – OSPUE is not possible since PEI and OSPUE are lumped together in the NA Statistics.

B.1.6 Greece

Georgakopoulos (1995) argues that it is hard to calculate the various tax ratios in the case of Greece because income taxation not only bears on labour income, but also on transfer income, income from self-employment and capital income. The problem is aggravated by the presence of significant income tax revenues from previous years and a non-attributable part (1300) of personal income tax revenue. Eurostat (1997) also argues that most of the presented results are based on estimates.

B.1.7 Italy

For the split of income tax revenues into its components, the data used by Eurostat (as shown in (Directorate General XXI of the European Commission 1998)) are used. Due to rounding,

the calculated figures are not perfect estimations. Furthermore, for the full sample period item 4120 had to be set to zero.

B.1.8 Luxembourg

According to Beauchot, Gérard, & Jamaels (1995b) even local authorities are not able to provide a breakdown of income tax revenues by source of income. In spite of this, Eurostat (1997) does provide all tax ratios, based on detailed data from the Revenue Statistics. It is not entirely clear whether this approach is correct, however, that is not the real issues since the relevant data from the National Accounts are missing.

B.1.9 The Netherlands

Beauchot, Gérard, & Jamaels (1995c) do adjust some of the revenues from personal income tax to split the revenues over different income sources, but this split is arbitrary and incorrect. The wage tax is a purely withholding tax, that can be compensated with the income tax at a point later in time. What Beauchot, Gérard, & Jamaels (1995c) propose is to let all wage taxes be assigned to employed labour, and all income tax revenues to self-employed income. This is not correct, some part of income taxes should be assigned to employed labour income. Furthermore, part of wage and income taxes is levied on social transfers. They do not take this into account as well. They also split social security contributions of self- and non-employed into a part on social transfers (75%), and a part on entrepreneurial income (25%).

The approach taken by Eurostat (1997) is quite similar, except for the assumption taken there that 75% of the social security contributions paid by self- and non-employed actually falls on employed labour income!

For the moment, we will assume the approach taken by Beauchot, Gérard, & Jamaels (1995c) is valid. We take it, however, that all income taxes paid bear on capital, and not on entrepreneurial income. This is not correct, but a reasonable shortcut, since better data are missing. Furthermore, item 4120 had to be set to zero for the whole sample period.

B.1.10 Portugal

Brandts, Caminal, & Del Mar Racionero (1995a) have calculated an employed labour income tax ratio on the basis of an arbitrary split (shares are obtained by relating economic activity to NDP). Since this means assuming equal average tax rates on different factors, we have not replicated these results. Eurostat (1997) have constructed an employed labour income tax ratio by the use of their own data. The OECD data do not allow for this.

B.1.11 Spain

Eurostat (1997) uses its own data here. These provide a separate category for taxes on income from employment. This approach can thus not be adopted here. Brandts, Caminal,

& Del Mar Racionero (1995b) provide some estimates to split income tax revenues over different sources of these revenues, and some alternative measures of the tax burden. We have not been able to replicate these results.

B.1.12 Sweden

Eurostat (1997) provides a split of the revenues from income taxation into a part due to employed labour and self-employed labour. But, part of the revenue classified under revenues from income taxation (both local and national) stems from capital income. Eurostat data provide a split over these components, but OECD data do not (no capital yields tax revenues stated). Therefore, we have not been able (at this moment) to provide better estimates. McCarthy (1995) follows basically the same approach, except for the breakdown of income tax revenues over labour income tax revenues and entrepreneurial income tax revenue.

B.1.13 United Kingdom

Both Eurostat (1997) and McCarthy (1995) follow the same approach to compute the employed labour and capital income tax ratios. The revenues from wage taxes are assumed to be correlated fully with employed labour income. All other taxes (except an item relating to social security benefits under 1100, assumed to bear on employed labour) from category 1100, are assumed to be taxes on capital income. There are also some social security revenues in category 2400 (unallocable), that we have neglected. A similar approach was adopted for taxes reported under heading 1300 (unallocable between 1100 and 1200).

Figure 1: Labour Income Tax Ratio: our data vs. Mendoza et al. (1997)

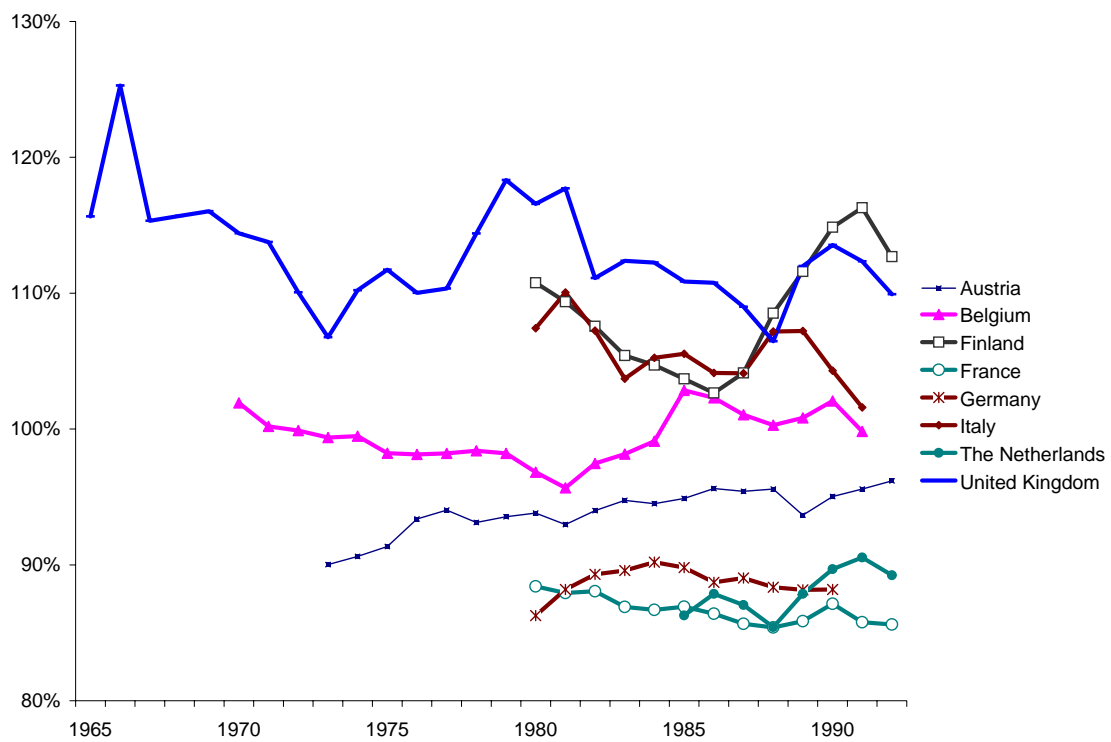


Figure 2: Capital Income Tax Ratio: our data vs. Mendoza et al. (1997)

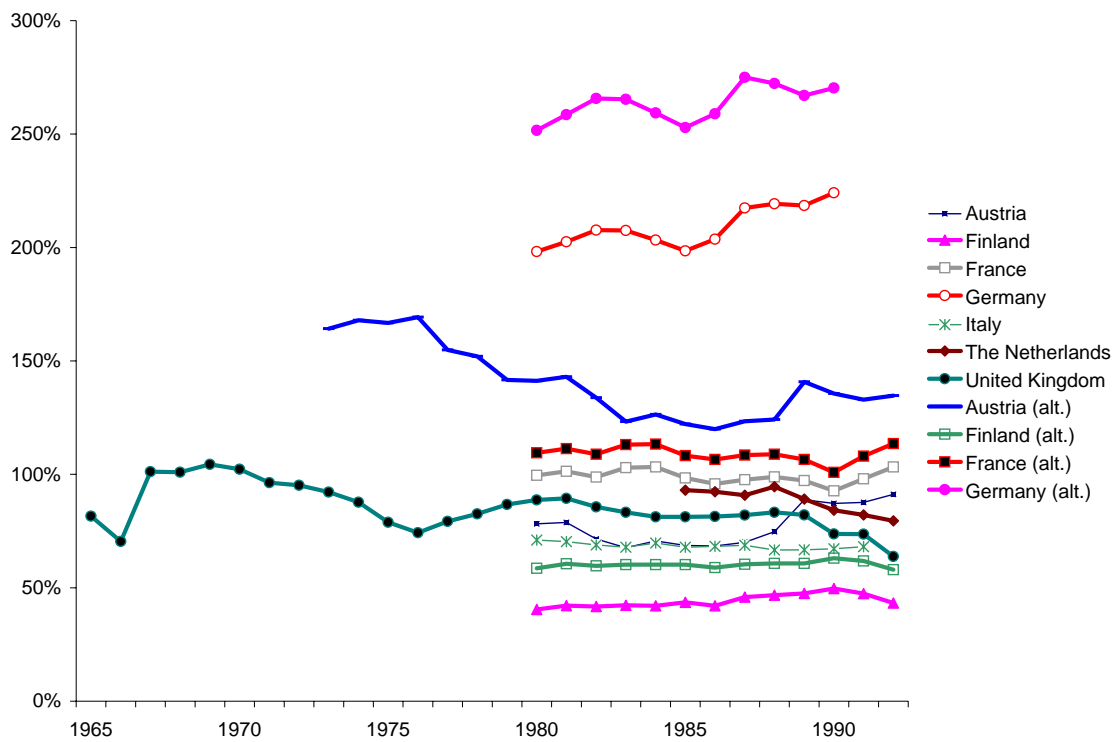


Figure 3: Corporate Income Tax Ratio: our data vs. Mendoza et al. (1997)

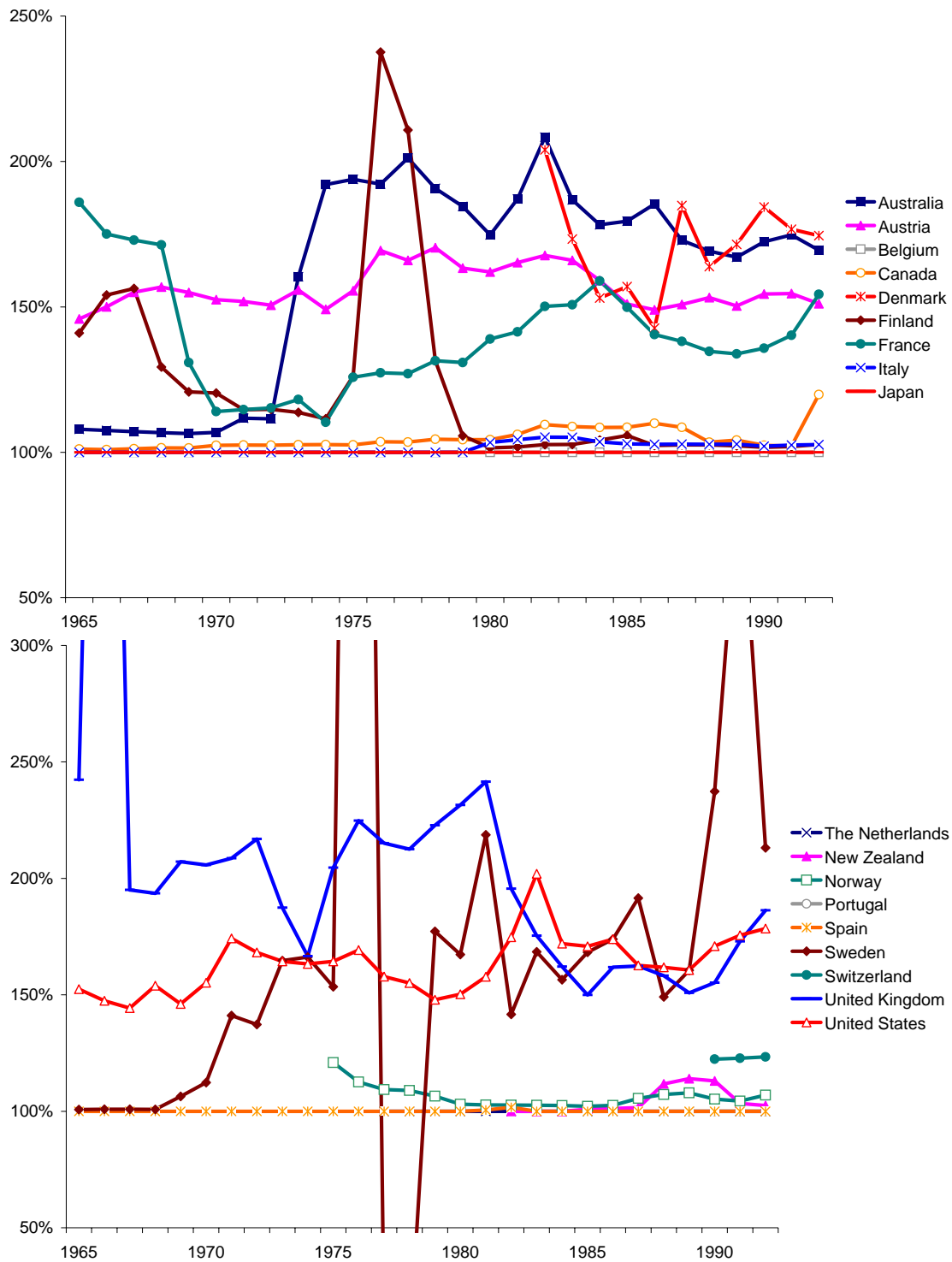


Figure 4: Consumption Tax Ratio: our data vs. Mendoza et al. (1997)

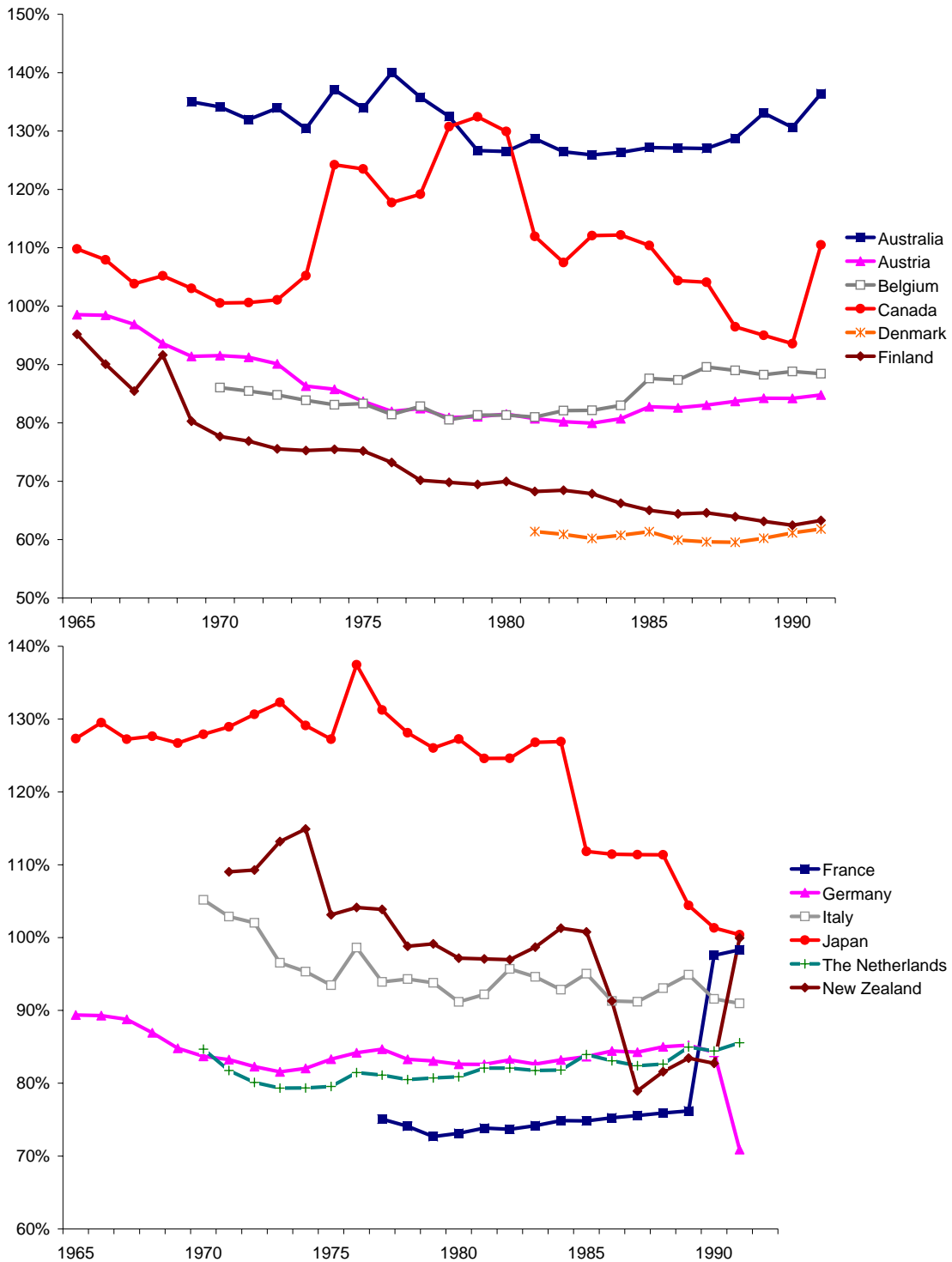


Figure 4: Consumption Tax Ratio: our data vs. Mendoza et al. (1997) (continued)

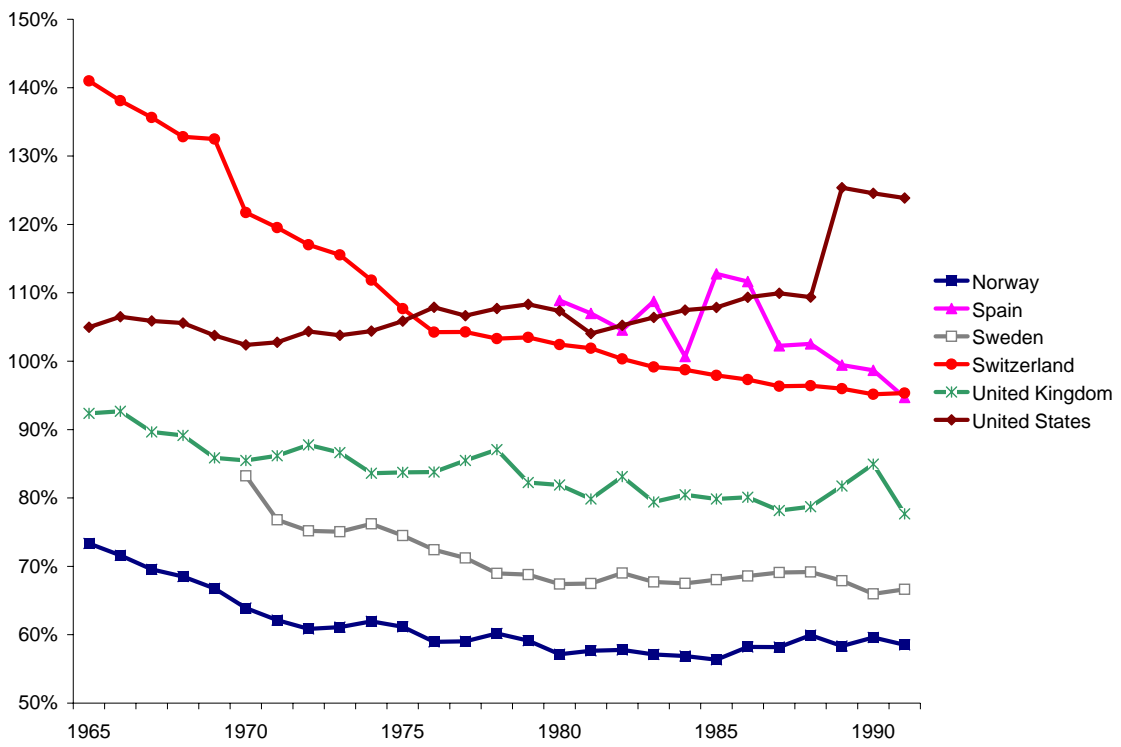


Table 11: Labour income tax ratios (Mendoza et al. (1997))

	Australia	Austria	Belgium	Canada	Denmark	Finland
1965	10.96	–	–	12.48	–	17.58
1966	10.97	–	–	15.07	–	18.51
1967	11.78	–	–	16.34	–	20.57
1968	11.44	–	–	17.81	–	21.72
1969	12.47	–	–	19.97	–	22.25
1970	12.38	31.60	33.37	21.20	–	23.50
1971	13.06	31.91	34.12	21.39	–	25.92
1972	12.41	32.96	34.98	22.03	–	26.61
1973	13.53	33.25	35.92	21.31	–	28.54
1974	15.41	34.15	36.82	22.82	–	29.05
1975	16.02	33.18	40.08	22.48	–	30.48
1976	16.80	33.39	39.52	23.23	–	33.26
1977	16.78	34.44	41.24	22.13	–	33.28
1978	15.75	37.59	42.60	22.15	–	29.85
1979	16.54	37.55	42.97	22.44	–	29.18
1980	16.85	38.28	42.01	22.95	–	28.75
1981	17.69	39.53	42.35	24.21	38.40	30.51
1982	17.56	39.22	44.34	24.43	38.36	29.91
1983	17.21	39.29	44.89	25.69	41.00	30.05
1984	18.62	40.40	46.90	24.90	40.66	31.64
1985	18.46	41.25	48.29	25.90	42.82	33.35
1986	19.39	41.12	47.95	27.17	42.79	35.35
1987	19.28	40.57	49.14	29.09	44.48	32.28
1988	18.97	40.93	48.54	28.02	44.54	34.53
1989	17.85	39.21	47.35	28.76	44.72	33.51
1990	17.41	39.61	47.12	30.34	43.71	34.10
1991	16.39	39.99	46.22	31.79	44.20	33.59
1992	–	41.06	–	32.93	45.53	34.64

Source: Mendoza, Milesi-Ferretti, & Asea (1997), the data are only accessible via <http://www.econ.duke.edu/~mendozae/pdfs/taxdata.pdf>.

Table 11: Labour income tax ratios (Mendoza et al. (1997)) (continued)

	France	Germany	Italy	Japan	The Netherlands	New Zealand
1965	–	28.97	–	15.13	–	–
1966	–	30.17	–	15.38	–	–
1967	–	30.04	–	15.93	–	–
1968	–	30.83	–	16.17	–	–
1969	–	31.70	–	16.60	–	–
1970	32.60	31.54	–	16.95	–	–
1971	32.36	32.55	–	17.36	–	–
1972	32.75	34.02	–	18.08	–	–
1973	32.63	36.02	–	18.72	–	–
1974	32.88	36.57	–	18.48	–	–
1975	34.52	36.37	–	18.10	–	–
1976	35.96	37.90	–	18.78	–	–
1977	37.04	38.96	–	19.51	–	–
1978	37.10	38.53	–	20.67	–	–
1979	39.01	38.03	–	21.57	–	–
1980	40.21	38.28	33.85	22.63	–	–
1981	39.96	37.85	34.07	23.70	–	–
1982	40.94	38.29	36.71	24.17	–	27.36
1983	42.64	38.76	38.45	24.46	–	26.59
1984	44.06	39.28	37.86	24.32	–	25.37
1985	44.25	40.35	38.18	25.51	52.40	26.95
1986	44.62	40.73	40.62	26.09	51.41	27.44
1987	45.58	41.01	40.29	26.54	52.48	25.20
1988	45.51	41.17	40.74	26.57	53.58	25.53
1989	45.99	41.64	41.75	27.55	50.94	25.68
1990	45.78	40.21	42.18	29.36	49.80	24.99
1991	46.47	45.39	42.81	28.77	52.78	24.00
1992	46.81	46.88	–	27.91	52.65	–

Table 11: Labour income tax ratios (Mendoza et al. (1997)) (continued)

	Norway	Spain	Sweden	Switzerland	United Kingdom	United States
1965	–	–	–	18.05	20.42	17.54
1966	–	–	–	19.02	21.16	18.20
1967	–	–	–	19.18	21.93	19.91
1968	–	–	–	20.14	23.12	19.97
1969	–	–	–	21.86	24.05	22.11
1970	–	–	36.80	21.90	24.66	22.63
1971	–	–	36.01	21.65	24.61	21.68
1972	–	–	38.25	21.83	23.66	22.14
1973	–	–	37.23	25.45	23.22	22.59
1974	–	–	40.58	27.04	24.85	23.98
1975	38.86	–	42.22	29.42	27.38	24.60
1976	38.19	–	45.10	31.38	29.01	24.25
1977	37.77	–	46.54	31.97	28.58	25.82
1978	38.14	–	48.38	31.93	26.31	26.03
1979	40.00	–	48.66	31.54	24.52	26.94
1980	39.65	29.82	47.39	31.26	25.05	27.60
1981	39.99	30.72	48.10	31.02	25.97	28.64
1982	38.70	31.29	48.05	31.23	27.95	29.17
1983	38.71	33.36	48.42	31.84	27.69	27.97
1984	37.49	34.38	48.31	32.98	27.08	27.47
1985	37.28	34.20	47.72	32.79	26.77	28.31
1986	37.58	34.38	49.41	33.37	26.89	28.26
1987	38.44	–	50.40	32.73	26.53	28.95
1988	39.84	–	51.90	33.05	26.73	28.54
1989	41.42	–	52.94	32.69	24.99	29.14
1990	40.60	–	53.01	32.69	24.50	29.11
1991	41.05	–	48.00	32.57	24.48	29.27
1992	–	–	46.86	33.67	24.78	–

Table 12: Capital income tax ratios (Mendoza et al. (1997))

	Australia	Austria	Belgium	Canada	Denmark	Finland
1965	31.34	–	–	36.85	–	23.19
1966	29.28	–	–	36.06	–	25.16
1967	31.00	–	–	39.54	–	25.72
1968	30.54	–	–	41.44	–	25.27
1969	32.35	–	–	46.55	–	21.61
1970	35.47	17.34	22.26	45.49	–	23.35
1971	35.32	18.34	24.21	44.20	–	25.58
1972	32.94	18.25	25.37	44.89	–	26.64
1973	36.86	17.71	27.19	41.37	–	27.70
1974	45.54	19.18	29.61	42.43	–	26.91
1975	43.50	21.17	33.89	44.02	–	33.66
1976	43.16	18.70	33.69	41.75	–	42.71
1977	45.44	19.69	36.28	42.61	–	42.61
1978	37.49	22.30	38.52	39.63	–	34.19
1979	37.93	21.43	39.88	36.50	–	28.94
1980	42.84	21.92	38.17	37.60	–	30.55
1981	46.55	23.43	39.13	39.83	33.90	35.28
1982	50.63	21.68	40.58	40.91	31.77	33.80
1983	39.89	21.20	38.90	37.22	31.48	33.65
1984	42.02	22.51	39.41	35.63	35.83	35.07
1985	43.61	23.80	39.34	35.87	35.72	38.18
1986	46.41	23.61	38.43	39.91	39.61	40.81
1987	46.38	22.68	38.49	40.78	37.91	36.38
1988	45.16	22.06	36.49	39.00	37.75	40.25
1989	48.02	21.01	34.00	42.72	34.70	41.46
1990	50.90	21.28	35.15	46.49	31.11	48.07
1991	47.47	22.40	35.34	50.02	31.05	57.52
1992	–	24.34	–	36.30	30.87	52.83

Source: Mendoza, Milesi-Ferretti, & Asea (1997), the data are only accessible via <http://www.econ.duke.edu/~mendozae/pdfs/taxdata.pdf>.

Table 12: Capital income tax ratios (Mendoza et al. (1997)) (continued)

	France	Germany	Italy	Japan	The Netherlands	New Zealand
1965	–	20.69	–	20.43	–	–
1966	–	21.10	–	19.50	–	–
1967	–	20.48	–	19.59	–	–
1968	–	20.70	–	20.00	–	–
1969	–	23.59	–	20.94	–	–
1970	16.98	20.64	–	22.31	–	–
1971	16.10	20.92	–	23.99	–	–
1972	16.78	23.22	–	25.34	–	–
1973	17.39	25.88	–	30.23	–	–
1974	19.77	27.47	–	34.94	–	–
1975	20.22	26.58	–	29.64	–	–
1976	24.15	26.75	–	29.60	–	–
1977	23.28	29.96	–	31.15	–	–
1978	21.77	29.03	–	33.20	–	–
1979	23.06	29.33	–	33.10	–	–
1980	27.31	32.11	20.02	35.98	–	–
1981	28.39	32.21	22.70	37.30	–	–
1982	29.44	32.03	25.06	38.25	–	37.45
1983	28.63	29.67	27.12	40.29	–	31.63
1984	28.17	29.80	26.20	41.45	–	33.19
1985	27.16	31.46	25.28	41.25	25.51	36.89
1986	26.04	29.14	27.80	43.26	28.34	34.68
1987	26.50	28.43	27.01	48.75	32.20	40.91
1988	25.76	27.34	26.68	50.70	31.66	38.53
1989	25.44	28.56	28.50	51.87	29.18	39.89
1990	26.25	24.93	30.40	51.06	30.69	33.91
1991	26.57	28.28	31.29	49.97	33.31	31.88
1992	23.98	29.87	–	53.47	33.26	–

Table 12: Capital income tax ratios (Mendoza et al. (1997)) (continued)

	Norway	Spain	Sweden	Switzerland	United Kingdom	United States
1965	–	–	–	13.94	39.26	36.80
1966	–	–	–	15.21	42.39	38.66
1967	–	–	–	15.03	46.99	42.14
1968	–	–	–	16.33	47.19	39.15
1969	–	–	–	16.96	48.61	46.43
1970	–	–	40.11	18.08	55.78	48.84
1971	–	–	40.13	18.51	51.06	42.44
1972	–	–	41.07	19.44	48.12	43.73
1973	–	–	38.14	20.95	45.88	42.77
1974	–	–	38.14	22.57	67.35	47.03
1975	27.32	–	41.87	25.70	70.47	45.38
1976	35.14	–	50.15	26.81	60.53	43.26
1977	43.13	–	62.19	26.06	50.79	45.30
1978	37.53	–	60.33	25.67	49.73	43.70
1979	31.83	–	50.77	24.87	53.19	44.59
1980	39.09	12.68	46.89	24.75	64.32	46.88
1981	44.38	13.30	52.79	25.78	74.33	44.88
1982	46.42	12.98	47.64	26.65	70.86	45.77
1983	40.26	14.56	45.02	27.38	61.62	39.21
1984	39.52	15.08	43.58	28.09	63.73	37.04
1985	42.37	13.80	48.19	27.70	61.85	37.84
1986	51.05	14.06	56.53	28.56	62.70	38.97
1987	39.67	–	59.44	28.13	58.77	40.77
1988	41.00	–	63.48	30.00	58.72	39.91
1989	30.21	–	64.49	28.44	61.54	41.77
1990	34.28	–	73.39	27.61	55.75	41.52
1991	35.87	–	66.10	26.87	52.25	42.86
1992	–	–	53.38	28.02	48.42	–

Table 13: Consumption tax ratios (Mendoza et al. (1997))

	Australia	Austria	Belgium	Canada	Denmark	Finland
1965	–	17.62	–	12.93	–	17.69
1966	–	18.15	–	13.12	–	19.23
1967	–	17.64	–	13.36	–	20.39
1968	–	19.23	–	12.90	–	20.28
1969	7.56	19.97	–	13.12	–	22.09
1970	7.59	20.45	19.42	12.72	–	23.11
1971	7.66	20.62	19.27	13.09	–	24.39
1972	7.31	21.36	18.07	13.28	–	24.20
1973	7.66	21.27	17.68	13.75	–	24.06
1974	7.07	20.39	17.75	12.86	–	22.52
1975	7.68	19.78	16.62	11.24	–	22.20
1976	7.29	21.07	18.17	11.55	–	22.40
1977	7.21	20.47	17.69	11.25	–	24.84
1978	7.96	21.05	18.07	10.04	–	25.50
1979	8.77	21.43	17.55	10.21	–	25.83
1980	8.83	21.27	17.04	10.73	–	25.93
1981	8.59	21.74	16.94	13.86	32.46	26.58
1982	9.04	20.89	16.88	13.51	31.91	25.90
1983	9.51	20.96	17.15	12.55	33.25	25.83
1984	9.87	22.51	16.73	12.84	33.87	28.12
1985	9.62	21.87	16.10	12.46	33.74	28.20
1986	9.37	21.73	15.89	12.30	37.44	28.92
1987	9.39	21.59	16.05	12.79	36.60	29.01
1988	8.84	21.30	16.40	13.35	36.86	31.20
1989	8.48	21.09	16.55	13.51	35.17	32.64
1990	8.08	20.76	16.66	12.59	34.24	31.96
1991	7.04	20.41	16.58	10.42	33.61	29.08

Source: Mendoza, Milesi-Ferretti, & Asea (1997), the data are only accessible via <http://www.econ.duke.edu/~mendozae/pdfs/taxdata.pdf>.

Table 13: Consumption tax ratios (Mendoza et al. (1997)) (continued)

	France	Germany	Italy	Japan	The Netherlands	New Zealand
1965	–	15.87	–	5.80	–	–
1966	–	15.72	–	5.58	–	–
1967	–	16.02	–	5.81	–	–
1968	–	15.77	–	6.02	–	–
1969	–	17.49	–	6.12	–	–
1970	–	17.27	13.26	5.92	15.91	–
1971	–	17.02	13.03	5.52	16.84	8.65
1972	–	17.12	11.93	5.55	17.86	8.50
1973	–	16.79	11.58	5.19	18.02	8.27
1974	–	15.50	12.22	4.67	16.86	7.78
1975	–	14.67	10.80	4.36	16.78	9.15
1976	–	14.55	11.28	4.39	17.05	9.04
1977	20.84	14.40	12.03	4.52	17.78	9.13
1978	21.61	15.36	10.99	4.92	17.77	9.79
1979	22.94	15.85	10.86	5.05	17.20	9.82
1980	22.30	15.93	11.62	4.86	17.32	9.52
1981	21.28	15.68	11.22	4.97	16.80	10.45
1982	21.59	15.25	11.33	4.79	16.44	10.74
1983	21.33	15.75	12.59	4.67	16.89	11.00
1984	21.36	15.60	12.76	4.74	17.63	11.38
1985	21.71	14.92	11.84	5.12	17.29	9.93
1986	21.36	14.67	13.27	5.03	17.98	12.44
1987	21.40	14.89	13.38	5.11	18.86	19.88
1988	21.45	14.72	14.14	5.19	19.24	18.20
1989	21.07	15.32	13.72	5.52	18.13	19.61
1990	16.27	15.82	15.19	6.14	18.32	19.20
1991	15.40	18.61	15.44	6.21	18.23	16.11

Table 13: Consumption tax ratios (Mendoza et al. (1997)) (continued)

	Norway	Spain	Sweden	Switzerland	United Kingdom	United States
1965	23.91	–	–	6.02	13.33	6.39
1966	24.98	–	–	6.05	13.16	5.92
1967	25.67	–	–	6.23	13.15	5.89
1968	26.19	–	–	6.47	13.99	5.84
1969	28.03	–	–	6.65	15.55	6.15
1970	31.51	–	17.35	7.16	15.11	6.39
1971	33.26	–	21.28	7.03	13.96	6.42
1972	34.38	–	21.12	7.38	12.87	6.20
1973	33.40	–	20.63	7.16	11.79	6.20
1974	31.21	–	18.19	6.92	12.52	6.10
1975	31.00	–	17.78	6.94	12.15	5.80
1976	33.49	–	19.29	7.15	12.52	5.64
1977	33.64	–	19.56	7.37	12.56	5.53
1978	33.75	–	20.16	7.69	11.99	5.48
1979	33.56	–	20.02	7.48	12.25	5.31
1980	36.08	5.81	20.68	7.57	15.06	5.40
1981	36.85	6.50	20.89	7.49	14.79	6.07
1982	36.02	6.78	20.13	7.53	16.38	5.79
1983	37.18	7.64	21.85	7.65	16.29	5.46
1984	37.91	9.34	22.85	7.68	17.11	5.59
1985	40.27	9.29	24.05	7.80	17.68	5.50
1986	38.73	11.69	23.48	8.13	17.02	5.29
1987	38.53	12.43	24.14	8.34	17.03	5.16
1988	34.59	12.71	23.98	8.42	17.24	5.22
1989	34.13	12.83	24.84	8.35	16.25	4.43
1990	33.35	12.69	26.14	8.23	16.04	4.44
1991	33.39	13.24	25.67	7.78	17.13	4.56

Table 14: Personal income tax ratios (own calculations, based on Mendoza et al. (1994))

	Australia	Austria	Belgium	Canada	Denmark	Finland
1965	10.96	–	8.71	9.58	–	15.13
1966	10.98	–	9.82	10.29	–	16.04
1967	11.79	–	10.58	11.65	–	17.36
1968	11.45	–	11.38	12.82	–	18.46
1969	12.47	–	11.61	14.59	–	19.00
1970	12.39	–	12.50	16.04	–	20.09
1971	13.06	–	13.15	16.29	–	21.16
1972	12.40	13.95	14.06	17.09	–	21.84
1973	13.52	14.43	14.82	16.32	–	23.19
1974	15.41	15.33	16.15	17.47	–	24.01
1975	16.01	13.76	18.50	16.81	–	25.23
1976	16.79	13.19	18.16	17.19	–	27.83
1977	16.77	13.51	19.92	16.11	–	27.66
1978	15.75	15.18	21.47	15.86	–	24.11
1979	16.55	14.78	21.89	16.50	–	23.17
1980	16.85	15.14	20.75	16.98	–	23.03
1981	17.69	15.99	20.34	17.46	–	25.07
1982	17.56	15.26	21.78	17.71	35.97	24.30
1983	17.19	14.71	21.08	17.95	37.97	24.59
1984	18.59	15.31	21.49	17.51	37.71	26.15
1985	18.47	15.77	22.24	18.09	40.20	27.70
1986	19.38	15.93	21.60	19.11	40.77	29.71
1987	19.41	15.33	21.61	21.07	42.24	26.69
1988	19.15	15.19	20.75	19.98	43.28	29.22
1989	17.96	13.06	19.04	20.81	42.88	28.44
1990	17.62	13.61	19.48	21.82	41.97	29.36
1991	16.70	14.12	18.57	22.21	42.03	27.87
1992	16.65	14.63	18.60	21.63	42.65	29.50
1993	17.19	15.13	18.19	21.11	42.72	27.85
1994	17.10	13.87	19.72	21.54	45.66	31.67
1995	17.53	14.33	20.27	21.97	–	29.41
1996	24.94	14.86	20.41	22.41	–	30.91

Table 14: Personal income tax ratios (own calculations, based on Mendoza et al. (1994))
(continued)

	France	Germany	Greece	Ireland	Italy	Japan
1965	5.72	12.81	1.89	–	4.44	5.80
1966	5.63	13.51	2.32	–	4.57	5.68
1967	5.79	13.31	2.60	–	4.63	5.93
1968	6.42	13.32	2.93	–	4.89	6.11
1969	6.64	13.86	3.06	–	5.00	6.37
1970	6.77	13.32	3.22	10.89	4.52	6.66
1971	6.37	14.13	3.39	14.12	4.85	7.13
1972	6.55	15.17	2.81	13.23	5.23	7.84
1973	6.45	16.43	2.88	14.21	4.44	8.62
1974	6.80	17.07	3.58	12.63	6.09	7.48
1975	7.22	15.85	2.88	13.94	5.85	6.83
1976	7.95	16.54	3.18	16.39	7.27	6.95
1977	8.19	17.56	3.68	17.47	8.31	6.89
1978	8.15	17.00	3.84	17.10	8.78	7.55
1979	8.22	16.40	5.01	16.35	9.18	8.23
1980	8.71	16.67	5.56	18.21	9.56	8.77
1981	8.86	15.89	5.33	18.89	10.56	9.21
1982	8.86	15.94	6.04	19.39	11.29	9.50
1983	9.56	15.89	5.58	20.19	12.52	9.74
1984	9.90	15.67	6.63	22.04	12.26	9.52
1985	9.43	16.28	6.32	22.01	12.57	9.92
1986	9.57	16.34	6.43	23.30	13.75	10.36
1987	9.76	16.60	6.17	25.30	13.16	10.64
1988	9.22	16.56	6.17	27.09	13.83	10.63
1989	8.85	17.15	5.60	25.13	14.24	11.42
1990	8.79	15.40	6.53	25.29	14.43	12.54
1991	9.91	15.29	6.01	25.24	14.43	12.05
1992	9.88	15.98	5.34	–	15.22	10.72
1993	10.09	15.56	4.74	–	16.35	10.83
1994	10.45	15.50	5.59	–	15.05	9.35
1995	10.38	16.02	6.42	–	15.37	9.24
1996	10.84	14.11	–	–	15.66	8.79

Table 14: Personal income tax ratios (own calculations, based on Mendoza et al. (1994))
(continued)

	The Netherlands	New Zealand	Norway	Portugal	Spain	Sweden
1965	–	–	–	–	–	25.60
1966	–	–	–	–	–	25.64
1967	–	–	–	–	–	26.72
1968	–	–	–	–	–	27.86
1969	–	–	–	–	–	29.06
1970	–	–	–	–	–	28.88
1971	–	–	–	–	–	27.69
1972	16.45	–	–	–	2.94	29.60
1973	16.56	–	–	–	3.10	28.30
1974	17.20	–	–	–	3.20	29.45
1975	17.39	–	22.80	–	3.85	31.87
1976	17.48	–	23.00	–	4.33	32.37
1977	17.99	–	22.58	–	4.76	32.39
1978	18.27	–	22.46	–	5.71	33.48
1979	18.33	–	23.29	–	5.93	33.73
1980	18.36	–	23.10	–	6.94	31.46
1981	17.11	–	22.41	–	7.21	31.41
1982	16.55	27.44	20.75	–	7.55	32.03
1983	15.54	26.65	20.70	–	8.33	32.17
1984	14.92	25.47	18.94	–	9.67	32.21
1985	13.83	27.14	18.48	–	8.27	32.28
1986	14.38	27.47	18.13	–	7.80	33.57
1987	14.32	24.87	19.45	–	11.70	34.75
1988	15.09	25.41	19.94	–	10.30	36.30
1989	14.70	25.32	19.69	5.94	11.53	36.70
1990	16.02	24.50	18.97	6.61	10.66	35.48
1991	17.77	23.04	19.06	7.45	11.37	30.36
1992	16.51	24.01	18.08	9.09	11.89	29.75
1993	17.23	24.86	18.08	8.59	11.51	30.67
1994	13.50	25.13	19.79	–	11.61	31.75
1995	12.24	–	19.80	–	–	30.54
1996	11.32	–	20.35	–	–	31.85

Table 14: Personal income tax ratios (own calculations, based on Mendoza et al. (1994))
(continued)

	Switzerland	United Kingdom	United States
1965	11.71	13.85	9.90
1966	12.69	15.98	10.34
1967	12.58	14.26	10.88
1968	13.10	14.97	11.33
1969	13.79	15.99	13.13
1970	13.95	16.42	13.09
1971	13.66	16.74	11.95
1972	13.87	15.38	12.26
1973	12.30	14.75	12.08
1974	13.13	16.82	12.74
1975	14.55	19.26	12.55
1976	15.67	19.51	12.38
1977	15.72	18.39	13.31
1978	15.58	17.21	13.53
1979	15.16	15.69	14.25
1980	15.09	15.71	14.39
1981	14.96	16.55	14.68
1982	15.13	16.61	14.56
1983	15.27	16.32	13.64
1984	15.66	15.52	12.73
1985	15.36	15.07	13.17
1986	15.95	14.88	13.05
1987	15.24	14.55	13.84
1988	15.38	14.31	13.13
1989	14.82	13.59	13.53
1990	15.82	13.69	13.50
1991	15.30	13.47	13.36
1992	15.66	13.18	13.15
1993	15.46	13.00	13.55
1994	16.65	13.53	13.65
1995	15.70	13.66	13.86
1996	16.35	13.02	14.46

Table 15: Labour income tax ratios (own calculations, based on Mendoza et al. (1994))

	Australia	Austria	Belgium	Canada	Denmark	Finland
1965	12.37	–	27.24	12.38	–	22.34
1966	12.34	–	28.52	14.88	–	23.04
1967	13.15	–	29.34	16.15	–	24.90
1968	12.81	–	30.25	17.63	–	26.21
1969	13.81	–	30.38	19.78	–	26.95
1970	13.63	–	33.29	21.30	–	28.45
1971	14.98	–	33.98	21.39	–	29.59
1972	14.39	39.13	34.83	22.03	–	30.58
1973	15.93	39.39	35.76	21.30	–	32.69
1974	18.21	40.24	36.60	22.79	–	33.27
1975	18.87	39.23	39.78	22.43	–	35.03
1976	19.65	38.90	39.19	23.18	–	38.61
1977	19.57	39.87	40.82	22.04	–	39.34
1978	18.52	42.37	42.12	22.09	–	35.44
1979	19.31	42.34	42.43	22.37	–	34.21
1980	19.54	43.22	41.22	22.81	–	34.04
1981	20.58	43.97	41.61	24.09	–	35.89
1982	20.43	43.67	43.62	24.30	37.82	34.61
1983	19.98	43.66	44.44	25.59	40.63	34.38
1984	21.39	44.74	46.28	25.00	40.89	35.98
1985	21.26	45.60	47.42	25.88	43.72	38.16
1986	22.56	45.54	47.25	27.14	43.70	39.92
1987	22.78	45.09	48.21	29.13	45.58	37.26
1988	22.65	45.32	47.42	28.12	45.72	40.74
1989	21.48	43.57	46.20	28.72	45.69	40.48
1990	21.36	43.83	46.23	30.17	45.00	42.54
1991	20.45	44.13	45.70	31.24	45.05	42.37
1992	20.21	45.45	46.20	31.25	45.79	43.54
1993	20.74	46.69	46.57	30.92	46.47	45.36
1994	21.26	47.32	47.24	31.75	49.02	50.28
1995	21.75	47.99	47.72	32.00	–	48.77
1996	29.14	49.02	47.82	32.63	–	49.58

Table 15: Labour income tax ratios (own calculations, based on Mendoza et al. (1994))
(continued)

	France	Germany	Greece	Ireland	Italy	Japan
1965	34.96	29.38	25.55	–	–	15.13
1966	35.20	30.59	26.46	–	–	15.37
1967	36.21	30.45	26.76	–	–	15.93
1968	36.16	31.23	26.94	–	–	16.17
1969	34.76	32.10	27.25	–	–	16.59
1970	33.50	31.94	27.19	15.44	–	16.95
1971	33.29	33.02	26.49	18.95	–	17.36
1972	33.76	34.53	25.98	18.10	–	18.08
1973	33.77	36.54	25.42	19.42	26.51	18.72
1974	34.03	37.09	25.38	18.46	29.28	18.48
1975	35.90	36.91	25.46	20.65	30.40	18.10
1976	37.43	38.44	27.47	23.60	31.34	18.78
1977	38.66	39.49	28.31	24.71	30.46	19.51
1978	38.84	39.01	28.65	24.04	30.85	20.67
1979	40.69	38.47	29.66	22.98	31.24	21.57
1980	41.93	38.38	30.97	25.13	34.37	22.63
1981	41.69	37.86	30.67	25.98	34.66	23.70
1982	42.74	38.29	34.39	27.91	37.34	24.16
1983	44.49	38.76	35.73	29.82	39.03	24.45
1984	46.03	39.28	36.46	32.14	38.44	24.32
1985	46.01	40.35	36.15	31.91	38.67	25.51
1986	46.37	40.73	37.10	32.55	41.12	26.17
1987	47.32	41.01	35.66	34.24	40.80	26.69
1988	47.14	41.17	31.57	36.68	41.30	26.75
1989	47.68	41.64	32.31	35.20	42.39	27.73
1990	47.49	40.19	33.08	35.55	42.63	29.46
1991	48.09	40.63	34.00	35.53	43.06	28.96
1992	48.51	41.57	34.53	–	44.21	27.68
1993	48.89	41.55	37.94	–	47.02	28.15
1994	49.16	42.63	38.96	–	45.62	26.67
1995	49.29	43.55	39.43	–	47.03	27.81
1996	50.08	42.38	–	–	49.77	27.44

Table 15: Labour income tax ratios (own calculations, based on Mendoza et al. (1994))
(continued)

	The Netherlands	New Zealand	Norway	Portugal	Spain	Sweden
1965	–	–	–	–	–	31.98
1966	–	–	–	–	–	32.22
1967	–	–	–	–	–	34.17
1968	–	–	–	–	–	36.23
1969	–	–	–	–	–	38.18
1970	–	–	–	–	–	37.86
1971	–	–	–	–	–	37.88
1972	42.64	–	–	–	17.69	40.31
1973	44.10	–	–	–	18.19	40.72
1974	45.63	–	–	–	18.47	44.11
1975	46.07	–	38.86	–	20.62	45.70
1976	46.38	–	38.19	–	19.96	49.07
1977	46.13	–	37.77	–	23.47	51.00
1978	46.87	–	37.67	–	25.30	51.31
1979	47.58	–	39.44	–	26.26	50.76
1980	47.92	–	39.06	–	28.50	49.48
1981	48.64	–	39.15	–	29.54	50.20
1982	50.19	27.44	37.86	–	30.19	50.02
1983	54.30	26.65	37.91	–	31.77	51.89
1984	53.41	25.47	36.30	–	33.13	52.06
1985	52.47	27.60	36.00	–	32.17	51.08
1986	51.48	28.09	36.41	–	31.98	53.02
1987	52.54	25.57	37.26	–	35.21	53.98
1988	53.65	27.04	38.61	–	33.60	54.45
1989	50.99	26.78	39.93	23.79	35.17	55.42
1990	49.82	25.96	39.17	24.59	34.15	54.44
1991	53.01	24.46	39.37	25.12	34.61	52.06
1992	52.62	25.17	38.62	26.39	36.24	50.33
1993	53.34	25.75	37.52	25.99	36.19	49.17
1994	52.29	25.92	38.97	–	36.90	50.70
1995	51.15	–	38.82	–	–	52.24
1996	48.10	–	39.36	–	–	54.51

Table 15: Labour income tax ratios (own calculations, based on Mendoza et al. (1994))
(continued)

	Switzerland	United Kingdom	United States
1965	20.60	21.54	15.46
1966	21.75	24.22	16.15
1967	21.82	24.19	17.82
1968	22.60	25.40	17.86
1969	24.59	26.89	19.91
1970	24.58	27.70	20.29
1971	24.23	26.94	19.22
1972	24.38	25.20	19.64
1973	25.45	23.83	20.05
1974	27.04	26.00	21.38
1975	29.42	28.20	21.77
1976	31.38	29.45	21.36
1977	31.97	29.88	22.78
1978	31.93	28.87	23.07
1979	31.54	27.84	23.99
1980	31.26	28.07	24.43
1981	31.02	29.17	25.22
1982	31.23	30.20	25.59
1983	31.84	29.47	24.51
1984	32.98	28.17	24.04
1985	32.79	27.10	24.82
1986	33.37	27.04	24.87
1987	32.28	26.67	25.60
1988	32.56	26.62	25.24
1989	32.19	24.80	25.83
1990	33.22	24.26	25.81
1991	32.88	23.96	25.91
1992	33.62	24.06	25.66
1993	35.78	23.52	25.96
1994	37.22	24.77	26.35
1995	37.08	25.03	26.44
1996	38.63	24.41	26.91

Table 16: Capital income tax ratios (own calculations, based on Mendoza et al. (1994))

	Australia	Austria	Belgium	Canada	Denmark	Finland
1965	31.34	–	17.14	35.83	–	22.49
1966	29.27	–	19.01	35.17	–	24.48
1967	30.98	–	19.53	38.63	–	25.05
1968	30.54	–	20.66	40.34	–	24.64
1969	32.35	–	21.54	45.71	–	20.93
1970	35.47	–	22.57	44.83	–	22.60
1971	35.32	–	24.35	43.98	–	24.69
1972	32.94	14.85	25.50	44.58	–	25.79
1973	36.88	14.40	27.40	40.85	–	26.89
1974	45.68	15.60	29.67	41.82	–	26.11
1975	44.04	17.22	33.49	43.21	–	32.57
1976	43.51	17.86	33.19	41.23	–	41.06
1977	45.70	18.48	35.77	41.66	–	40.85
1978	37.62	21.00	37.62	39.34	–	32.82
1979	37.51	20.20	39.08	36.15	–	27.65
1980	42.36	21.00	37.16	37.18	–	29.22
1981	45.87	22.25	37.41	39.70	–	33.71
1982	49.65	20.62	39.11	40.79	47.65	32.35
1983	39.08	19.89	37.22	37.14	45.05	32.14
1984	41.33	21.67	37.77	36.01	50.32	33.44
1985	43.10	22.98	36.61	35.56	48.27	36.33
1986	45.98	23.02	36.06	39.87	53.68	38.87
1987	45.39	22.26	36.14	40.82	53.33	34.33
1988	44.62	21.99	34.53	39.58	51.33	37.96
1989	46.77	20.98	32.63	43.80	45.95	38.84
1990	49.65	21.08	33.21	48.79	37.60	45.18
1991	45.70	21.88	33.25	52.71	38.76	58.08
1992	43.06	23.88	33.65	52.86	37.47	53.12
1993	40.76	23.45	34.65	50.56	42.49	38.42
1994	42.93	21.46	36.64	48.05	41.44	37.21
1995	44.28	23.03	36.71	48.15	–	34.18
1996	52.65	25.92	36.34	50.66	–	38.05

Table 16: Capital income tax ratios (own calculations, based on Mendoza et al. (1994))
(continued)

	France	Germany	Greece	Ireland	Italy	Japan
1965	15.96	20.69	4.09	–	13.01	20.43
1966	15.40	21.10	4.59	–	12.79	19.50
1967	14.79	20.48	5.10	–	13.05	19.59
1968	15.10	20.70	5.23	–	13.19	20.00
1969	16.22	23.59	5.07	–	12.94	20.94
1970	16.98	20.64	5.29	22.01	12.60	22.31
1971	16.10	20.92	5.63	20.75	14.05	23.99
1972	16.78	23.22	6.05	18.16	15.27	25.34
1973	17.39	25.88	5.25	16.27	12.55	30.23
1974	19.77	27.47	6.05	21.02	12.71	34.94
1975	20.22	26.58	6.02	14.85	13.71	29.64
1976	24.14	26.75	6.44	16.20	15.23	29.60
1977	23.27	29.95	7.19	11.75	16.93	31.15
1978	21.76	29.02	7.36	10.09	18.63	33.20
1979	23.06	29.33	6.96	11.85	17.34	33.10
1980	27.31	32.11	6.96	14.04	20.25	35.98
1981	28.39	32.21	6.55	13.98	22.99	37.30
1982	29.44	32.03	7.35	12.52	25.33	38.25
1983	28.62	29.67	6.24	11.50	27.35	40.29
1984	28.16	29.80	6.90	9.77	26.57	41.45
1985	27.15	31.46	6.89	8.96	25.45	41.25
1986	26.04	29.14	7.82	9.57	28.00	42.66
1987	26.49	28.43	8.14	9.73	27.16	47.46
1988	25.75	27.34	7.93	9.28	26.83	48.93
1989	25.43	28.56	7.95	8.90	28.58	49.67
1990	25.81	24.93	10.75	9.75	30.47	48.47
1991	25.77	26.91	9.26	11.06	31.52	45.91
1992	23.79	28.12	8.92	–	35.50	42.65
1993	24.68	27.59	8.87	–	38.40	41.45
1994	24.45	25.13	9.81	–	33.13	41.51
1995	24.69	24.72	10.98	–	32.55	44.30
1996	26.10	23.91	–	–	33.86	42.61

Table 16: Capital income tax ratios (own calculations, based on Mendoza et al. (1994))
(continued)

	The Netherlands	New Zealand	Norway	Portugal	Spain	Sweden
1965	–	–	–	–	–	32.31
1966	–	–	–	–	–	32.78
1967	–	–	–	–	–	32.36
1968	–	–	–	–	–	36.24
1969	–	–	–	–	–	35.27
1970	–	–	–	–	–	39.22
1971	–	–	–	–	–	39.15
1972	31.09	–	–	–	9.04	40.09
1973	31.88	–	–	–	9.51	37.64
1974	32.21	–	–	–	9.82	37.63
1975	36.71	–	20.46	–	10.61	41.35
1976	33.07	–	26.32	–	10.98	49.50
1977	32.58	–	32.30	–	11.02	61.37
1978	33.44	–	28.47	–	11.15	59.51
1979	33.94	–	27.03	–	11.40	50.11
1980	35.43	–	34.55	–	12.35	46.89
1981	33.41	–	40.29	–	13.25	52.79
1982	32.79	37.91	41.01	–	12.61	47.64
1983	28.87	31.80	36.60	–	14.09	45.02
1984	25.19	33.68	37.07	–	14.53	43.58
1985	25.84	37.28	40.38	–	13.79	48.19
1986	28.76	35.96	49.59	–	13.93	56.53
1987	32.73	43.11	39.40	–	17.21	59.43
1988	32.11	39.18	38.97	–	18.93	63.48
1989	29.47	42.12	29.60	9.04	22.90	64.49
1990	30.86	37.70	32.82	13.53	23.21	73.39
1991	33.31	35.52	32.93	16.26	23.16	68.09
1992	32.47	35.52	28.63	18.62	23.21	53.83
1993	34.95	35.35	28.25	16.04	22.15	52.61
1994	29.34	36.81	29.26	–	20.49	50.03
1995	28.38	–	30.26	–	–	41.63
1996	31.23	–	28.59	–	–	53.82

Table 16: Capital income tax ratios (own calculations, based on Mendoza et al. (1994))
(continued)

	Switzerland	United Kingdom	United States
1965	9.51	36.91	36.84
1966	10.54	36.99	38.74
1967	10.45	48.61	42.12
1968	11.67	49.01	39.16
1969	12.24	49.75	46.45
1970	13.23	54.93	48.72
1971	13.58	50.35	42.29
1972	14.48	46.74	43.13
1973	21.08	46.59	42.21
1974	22.71	67.65	46.03
1975	25.86	69.13	44.27
1976	26.98	59.07	42.11
1977	26.23	49.05	44.07
1978	25.83	48.95	42.56
1979	25.03	52.22	43.25
1980	24.91	63.48	45.59
1981	26.48	72.83	43.19
1982	28.91	68.93	43.78
1983	31.60	61.33	38.41
1984	29.25	62.93	36.34
1985	31.02	61.28	37.41
1986	34.91	61.83	38.73
1987	37.29	58.39	40.88
1988	39.49	58.73	39.36
1989	39.18	61.78	41.04
1990	36.53	56.98	40.61
1991	38.62	53.11	41.91
1992	39.69	44.81	42.09
1993	36.83	42.36	42.24
1994	34.43	42.34	41.60
1995	32.73	46.26	41.73
1996	32.85	47.17	41.54

Table 17: Corporate income tax ratios (own calculations, based on Mendoza et al. (1994))

	Australia	Belgium	Canada	Denmark	Finland	France
1965	38.21	17.02	27.29	–	31.76	38.88
1966	34.19	18.68	25.47	–	39.68	35.84
1967	31.70	17.95	26.01	–	37.45	32.08
1968	33.07	17.53	27.43	–	30.02	27.32
1969	32.70	18.69	33.17	–	16.40	27.96
1970	39.55	26.55	27.98	–	18.58	26.02
1971	39.66	30.17	26.76	–	21.16	22.84
1972	35.97	31.04	27.10	–	23.75	24.50
1973	47.14	32.77	26.70	–	23.03	23.79
1974	67.88	33.71	28.09	–	19.33	37.17
1975	56.62	41.03	29.67	–	33.74	34.32
1976	52.96	42.12	24.79	–	85.32	39.75
1977	62.30	43.58	24.16	–	81.79	37.27
1978	45.00	44.97	22.20	–	39.21	33.24
1979	40.88	45.75	19.68	–	20.78	34.91
1980	50.12	42.69	20.05	–	23.44	48.73
1981	53.28	46.34	19.23	–	29.50	52.24
1982	54.57	40.61	16.53	-237.22	27.11	63.39
1983	30.91	34.75	15.07	93.61	24.34	52.03
1984	31.09	33.50	16.11	115.57	21.55	41.32
1985	32.73	26.36	15.36	71.63	22.84	37.18
1986	33.50	26.74	17.74	96.52	23.27	30.19
1987	33.25	26.53	17.92	112.71	18.59	29.01
1988	31.93	25.08	17.73	90.99	19.63	26.96
1989	39.89	23.58	19.09	63.02	20.10	27.51
1990	47.13	22.23	17.97	34.45	34.57	29.29
1991	43.87	24.12	17.50	33.69	83.81	24.83
1992	40.44	23.04	16.55	27.98	46.40	20.01
1993	33.83	26.50	17.88	35.25	18.16	20.95
1994	38.22	28.29	19.83	29.52	20.10	19.91
1995	41.57	29.51	21.54	10.68	20.75	20.95
1996	45.80	28.98	24.64	12.18	26.72	23.21

Table 17: Corporate income tax ratios (own calculations, based on Mendoza et al. (1994))
(continued)

	Italy	Japan	The Netherlands	New Zealand	Norway	Portugal
1965	25.32	33.91	–	–	–	–
1966	23.13	29.39	–	–	–	–
1967	25.28	26.87	–	–	–	–
1968	24.57	27.74	–	–	–	–
1969	24.58	27.66	–	–	–	–
1970	28.24	28.32	–	–	–	–
1971	36.29	30.16	–	–	–	–
1972	44.02	31.35	–	–	–	–
1973	27.60	41.02	–	–	–	–
1974	18.46	53.84	–	–	–	–
1975	27.08	42.45	–	–	11.20	–
1976	22.65	41.64	–	–	21.33	–
1977	22.38	42.80	26.85	–	36.39	–
1978	25.54	45.07	24.73	–	24.67	–
1979	19.89	43.03	24.21	–	21.54	–
1980	39.47	43.16	26.29	–	34.10	–
1981	48.56	42.55	24.22	–	42.99	–
1982	63.67	43.40	23.46	10.24	45.06	–
1983	67.89	45.13	19.40	6.86	37.28	–
1984	53.62	47.23	15.32	9.64	40.02	–
1985	46.20	46.35	17.57	10.43	44.82	–
1986	51.92	45.64	20.80	8.70	65.00	–
1987	52.79	54.51	26.04	14.52	39.68	–
1988	46.07	56.80	24.43	12.15	35.80	–
1989	51.36	57.89	20.97	15.08	21.80	8.13
1990	61.58	53.67	21.44	10.59	30.82	16.05
1991	73.36	49.83	22.40	11.01	32.20	21.64
1992	96.05	47.40	21.80	12.93	25.08	23.58
1993	75.93	42.58	24.38	14.57	25.38	17.72
1994	56.41	48.06	21.80	16.29	26.46	16.45
1995	51.39	51.26	22.20	–	27.76	17.89
1996	58.15	48.86	28.10	–	26.88	–

Table 17: Corporate income tax ratios (own calculations, based on Mendoza et al. (1994))
(continued)

	Spain	Sweden	Switzerland	United Kingdom	United States
1965	19.06	29.61	–	12.19	30.37
1966	17.52	28.85	–	3.77	33.10
1967	16.02	26.32	–	29.49	37.32
1968	13.93	32.11	–	29.77	29.84
1969	13.34	26.50	–	29.31	39.15
1970	13.43	41.81	–	37.72	39.83
1971	14.41	46.07	–	29.69	28.26
1972	13.70	43.94	–	25.31	30.28
1973	14.85	38.06	–	30.07	31.02
1974	16.08	30.73	–	71.89	34.28
1975	17.38	34.66	–	58.38	31.72
1976	17.07	66.27	–	36.33	27.68
1977	15.50	-976.24	–	25.60	30.47
1978	12.55	3731.40	–	27.95	29.29
1979	13.50	55.74	–	33.24	30.54
1980	12.56	37.54	–	49.79	31.24
1981	14.63	60.62	–	64.62	26.10
1982	12.72	40.25	–	56.05	23.42
1983	15.13	31.66	–	46.02	15.73
1984	13.71	27.08	–	52.35	18.69
1985	14.40	28.39	–	49.32	19.73
1986	16.61	42.75	–	49.79	20.67
1987	11.60	44.50	–	43.43	24.02
1988	19.82	49.85	–	46.28	23.78
1989	26.82	43.81	–	57.79	24.98
1990	30.74	61.67	29.01	66.19	22.07
1991	30.09	65.99	32.70	63.22	22.89
1992	28.64	33.60	33.07	46.44	24.60
1993	28.16	41.76	27.75	33.20	24.34
1994	20.51	37.24	24.52	32.73	24.67
1995	–	28.19	23.69	40.61	24.89
1996	–	43.36	23.01	41.78	24.64

Table 18: Consumption tax ratios (own calculations, based on Mendoza et al. (1994))

	Australia	Austria	Belgium	Canada	Denmark	Finland
1965	–	–	15.77	12.16	–	17.08
1966	–	–	18.50	12.30	22.25	18.52
1967	–	–	19.30	12.44	22.73	19.61
1968	–	–	18.80	11.98	28.19	19.46
1969	7.56	–	19.15	12.19	29.38	21.22
1970	7.59	–	19.51	11.79	28.80	22.18
1971	7.66	–	19.47	12.04	29.69	23.35
1972	7.30	22.30	17.92	12.19	30.01	23.21
1973	7.65	22.25	17.75	12.64	29.38	23.09
1974	7.06	21.26	17.75	11.81	26.68	21.64
1975	7.67	20.66	16.54	10.32	25.35	21.34
1976	7.28	22.06	17.83	10.59	26.83	21.52
1977	7.20	21.30	17.47	10.23	29.01	23.86
1978	7.96	22.22	17.72	9.13	31.85	24.51
1979	8.77	22.59	17.15	9.28	33.58	24.81
1980	8.83	22.46	16.60	9.76	32.93	24.89
1981	8.59	22.99	16.44	12.70	32.91	25.48
1982	9.04	21.79	16.23	12.35	32.33	24.81
1983	9.51	21.69	16.44	11.52	33.71	24.75
1984	9.87	23.70	16.09	11.82	34.39	26.94
1985	9.62	23.20	15.51	11.50	34.29	27.01
1986	9.36	23.03	15.35	11.40	38.12	27.70
1987	9.37	23.03	15.53	11.90	37.19	27.79
1988	8.82	22.63	15.84	12.48	37.42	29.84
1989	8.47	22.28	15.95	12.62	35.44	31.19
1990	8.05	21.80	16.19	11.68	34.51	30.50
1991	6.98	21.58	15.93	11.46	33.40	27.77
1992	6.73	21.91	16.06	11.41	32.54	26.50
1993	7.23	21.11	16.21	11.45	31.61	26.51
1994	7.62	22.52	17.02	–	32.68	26.88
1995	7.78	19.28	16.62	–	33.20	26.08
1996	7.69	21.15	17.01	–	–	27.74

Table 18: Consumption tax ratios (own calculations, based on Mendoza et al. (1994)) (continued)

	France	Germany	Greece	Iceland	Ireland	Italy
1965	22.52	15.87	6.81	–	–	12.81
1966	22.26	15.72	7.74	–	–	12.91
1967	22.42	16.02	8.29	–	–	13.29
1968	21.36	15.77	9.38	–	–	13.46
1969	24.51	17.49	9.94	–	–	13.59
1970	23.52	17.27	9.61	–	25.14	13.26
1971	23.22	17.02	9.53	–	24.67	13.01
1972	23.53	17.11	9.99	–	23.17	11.91
1973	22.35	16.79	10.08	–	23.65	11.57
1974	22.28	15.50	8.79	–	20.94	12.22
1975	20.77	14.66	9.86	–	21.68	10.78
1976	21.75	14.55	10.09	–	24.42	11.28
1977	20.72	14.40	10.50	–	22.80	12.14
1978	21.49	15.36	10.82	–	22.93	11.15
1979	22.81	15.85	10.11	–	21.06	10.95
1980	22.17	15.93	8.97	19.42	22.90	11.69
1981	21.16	15.68	9.03	20.19	24.62	11.31
1982	21.47	15.25	10.69	20.67	29.50	11.40
1983	21.21	15.75	11.22	19.32	31.05	12.67
1984	21.24	15.60	13.33	19.00	31.37	12.80
1985	21.60	14.92	14.10	18.38	29.28	11.84
1986	21.26	14.67	16.88	18.57	28.98	13.30
1987	21.30	14.89	19.11	18.85	28.20	13.42
1988	21.35	14.72	17.20	21.44	29.54	14.16
1989	20.97	15.32	14.80	21.54	28.47	13.73
1990	20.56	15.80	16.72	18.62	27.87	15.21
1991	19.34	15.78	17.93	17.54	26.44	15.39
1992	18.90	16.07	19.21	17.98	26.13	15.20
1993	19.28	16.62	18.33	19.90	25.74	15.08
1994	20.21	17.49	17.92	22.47	27.22	16.46
1995	20.84	16.68	17.58	22.92	28.15	15.72
1996	21.35	16.40	–	–	–	14.72

Table 18: Consumption tax ratios (own calculations, based on Mendoza et al. (1994)) (continued)

	Japan	Luxembourg	The Netherlands	New Zealand	Norway	Portugal
1965	5.67	–	–	–	21.32	–
1966	5.46	–	–	–	22.25	–
1967	5.70	–	–	–	22.83	–
1968	5.91	–	15.35	–	23.26	–
1969	6.01	–	14.03	–	24.86	–
1970	5.84	9.26	15.87	–	27.85	–
1971	5.45	9.93	16.80	–	29.32	–
1972	5.48	11.36	17.80	–	30.25	–
1973	5.13	12.22	18.03	8.31	29.38	–
1974	4.62	11.17	16.88	7.82	27.51	–
1975	4.31	12.40	16.81	9.15	27.31	–
1976	4.35	12.03	17.08	9.04	29.40	–
1977	4.47	11.66	17.37	9.16	29.54	9.55
1978	4.87	12.35	17.36	9.81	31.04	9.94
1979	4.98	11.79	16.81	9.84	29.98	10.16
1980	4.80	13.72	17.02	9.54	31.43	13.16
1981	4.91	15.42	16.58	10.46	32.72	12.61
1982	4.73	17.54	16.11	10.80	32.07	12.75
1983	4.61	18.64	16.50	10.98	32.90	13.99
1984	4.67	18.96	17.20	11.29	33.62	13.02
1985	5.05	18.26	17.28	9.88	35.75	12.45
1986	4.94	18.16	17.97	12.28	35.22	20.58
1987	5.00	17.56	18.83	19.76	35.25	18.62
1988	5.05	17.88	19.22	18.31	31.81	18.40
1989	5.34	18.23	18.11	19.83	30.25	18.39
1990	5.92	18.27	18.30	19.41	30.20	17.84
1991	5.96	19.23	18.24	19.65	29.53	17.88
1992	5.79	22.10	18.17	20.17	31.83	20.70
1993	5.85	23.48	17.82	20.00	32.48	18.76
1994	5.98	25.06	17.64	19.56	34.49	–
1995	5.98	24.26	18.26	–	35.60	–
1996	6.00	–	–	–	36.31	–

Table 18: Consumption tax ratios (own calculations, based on Mendoza et al. (1994)) (continued)

	Spain	Sweden	Switzerland	United Kingdom	United States
1965	6.13	16.70	–	13.33	6.44
1966	5.98	18.70	–	13.44	5.95
1967	6.07	19.04	–	13.49	5.91
1968	5.82	19.59	–	14.43	5.86
1969	6.30	18.44	–	15.56	6.17
1970	6.64	17.60	–	15.33	6.41
1971	6.26	21.66	–	13.98	6.42
1972	6.13	21.51	–	12.92	6.22
1973	6.34	21.22	–	12.50	6.22
1974	5.85	18.71	–	12.13	6.12
1975	5.33	18.29	–	12.21	5.81
1976	5.09	19.88	–	12.37	5.66
1977	5.06	20.25	–	12.69	5.53
1978	5.42	20.73	–	12.16	5.48
1979	5.20	20.56	–	13.40	5.32
1980	5.79	20.67	–	15.37	5.40
1981	6.47	20.89	–	15.78	6.07
1982	6.74	20.13	–	16.26	5.77
1983	7.62	21.85	–	16.51	5.43
1984	9.31	22.85	–	17.31	5.55
1985	9.29	24.05	7.91	17.47	5.46
1986	11.69	23.48	–	17.33	5.26
1987	12.44	24.14	–	17.06	5.13
1988	12.72	23.98	–	17.07	5.18
1989	12.83	24.84	–	16.40	5.03
1990	12.65	26.14	8.45	16.64	5.05
1991	13.19	25.67	7.96	17.66	5.23
1992	14.07	23.28	–	17.40	5.29
1993	12.47	24.00	–	16.94	5.41
1994	13.64	23.57	–	17.19	5.52
1995	13.67	–	–	17.30	5.57
1996	14.08	–	–	–	5.47

Table 19: Labour income tax ratios (own calculations, based on our approach)

	Austria	Belgium	Finland	France	Germany	Ireland
1965	–	–	–	–	–	–
1966	–	–	–	–	–	–
1967	–	–	–	–	–	–
1968	–	–	–	–	–	–
1969	–	–	–	–	–	–
1970	–	34.02	–	–	–	–
1971	–	34.19	–	–	–	–
1972	–	34.94	–	–	–	–
1973	29.93	35.69	–	–	–	–
1974	30.95	36.63	–	–	–	–
1975	30.31	39.36	–	–	–	–
1976	31.17	38.78	–	–	–	–
1977	32.38	40.50	–	–	–	–
1978	35.01	41.91	–	–	–	–
1979	35.12	42.20	–	–	–	–
1980	35.91	40.68	31.85	35.55	33.02	22.79
1981	36.75	40.51	33.37	35.14	33.38	23.66
1982	36.86	43.22	32.17	36.05	34.20	25.66
1983	37.23	44.06	31.68	37.06	34.72	27.42
1984	38.17	46.48	33.13	38.19	35.43	29.44
1985	39.15	49.67	34.58	38.46	36.24	29.22
1986	39.32	49.05	36.29	38.56	36.13	29.74
1987	38.71	49.66	33.61	39.05	36.52	31.19
1988	39.12	48.68	37.47	38.86	36.38	33.03
1989	36.72	47.74	37.39	39.48	36.71	31.84
1990	37.64	48.09	39.17	39.89	35.46	32.22
1991	38.22	46.14	39.07	39.86	–	32.12
1992	39.50	46.74	39.04	40.07	–	–
1993	40.66	46.36	–	–	–	–
1994	41.23	48.14	–	–	–	–
1995	42.51	48.47	–	–	–	–
1996	43.66	47.75	–	–	–	–

Note: calculations are made on the basis of our suggested methodology, displayed in Section 7.2. Further details are provided in Section B.1.

Table 19: Labour income tax ratios (own calculations, based on our approach) (continued)

	Italy	The Netherlands	United Kingdom
1965	–	–	23.62
1966	–	–	26.51
1967	–	–	25.29
1968	–	–	26.75
1969	–	–	27.91
1970	–	–	28.22
1971	–	–	28.00
1972	–	–	26.04
1973	–	–	24.79
1974	–	–	27.38
1975	–	–	30.59
1976	–	–	31.91
1977	–	39.48	31.53
1978	–	40.16	30.09
1979	–	41.24	29.02
1980	36.36	42.13	29.20
1981	37.49	42.37	30.57
1982	39.37	43.54	31.06
1983	39.87	45.90	31.12
1984	39.84	44.98	30.40
1985	40.30	45.21	29.67
1986	42.30	45.18	29.79
1987	41.94	45.68	28.92
1988	43.67	45.77	28.46
1989	44.76	44.76	27.99
1990	44.00	44.66	27.82
1991	43.49	47.78	27.50
1992	44.81	46.99	27.24
1993	46.34	46.97	27.06
1994	46.20	43.44	28.16
1995	51.93	42.26	28.84
1996	53.07	39.75	27.83

Table 20: Capital income tax ratios (own calculations, based on our approach)

	Austria	Austria (alt.)	Finland	Finland (alt.)	France	France (alt.)
1965						
1966						
1967						
1968						
1969						
1970						
1971						
1972						
1973		29.08				
1974		32.20				
1975		35.30				
1976		31.66				
1977		30.48				
1978		33.90				
1979		30.35				
1980	17.13	30.95	12.35	17.89	27.20	29.91
1981	18.47	33.50	14.85	21.37	28.77	31.61
1982	15.51	29.00	14.11	20.15	29.10	32.06
1983	14.34	26.12	14.22	20.26	29.47	32.39
1984	15.91	28.45	14.74	21.12	29.09	31.92
1985	16.33	29.07	16.63	22.99	26.72	29.40
1986	16.16	28.32	17.15	24.04	24.94	27.75
1987	15.88	27.98	16.70	21.96	25.87	28.76
1988	16.49	27.40	18.82	24.44	25.46	28.03
1989	18.65	29.57	19.70	25.18	24.74	27.11
1990	18.56	28.86	23.88	30.31	24.34	26.48
1991	19.63	29.77	27.27	35.57	26.05	28.70
1992	22.19	32.78	22.86	30.61	24.76	27.24
1993		33.31				
1994		28.87				
1995		29.04				
1996		31.86				

Note: calculations are made on the basis of our suggested methodology, displayed in Section 7.2. Further details are provided in Section B.1. The alternative calculations (denoted by (alt.)) assume that all taxes paid by the self-employed are attributed to capital income.

Table 20: Capital income tax ratios (own calculations, based on our approach) (continued)

	Germany	Germany (alt.)	Ireland	Italy	The Netherlands	United Kingdom
1965					31.38	32.02
1966					34.51	29.85
1967					34.40	47.53
1968					33.08	47.63
1969					33.33	50.75
1970				10.94	32.65	57.02
1971				12.30	35.23	49.17
1972				13.61	34.58	45.80
1973				10.85	33.72	42.30
1974				9.91	32.94	59.07
1975				10.70	37.41	55.58
1976				11.56	31.99	44.93
1977				12.86	33.08	40.25
1978				14.46	33.83	41.06
1979				13.12	33.39	46.14
1980	63.65	80.81	18.67	14.22	34.08	57.09
1981	65.23	83.27	18.60	15.98	31.82	66.44
1982	66.51	85.09	17.44	17.26	30.29	60.72
1983	61.57	78.70	17.00	18.41	26.37	51.33
1984	60.57	77.27	15.03	18.28	22.88	51.77
1985	62.47	79.56	13.75	17.16	23.75	50.26
1986	59.35	75.45	14.62	18.97	26.16	51.02
1987	61.81	78.19	14.79	18.56	29.24	48.21
1988	59.95	74.45	14.18	17.79	29.94	48.89
1989	62.39	76.25	13.00	19.02	25.99	50.52
1990	55.87	67.38	13.71	20.43	25.84	41.10
1991			15.64	21.32	27.36	38.47
1992			17.05	25.17	26.43	30.91
1993				26.82	29.76	30.89
1994				23.44	26.98	31.09
1995				22.69	26.40	33.93
1996				23.76	29.85	35.99

Table 21: Corporate income tax ratios (own calculations, based on our approach)

	Australia	Belgium	Canada	Denmark	Finland	France
1965	41.23	17.02	27.59	–	44.78	72.29
1966	36.77	18.68	25.70	–	61.13	62.75
1967	33.95	17.95	26.32	–	58.54	55.49
1968	35.30	17.53	27.85	–	38.82	46.82
1969	34.81	18.69	33.65	–	19.81	36.59
1970	42.26	26.55	28.65	–	22.36	29.66
1971	44.31	30.17	27.43	–	24.26	26.19
1972	40.11	31.04	27.76	–	27.27	28.24
1973	75.59	32.77	27.40	–	26.20	28.12
1974	130.37	33.71	28.83	–	21.55	41.01
1975	109.77	41.03	30.43	–	42.59	43.17
1976	101.82	42.12	25.68	–	202.74	50.61
1977	125.35	43.58	25.01	–	172.43	47.33
1978	85.85	44.97	23.20	–	51.55	43.70
1979	75.43	45.75	20.53	–	21.96	45.68
1980	87.60	42.69	20.92	–	23.79	67.71
1981	99.70	46.34	20.41	–	30.04	73.86
1982	113.70	40.61	18.11	-483.90	27.83	95.19
1983	57.73	34.75	16.41	162.24	25.00	78.43
1984	55.40	33.50	17.49	176.90	22.46	65.66
1985	58.74	26.36	16.68	112.47	24.16	55.73
1986	62.10	26.74	19.51	137.72	23.81	42.42
1987	57.47	26.53	19.46	208.36	19.06	40.08
1988	54.02	25.08	18.35	149.07	20.14	36.31
1989	66.64	23.58	19.89	108.05	20.55	36.81
1990	81.25	22.23	18.40	63.51	35.17	39.78
1991	76.68	24.12	17.88	59.53	85.46	34.82
1992	68.56	23.04	19.83	48.82	47.65	30.88
1993	57.44	26.50	20.99	60.35	22.70	33.44
1994	63.46	28.29	22.82	47.33	23.84	30.89
1995	67.82	29.51	24.26	16.44	23.44	34.14
1996	75.23	28.98	27.72	17.49	29.21	36.03

Note: calculations are made on the basis of our suggested methodology, displayed in Section 7.2. Further details are provided in Section B.1.

Table 21: Corporate income tax ratios (own calculations, based on our approach)

	Italy	Japan	The Netherlands	New Zealand	Norway	Portugal
1965	25.32	33.91	–	–	–	–
1966	23.13	29.39	–	–	–	–
1967	25.28	26.87	–	–	–	–
1968	24.57	27.74	–	–	–	–
1969	24.58	27.66	–	–	–	–
1970	28.24	28.32	–	–	–	–
1971	36.29	30.16	–	–	–	–
1972	44.02	31.35	–	–	–	–
1973	27.60	41.02	–	–	–	–
1974	18.46	53.84	–	–	–	–
1975	27.08	42.45	–	–	13.54	–
1976	22.65	41.64	–	–	24.02	–
1977	22.38	42.80	26.85	–	39.78	–
1978	25.54	45.07	24.73	–	26.88	–
1979	19.89	43.03	24.21	–	22.94	–
1980	40.79	43.16	26.29	–	35.14	–
1981	50.67	42.55	24.22	–	44.18	–
1982	67.00	43.40	23.46	10.24	46.26	–
1983	71.39	45.13	19.40	6.86	38.24	–
1984	55.53	47.23	15.32	9.64	41.01	–
1985	47.54	46.35	17.57	10.52	45.78	–
1986	53.35	45.64	20.80	8.81	66.65	–
1987	54.27	54.51	26.04	14.74	41.89	–
1988	47.33	56.80	24.43	13.58	38.37	–
1989	52.81	57.89	20.97	17.19	23.53	8.13
1990	62.87	53.67	21.44	11.97	32.43	16.05
1991	75.19	49.83	22.40	11.38	33.61	21.64
1992	98.59	47.40	21.80	13.24	26.82	23.58
1993	77.76	42.58	24.38	14.79	26.04	17.72
1994	57.50	48.06	21.80	16.50	27.05	16.45
1995	52.31	51.26	22.20	–	28.28	17.89
1996	58.71	48.86	28.10	–	27.31	–

Table 21: Corporate income tax ratios (own calculations, based on our approach)

	Spain	Sweden	Switzerland	United Kingdom	United States
1965	19.06	29.84	–	29.53	46.30
1966	17.52	29.10	–	25.44	48.82
1967	16.02	26.55	–	57.53	53.84
1968	13.93	32.37	–	57.62	45.93
1969	13.34	28.18	–	60.70	57.20
1970	13.43	46.97	–	77.61	61.83
1971	14.41	65.00	–	61.94	49.23
1972	13.70	60.30	–	54.90	50.93
1973	14.85	62.66	–	56.35	50.98
1974	16.08	51.08	–	119.80	55.96
1975	17.38	53.18	–	119.45	52.13
1976	17.07	591.37	–	81.65	46.84
1977	15.50	-50.79	–	55.08	48.09
1978	12.55	-93.14	–	59.40	45.42
1979	13.50	98.78	–	74.06	45.17
1980	12.56	62.81	–	115.27	46.94
1981	14.70	132.58	–	156.04	41.18
1982	12.94	57.01	–	109.62	40.92
1983	15.13	53.33	–	80.72	31.77
1984	13.71	42.39	–	84.89	32.14
1985	14.40	47.77	–	73.97	33.72
1986	16.61	74.34	–	80.59	35.94
1987	11.60	85.23	–	70.53	39.06
1988	19.82	74.33	–	73.21	38.48
1989	26.82	70.31	–	87.18	40.14
1990	30.74	146.37	35.50	102.71	37.72
1991	30.09	248.42	40.15	109.33	40.19
1992	28.64	71.62	40.80	86.51	43.90
1993	28.16	53.88	34.63	61.76	41.91
1994	20.51	45.53	30.56	55.66	41.25
1995	–	34.13	29.43	63.68	40.35
1996	–	63.64	28.81	63.38	39.12

Table 22: Consumption tax ratios (own calculations, based on our approach)

	Australia	Austria	Belgium	Canada	Denmark	Finland
1965	10.72	17.36	14.96	14.20	15.95	16.84
1966	10.49	17.87	16.55	14.16	16.76	17.32
1967	10.42	17.09	17.07	13.88	16.76	17.42
1968	10.56	18.00	16.78	13.57	19.35	18.58
1969	10.20	18.25	16.93	13.52	19.97	17.74
1970	10.18	18.72	16.71	12.79	19.58	17.95
1971	10.11	18.82	16.47	13.17	20.02	18.75
1972	9.78	19.25	15.33	13.43	20.62	18.29
1973	9.98	18.36	14.83	14.46	19.44	18.10
1974	9.68	17.49	14.75	15.97	17.83	16.99
1975	10.28	16.56	13.85	13.88	17.04	16.69
1976	10.20	17.27	14.79	13.61	17.97	16.40
1977	9.79	16.88	14.66	13.41	19.04	17.43
1978	10.55	17.03	14.55	13.12	20.09	17.80
1979	11.11	17.37	14.28	13.52	20.75	17.94
1980	11.16	17.34	13.86	13.94	20.25	18.14
1981	11.05	17.55	13.72	15.51	19.93	18.14
1982	11.43	16.76	13.86	14.52	19.43	17.73
1983	11.98	16.75	14.09	14.06	20.02	17.53
1984	12.47	18.17	13.89	14.40	20.58	18.62
1985	12.24	18.10	14.11	13.75	20.70	18.34
1986	11.91	17.95	13.88	12.84	22.44	18.63
1987	11.92	17.93	14.38	13.31	21.82	18.74
1988	11.38	17.83	14.59	12.88	21.95	19.95
1989	11.28	17.77	14.60	12.83	21.18	20.61
1990	10.55	17.48	14.80	11.78	20.94	19.97
1991	9.60	17.30	14.66	11.52	20.78	18.40
1992	9.63	17.45	14.76	11.47	20.37	17.87
1993	10.27	16.84	15.04	11.51	19.94	17.98
1994	10.67	17.71	15.54	11.64	20.71	18.35
1995	10.84	15.46	15.20	11.54	21.03	17.85
1996	10.80	16.55	15.66	11.69	21.28	18.67

Note: calculations are made on the basis of our suggested methodology, displayed in Section 7.2. Further details are provided in Section B.1.

Table 22: Consumption tax ratios (own calculations, based on our approach) (continued)

	France	Germany	Greece	Iceland	Ireland	Italy
1965	17.91	14.18	10.54	23.20	14.62	13.71
1966	17.76	14.04	11.49	–	16.05	13.80
1967	17.83	14.22	11.76	–	16.57	14.15
1968	16.94	13.71	12.45	–	16.49	14.27
1969	18.74	14.83	13.06	–	17.61	14.27
1970	18.28	14.45	12.44	22.13	17.97	13.95
1971	18.01	14.17	12.27	–	17.72	13.40
1972	18.17	14.08	12.58	–	17.54	12.18
1973	17.51	13.69	12.61	–	17.87	11.18
1974	17.23	12.72	11.14	–	16.21	11.65
1975	16.17	12.22	12.13	24.84	16.43	10.10
1976	16.68	12.25	12.56	–	18.73	11.13
1977	15.65	12.19	12.91	–	17.83	11.30
1978	16.01	12.79	13.10	–	17.07	10.36
1979	16.67	13.17	14.42	–	15.50	10.19
1980	16.31	13.16	12.68	23.30	16.34	10.59
1981	15.71	12.95	12.19	24.22	17.35	10.34
1982	15.90	12.69	13.78	23.90	19.84	10.84
1983	15.82	13.01	14.33	21.77	20.86	11.91
1984	15.99	12.98	15.26	22.36	21.26	11.85
1985	16.24	12.48	14.97	20.90	20.12	11.25
1986	16.08	12.39	16.50	20.58	20.28	12.11
1987	16.17	12.55	16.99	20.71	20.04	12.20
1988	16.28	12.51	15.53	21.46	20.94	13.15
1989	16.06	13.05	13.87	21.64	20.55	13.02
1990	15.87	13.33	14.94	19.65	19.87	13.91
1991	15.15	13.19	15.76	19.15	18.98	14.04
1992	14.74	13.37	16.59	18.92	18.72	14.21
1993	14.37	13.69	15.94	18.66	18.33	14.24
1994	14.84	14.41	15.42	18.45	19.20	14.96
1995	15.19	14.00	15.23	18.10	19.62	14.50
1996	15.41	13.57	15.45	18.40	19.58	14.39

Table 22: Consumption tax ratios (own calculations, based on our approach) (continued)

	Japan	Luxembourg	The Netherlands	New Zealand	Norway	Portugal
1965	7.39	9.06	12.20	8.97	17.53	9.09
1966	7.22	8.91	12.48	8.64	17.89	9.06
1967	7.40	8.94	12.79	8.91	17.86	10.35
1968	7.69	8.54	13.50	9.13	17.94	9.88
1969	7.75	8.63	12.33	9.18	18.71	9.93
1970	7.57	8.58	13.47	9.46	20.13	11.51
1971	7.12	9.00	13.77	9.43	20.67	10.67
1972	7.25	9.99	14.31	9.29	20.92	10.78
1973	6.87	10.46	14.30	9.36	20.41	10.12
1974	6.03	9.65	13.38	8.94	19.34	9.32
1975	5.54	10.28	13.35	9.44	18.96	9.70
1976	6.03	9.94	13.89	9.41	19.74	11.48
1977	5.93	9.59	14.43	9.49	19.86	12.41
1978	6.30	10.07	14.30	9.68	20.31	12.17
1979	6.36	9.65	13.88	9.74	19.85	11.96
1980	6.19	10.90	14.01	9.25	20.62	14.00
1981	6.20	12.05	13.79	10.14	21.25	13.71
1982	5.97	13.42	13.49	10.41	20.82	14.28
1983	5.93	14.11	13.80	10.86	21.23	15.29
1984	6.01	14.40	14.42	11.52	21.57	14.81
1985	5.72	14.27	14.51	10.01	22.69	14.46
1986	5.60	14.19	14.94	11.35	22.55	18.65
1987	5.69	13.71	15.54	15.69	22.42	17.41
1988	5.78	14.01	15.90	14.85	20.73	18.06
1989	5.76	14.22	15.41	16.36	19.92	17.43
1990	6.22	14.13	15.47	15.88	19.88	16.78
1991	6.24	14.84	15.60	16.10	19.54	16.22
1992	6.09	16.35	15.48	16.53	19.89	17.52
1993	6.10	16.98	15.23	16.63	20.22	16.04
1994	6.23	17.92	15.15	16.62	21.15	17.34
1995	6.24	17.53	15.53	16.52	21.76	17.52
1996	6.29	17.96	16.01	16.07	21.85	17.03

Table 22: Consumption tax ratios (own calculations, based on our approach) (continued)

	Spain	Sweden	Switzerland	United Kingdom	United States
1965	7.74	14.43	8.48	12.31	6.71
1966	7.99	15.26	8.36	12.19	6.30
1967	7.83	15.11	8.45	11.79	6.24
1968	7.49	15.24	8.59	12.47	6.17
1969	8.12	15.11	8.81	13.35	6.39
1970	8.15	14.44	8.71	12.91	6.54
1971	7.55	16.35	8.40	12.03	6.59
1972	7.72	15.88	8.64	11.30	6.47
1973	8.02	15.49	8.27	10.22	6.43
1974	6.53	13.86	7.74	10.47	6.37
1975	6.26	13.24	7.48	10.17	6.14
1976	6.28	13.97	7.45	10.49	6.09
1977	6.26	13.93	7.69	10.74	5.89
1978	6.37	13.90	7.94	10.44	5.90
1979	6.32	13.77	7.74	10.08	5.76
1980	6.32	13.94	7.75	12.34	5.79
1981	6.96	14.10	7.63	11.81	6.32
1982	7.09	13.89	7.55	13.61	6.09
1983	8.31	14.80	7.58	12.93	5.81
1984	9.40	15.42	7.58	13.77	6.00
1985	10.48	16.37	7.64	14.11	5.93
1986	13.06	16.10	7.92	13.64	5.78
1987	12.71	16.68	8.03	13.31	5.67
1988	13.04	16.59	8.12	13.57	5.71
1989	12.76	16.87	8.02	13.28	5.55
1990	12.52	17.24	7.83	13.63	5.53
1991	12.54	17.11	7.42	13.30	5.65
1992	12.63	15.74	7.04	13.72	5.70
1993	11.57	16.01	7.13	13.64	5.78
1994	12.35	15.88	7.15	14.10	5.92
1995	12.41	15.24	8.20	14.68	5.96
1996	12.55	14.83	8.03	14.77	5.83