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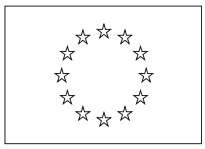

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Taxation & Customs Union

TAXATION PAPERS

Examination of the macroeconomic implicit tax rate on labour derived by the european commission

Working paper n° 4/2004

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TAXATION PAPERS

EXAMINATION OF THE MACROECONOMIC IMPLICIT TAX RATE ON LABOUR DERIVED BY THE EUROPEAN COMMISSION

By

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Working paper n°4 December 2004

The electronic version of the paper is available at
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Summary

All tax indicator estimates, whether based on aggregate- or micro data, need to be corroborated by other information and preferably also other tax indicators before policy conclusions can reasonably be drawn. The purpose of this paper is to describe the way the (macroeconomic) implicit tax rate on labour income is calculated in the European Commission "Structures of the Taxation Systems in the EU" publication, to show its relationship to the widely recognised (microeconomic) tax wedge indicator for an average production worker from the "Taxing Wages" approach of the OECD, and to illustrate its use. It appears from the European Commission report that evidence from the implicit tax ratio at the macro level in a single year cannot simply be projected to observations for an average worker at the micro level, and conversely. With a few exemptions, however, both the macroeconomic and the microeconomic indicator appear to have comparable informative content as regards to general increasing or decreasing trends over time. It should be noted that the changes in the macroeconomic implicit tax rate may reflect structural changes in the entire economy, such as changes in the distribution of wage income. The implicit tax rate relates to actual tax revenue data and it could be, for example, that the revenue effect of targeted reductions in personal income tax, at say, the lower end of the income scale, has been offset by increases in wage income at the top of the wage scale. The two indicators could then be considered complementary instruments for evaluating tax policy.

Keywords: Tax indicators, Effective tax rates, Taxes on labour, Non-wage labour costs.

JEL Classification: E62, H22, J32

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1. INTRODUCTION

Macroeconomic implicit tax rates are backward-looking tax ratios derived using aggregate data on tax revenues (numerator) and the aggregate income in the economy (denominator). Several authors give "health warnings" to the use of implicit tax rates. The authors of OECD (2001), for example, conclude that "…average tax rates measured using aggregate data will in a number of cases generate misleading indicators of the tax burden on taxpayers, on factors of production and on consumption. The major limitation of existing methodologies for calculating tax ratios is the techniques applied to allocate tax revenues to selected aggregate tax base are underdeveloped. At the same time it was recognised that an examination of such ratios is a useful exercise, if only to identify the substantial shortcomings of these measures. The message of this (OECD) study is that policymakers should be aware of the measurement problems underlying average tax rate based on aggregate data, should they be fielded to shape public policy debate."

The purpose of this paper is to describe the way the (improved) average effective (implicit) tax ratio on labour income is calculated in the European Commission "Structures of the Taxation Systems in the EU" publication, to show its relationship to the widely recognised "Taxing Wages" approach by the OECD, and to illustrate its use. The paper basically summarises the checks and balances that were carried out by the European Commission services. It shows, in particular, that the correlation of the implicit tax rate on labour with the micro indicator from the "Taxing Wages" approach by the OECD is reasonably strong. It also confirms the view that the evidence from observations of the implicit tax rate needs to be corroborated by a other information and also other tax indicators before policy conclusions can reasonably be drawn.

2. METHODOLOGY

The implicit tax rate on employed labour is defined as all direct and indirect taxes and employees' and employers' social contributions levied on employed labour income divided by the total compensation of employees working in the economic territory.

Here, direct taxes are defined as the revenue from personal income tax that can be allocated to labour income. Indirect taxes on labour income, currently applied in some Member States, are taxes such as payroll taxes paid by the employer. The compensation of employees is defined as total remuneration, in cash or in kind, payable by an employer to an employee in return for work done. It consists of gross wages (in cash or in kind) and thus also the amount paid as social insurance contributions and wage withholding tax. In addition, employers' contributions to social security (including imputed social contributions) as well as to private pensions and related schemes are included. Compensation of employees is thus a broad measure of the gross economic income from employment before any charges are withheld.

Box 1 Definition of the implicit tax rate on labour

Ratio	Definition
Implicit tax rate on employed labour (ESA95)	Direct taxes, indirect taxes and compulsory actual social contributions paid by employers and employees, on employed labour income/ (D1 + D29C)
Numerator: Taxes on employed labour From D51 Taxes on income: D51A+D51C1 Taxes on individual or household income including holding gains (part raised on labour income) D29C Total wage bill and payroll taxes From D611 Actual social contributions: D61111 Compulsory employers' actual social contributions D61121 Compulsory employees' social contributions *Denominator:* D1 Compensation of employees D29C Wage bill and payroll taxes	

The fundamental methodological problem in calculating the implicit tax rate on labour and capital is that the personal income tax is typically broad-based and relates to multiple sources of income (*i.e.* employed labour, self-employed labour, income from capital and income in the form of social benefits and pensions received).

Compared to previous editions of the "Structures of the Taxation Systems", for the 2003 edition the methodology for allocating the personal income tax revenue across different income sources has significantly been improved, by the use of micro tax revenue data and detailed wage- and income tax statistics from national tax departments. This means that the estimates incorporate the fact that effective tax rates may vary across different taxable income sources and groups of taxpayers. Ten out of the fifteen Member States actually used data sets of individual taxpayers to carry out the estimates; three Member States used income class data based on a data set of individual taxpayers and two others used tax receipts data from withholding tax- and income tax statistics, and applied certain corrections.

The resulting implicit tax rate on labour should be seen as a summary measure that approximates an average effective tax burden on labour income in the economy. It must be recognised that the tax ratio may hide important variation in effective tax rates across different household types or at different wage levels. In some countries, for example, the recent tax reforms may have clearly more pronounced effects on low-paid, low-qualified workers or families with children.

3. MAIN EMPIRICAL RESULTS: STABILISING/DECLINING TAX BURDEN ON LABOUR IN RECENT YEARS

The empirical results are limited to the EU-15 Member States since at the moment there has not been enough time to compute the split of the Personal Income Tax by economic functions for the new Member States, which is a prerequisite to compute the ITR on labour.

Previous publications by Commission services on the 'Structures of taxation systems in the European Union'[1], based on ESA79 system of national accounts, reported a common increasing trend in the tax burden on labour income in the EU-15 area since the beginning of the early 1970s (despite some decreases in single years). This general increase, which was quite marked in the 1970s and was still significant in the 1980s and the first half of the 1990s, was closely related to the increasing share of the public sector in the economy, in particular of social welfare spending driven by dependency ratios (especially for pensions, health care and other social benefits). The increase in the first half of the 1990s was associated with increases in social contributions related to the recession at the beginning of the decade. Moreover, increases in the tax burden were related to restrict budget deficits in the running up for the EMU.

Since the late 1990s, a number of EU-15 Member States implemented fiscal measures to lower the tax burden on labour income, in order to boost the demand for labour, and to foster work incentives[2]. Concerns about excessive labour costs prompted initiatives in some Member States to reduce non-wage labour costs (*i.e.* social contributions and other payroll taxes) across-the-board. Other Member States put forward targeted reductions of social contributions on behalf of low-paid and low-qualified workers. These cuts in social contributions have mostly been focused on relieving the fiscal pressure for employers, although some countries have also made substantial cuts to employee social contributions. Reforms of personal income tax codes often consist of lowering statutory tax rates, as well as raising the minimum level of tax exempted income and/or introducing specific tax base deductions and allowances or tax liability credits for workers with relatively low levels of earnings.

It now appears that the general trend towards increasing the implicit tax rate on labour has mostly stabilised or reversed slightly since the mid-1990s for most Member States (Table 1)[3]. Previous ESA79 data displayed a steady increase in the EU average implicit tax rate on labour (weighted by the total compensation of employees in the economy) from less than 30% in 1970 to almost 42% in 1997. New ESA95 data for the period 1995 to 2002, though not fully comparable, now indicate that the EU average implicit tax rate first continued to increase from 37.3% in 1995 to 37.7% in 1996, then stabilized until 1998 and finally started to slightly decrease reaching 36.3% in 2002[4]. However, the

[1] European Commission (2000 a, b).

[2] See also Carone and Salomäki (2001).

[3] A markedly slower annual rate of increase in the average effective tax rate on labour is reported for the 1990-2000 period in Carey and Rabesona (2002).

[4] Implicit tax rates computed on the basis of ESA79 data are generally higher than those on the basis of ESA95 data over the same period. This can partly be attributed to improved methods for estimating the allocation of personal income tax across different income sources.

pattern of the changes is quite diverse across Member States. Notable reductions in the period 1995-2002 are visible in Ireland, the Netherlands, Sweden, Luxemburg and the United Kingdom, while in the period 1998-2002 the hugest reductions can be found in Sweden, Ireland, the Netherlands, Italy and France. In the other Member States the implicit tax rate more or less stabilised. In Spain, Portugal and Greece the implicit tax rate continued to increase. The generally more pronounced decrease in 2002 respect to previous years is probably linked also to the slowdown of the economy

Table 1 Implicit tax rates on labour in the Union

1995-2002, in %

	1995	1996	1997	1998	1999	2000	2001	2002	Diff. 95-02	Diff. 98-02
BE	44,1	43,7	44,3	44,6	43,8	44,2	43,9	43,5	-0,7	-1,1
DK	40,7	41,2	41,5	39,9	41,1	41,8	41,5	39,9	-0,8	0,0
DE	39,5	39,7	40,6	40,7	40,4	40,2	39,9	39,9	0,4	-0,8
EL	34,1	35,7	36,4	37,5	37,0	38,2	37,6	37,8	3,7	0,4
ES	28,9	29,5	29,0	28,7	28,1	28,6	29,6	30,0	1,1	1,2
FR	42,2	42,6	42,7	43,2	43,5	43,1	42,7	41,8	-0,3	-1,4
IE	29,8	29,7	29,9	28,9	28,6	28,3	27,5	25,9	-3,9	-2,9
IT	37,8	41,4	43,1	42,8	42,1	41,3	41,5	41,1	3,3	-1,8
LU	29,5	29,3	29,1	28,4	28,9	30,0	29,2	28,0	-1,5	-0,4
NL	35,1	34,1	33,4	33,9	34,8	35,4	31,8	31,9	-3,1	-2,0
AT	38,7	39,3	40,2	39,9	40,1	39,7	40,0	39,2	0,5	-0,7
PT	31,0	31,6	32,5	32,9	33,0	33,2	33,3	33,7	2,7	0,9
FI	43,9	44,8	43,3	43,8	43,4	44,0	44,4	43,9	0,0	0,1
SE	48,4	49,7	50,0	51,0	50,5	49,3	47,9	46,6	-1,7	-4,4
UK	25,7	24,7	24,2	25,1	25,3	25,7	25,4	24,6	-1,1	-0,5
EU-15	37,3	37,7	37,7	37,7	37,5	37,2	36,8	36,3	-0,9	-1,4

Source: Commission Services

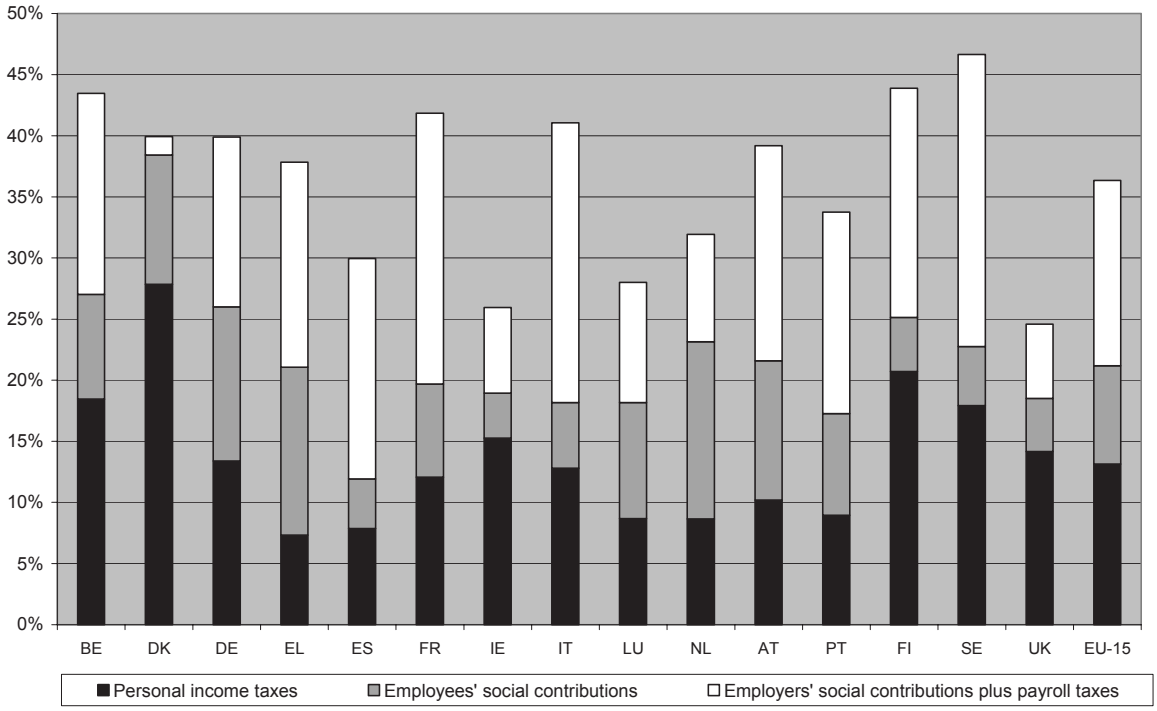
By the year 2002, labour income is estimated to be most heavily taxed in Sweden, despite having the greatest reduction between 1998 and 2002. Also Finland and Belgium have an implicit tax rates well above 40% of the wage bill. Ireland and the United Kingdom, on the other hand, stand out with implicit tax rates well below 30% (Graph 1). For the majority of the countries in the Union, the implicit tax rate on labour largely reflects the important role played by wage-based contributions in financing the social security system[5]. On average, somewhat more than 60% of the overall implicit tax rate on labour consists of non-wage labour costs paid by both employees and employers[6].

[5] It should be noted that the categories 'personal income tax' and 'social contributions' in the graph sometimes consist of multiple tax categories. In the 'Nordic' countries, for example, the recorded amount of personal income tax does not only consist of central government income tax, but also state income tax, or municipality income tax and sometimes also church tax. In France, the generalised social contribution ('CSG') and the contribution for the reduction of the debt of the social security institutions ('CRDS') are partially booked as income tax on labour income. In Austria, the tax on industry and trade and the contribution to chambers are also partially booked as income tax on labour income. In Italy, a new tax called 'IRAP' based on value of production net of depreciations was introduced in 1998 at the same time when employers' social contributions were substantially reduced. A part of its revenue has been allocated to labour and employers' social contributions in particular (and also included in the denominator of the tax ratio).

[6] It is worth noting that the effective tax rate on labour in the US was estimated just 24% in 1999, with non-wage labour cost only 12% of the average gross wage. See European Commission (2000a).

Only in Denmark, Ireland and the United Kingdom do personal income taxes form a relatively large part of the total charges paid on labour income. In Denmark, the share of social contributions in government receipts is relatively low as most welfare spending is financed out of general taxation[7]. The relatively low tax burden on labour in Ireland and the United Kingdom can largely be explained by the relatively low shares of the social contributions in these countries. The overall average rate of personal income taxation (as percentage of total labour costs) seems for example not very different from high tax countries like Sweden, Finland and Belgium. The latter countries have relatively high rates of both personal income tax and social contributions (as percentage of total labour costs).

Graph 1 Decomposition of the implicit tax rate on labour
2002, in %



Source: Commission Services

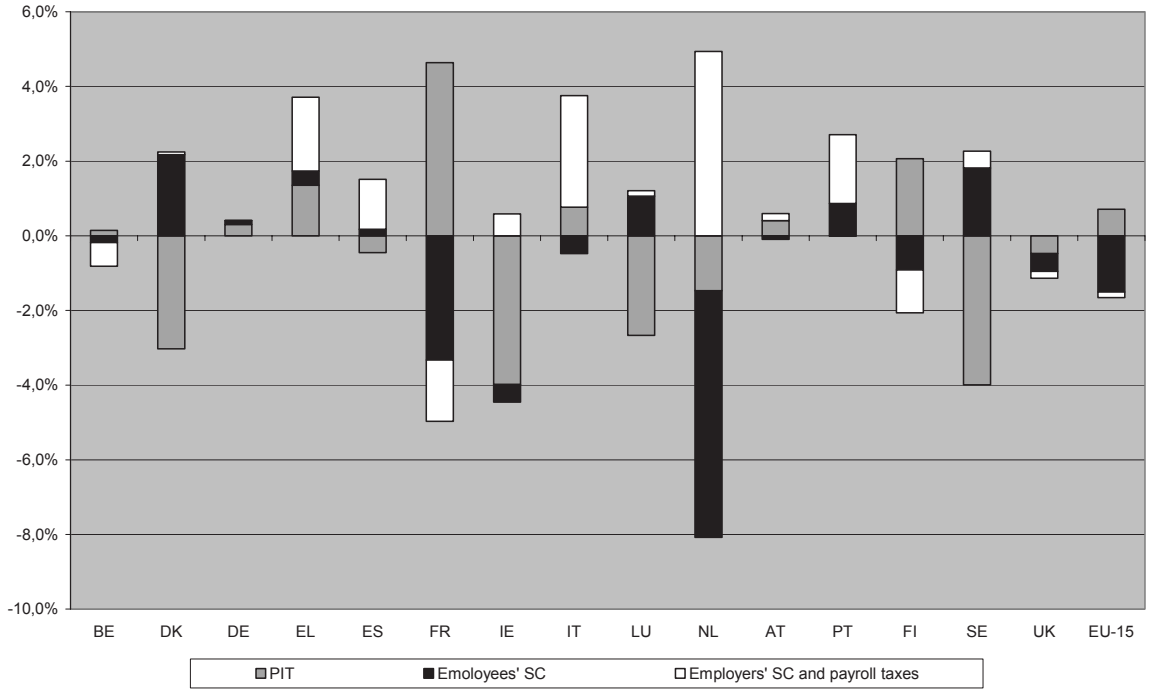
The average implicit tax rate on labour (EU-15) still remains relatively high by international standards[8]. It should however be noted that the full effects of the recent fiscal reforms could be reflected in the data with a certain delay. Also, a number of Member States are implementing further fiscal measures to improve labour market performance, which will come into effect beyond the year 2002. Next graph shows in each Member State the developments of the single components of the ITR in the whole period observed. It could be observed that the reduction in the EU-15 is linked especially

[7] Large part of employees' social contribution in Denmark comes from a 8% contribution paid on the basis of employees gross earnings. This revenue in some publications is classified as a social security contribution and in others it is reported as a separate type of personal income tax.

[8] Carey and Rabesona (2002) estimated the EU average effective tax rate on labour reached some 37% in 1999, compared with 25% and 23% for the United States and Japan, respectively. Martinez-Mongay (2000) provides broadly similar differences between the EU and the United States and Japan.

to the reduction of employees' social contributions, while the PIT shows overall a slight increase.

Graph 2 Developments of the single components of the ITR on labour
1995-2002, in %



4. A NOTE ON THE PROPERTIES OF THE IMPLICIT TAX RATE ON LABOUR

The implicit tax rate on labour is a macro backward-looking indicator that is mainly derived from aggregate data in national accounts. As such, the tax ratio should be seen as a summary measure that approximates an average effective tax burden on labour income in the economy. It must be recognised that the tax ratio may hide important variation in effective tax rates across different household types or at different wage levels[9]. The decomposition of total tax wedges, for example, may be quite different at relatively low or relatively high wage levels. Also, in some Member States the recent fiscal reforms may have had more pronounced effects on low-paid, low-qualified workers or on families with children. When interpreting the time-series comparisons, it should be borne in mind that the evolution refers to an *ex-post* trend without disentangling cyclical, structural and policy elements. This means that the observed changes may only partially reflect discretionary tax policy measures. In some Member States, for example, strong economic growth may have moved taxpayers into higher personal income tax brackets resulting in higher real tax payments ('bracket creep'), or taxpayers at the top of the pay scale may have witnessed relatively high increases in incomes, and such changes may have induced a cyclical swing in the implicit tax rate on labour that may to some extent offset the (*ex-ante*) expected fall driven by the tax reforms (aimed at reducing the tax burden at the bottom to the middle end of the distribution, say).

[9] See also Clark (2002).

In addition, it should again be noted that the figures in the national accounts often do not follow a real accrual principle. According to the ESA95 rules for the national accounts, taxes should normally be recorded when the underlying economic event/transaction takes place rather than then when the actual tax payment is made. Personal income tax, for example, is typically levied on incomes accrued one year prior to actual collection. However, ESA95 allows for considerable flexibility in interpreting accrual time of recording, depending on the type of taxes. Most statistical offices in fact use 'time adjusted' cash figures for a few months, which is permitted following amendments of ESA95. This means that the effects of tax reforms may be reflected in the figures with some delay, even when time shifted cash-figures are used.

Box 2 in the next page presents an overview of the main fiscal measures that seem to be (partially) reflected in the pattern of the changes in the implicit tax rates on labour (Graph 8 at page 25 displays the time trend of the implicit tax rates for each EU-15 Member State).

Box 2 Overview of main fiscal measures affecting the ITR on labour

	Personal income tax	Social contributions
BE	• Indexing of tax brackets abandoned Introduction of 'crisis tax' on top of all statutory rates plus 'solidarity levy' on personal income (1997). Reintroduction of automatic indexing of tax brackets (1999). Phasing out of additional 'crisis tax' (1997-2004). • Personal income tax reform of which the main provisions are (a) the lowering the tax burden on earned income including the introduction and subsequent increase of refundable employment tax credit aimed at low paid workers (b) a neutral tax treatment of spouses and singles (c) more favourable treatment of dependent children (d) greening of the tax system (2000-2006).	• Lowering of employers' contributions, especially in respect of the low-paid. The scope of the reductions in employers' social contributions was expanded to more social security schemes (1997-2001). • Flat rate reductions in employers' contributions for young workers, low skilled workers and workers aged over 45.
DK	• Reductions in rate low tax bracket (1996-1999). Increase in rate additional medium tax bracket (1997). Reductions of personal income tax, especially at the bottom- to the middle end (1999-2002).	• Increase employees' social contribution rate (1997). Split of the social unemployment contribution into two contributions: one for unemployment insurance and the other is a voluntary contribution for an early retirement scheme. The combined social contribution rate is higher. Introduction of contribution employees for special pension savings scheme (1999).
DE	• Across-the-board reductions of personal income tax (1999-2002). • Gradual increase of basic tax-free allowance (1998-2004)	• Increase in social contribution rates (1997). • Reduction of social contributions to the pension system (1999-2002).
EL	• Reduction of highest statutory personal income tax rate, indexing of tax brackets plus increase in standard tax allowances (2000-2002). • Increase in income tax allowances (2000-2002	• Reductions of employers' and employees' pension contributions in respect of new staff and at the low end of the wage scale (2001-2002).
ES	• Across the board reduction of personal income tax rates (1999). • Increase in work income allowance for low wages (1999). • Increase in basic personal allowances (1999).	• Targeted reductions in social contributions (1997-2000). • Reduction in unemployment contributions for employers and employees (2001).

Box 2 Continued

FR[1]	• Introduction of contribution for refunding of debt of social security institutions ('CRDS') with a broader base than the generalised social contribution ('CSG') (1996). • Gradual reduction of CSG and CRDS (2001-2003). • Reductions of personal income tax, especially at the bottom to the middle end (2001). • Gradual reduction in tax rates and modification of tax-free allowance system targeted especially to low-income earners (2001-2002).	• Reduction of employers' contributions in respect of low-paid workers in association with reduction working week (1997-2001). • Reduction of employees' sickness contributions (1998). Reduction of employees' and employers' unemployment contributions (2000-2001).
IE	• Personal income tax rates reductions, especially at the bottom- to the middle end (1997-2001). • Increases in basic tax allowances/credits (1997-2001). • Widening of the rate band (2000).	• Reductions in employers' and employees' PRSI levies (1997-2002). • Reduction in employers' contribution in respect of the low-paid (2001).
IT[2]	• Personal income tax rate of the second bracket down (2000). • Further reductions in tax rates of all the brackets, in particular the middle brackets (2001-2002). • Family allowance supplemented by and additional tax credit depending on the number of dependent children (2002).	• Reduction of employers' health care contribution rate. Introduction of new regional tax ('IRAP') based on the value of production net of depreciations (1998). Reductions of employers' social contributions in respect of new jobs and also at the low end of the pay scale (1997-2000).
LU	• Across-the-board reduction in personal income tax rates (1998). Across-the-board reduction in personal income tax rates (2001-2002). • Increase in the minimum level of taxable income (2001).	• Increase in contribution for sickness insurance (2000).

Box 2 Continued

NL	• Across-the-board reduction in personal income tax (2001). • Introduction of a tax credit for all employees and self employed (2001-2002), in return, lump sum deductions for labour cost expenses and self-employed were abolished in 2001	• Contribution for disability insurance scheme shifted from the employee to the employer (1998). • Increases in employees' contribution rate for state pensions and medical expenses (1998-2000). • Reductions of wage tax and employers' social contributions in respect of the long-term unemployed, the low-paid and also for training (1996-2001). • Reductions in employees' contribution rate for unemployment insurance (2001).
PT	• General reduction in personal income tax rates (2001).	• Targeted reductions in employers' social contributions (2001).
AT[3]	• Increases in family allowances and children's tax credits (1998-2000). • Reduction of the tax schedule and increase in the general tax credit (2000).	• Reduction of employers' contribution rates for health insurance and pay insurance schemes for 'blue collar' workers (2001).
FI	• Reductions in central- and local income tax, especially at the bottom- to the middle end (1995-2002). • Abolition of the lowest income tax bracket in 2001 (in other words, increase in the tax exemption) plus subsequent increase in the tax exemption in 2002.	• Reductions in employees' and employers' contribution rates (1997-2002).
SE	• Reductions in central- and local income tax, especially at the bottom to the middle end (1999-2001). • Increase in threshold for State income tax (2000-2002) and increase in basic allowance (2001-2002)	• Increases in employees' contribution rates (1995-1998). • Reductions in employers' contribution rates (2000-2001).
UK	• Personal income tax reductions, especially at the bottom to the middle end (1999-2000).	• Increase in starting point for paying national insurance contributions (NIC) for employers and employees. Reduction in employers' contribution rates to compensate for introduction of climate levy (1999-2001). • Increase of the NIC by 1% for both employers and employees (2002)

Box 2 Continued

(1) In France, the effects of the recent reductions of personal income tax were apparently partially offset at the aggregate level as a result of higher revenues from the generalised social contribution (CSG) and the contribution for the reduction of the debt of social security institutions (CRDS) since late 1990s; those contributions are currently being gradually reduced (2001-2003). France also witnessed sharp increases in tax receipts in the financial year 1999, notably from direct taxes.

(2) In Italy, the 1997-1998 tax reform eliminated employers' compulsory health care contributions, bringing the overall employer's social contribution rate down substantially. At the same time, however, a new tax for employers, called 'IRAP', based on the value of production net of depreciations was introduced. For reasons of comparability, a part of the revenue of this new tax has been allocated to labour income (and included in the denominator of the implicit tax rate) while it is not actually levied on wages and salaries as such.

(3) In Austria, the effects of the recent reductions in personal income tax were apparently offset at the aggregate level as a result of sharp increases in direct tax revenues in 2001. These increases are related to base-broadening measures and significantly increasing tax pre-payments, in reaction to the introduction of interest charges on tax arrears from October 2001 onwards. Children tax credits do not effect implicit tax rate because they are not booked among taxes but among benefits.

Source: Commission Services

5. SENSITIVITY ANALYSIS: THE ROLE OF IMPUTED SOCIAL CONTRIBUTION ON ITR ON LABOUR

Employers' imputed social contributions (D612) represent the counterpart to unfunded social benefits paid directly by employers to their employees. The fact that certain social benefits are paid directly by employers and not through the medium of social security funds, in no way detracts from their character as social welfare benefits. According to the guidelines of national accounts the value of imputed social contribution should be based on actuarial considerations. The remuneration should therefore be imputed for employees equal in value to the social contributions that would be needed to secure the de facto entitlements to the social benefits they accumulate[10].

In other words this is important for (mainly) governments which do not pay actual contributions for their employees but which directly provide to them a pension when they retire. In this case imputed social contributions represent the contribution the government should pay to a pension fund in order to provide a pension of an equivalent amount to the employees.

Despite the fact that imputed social contributions are not considered part of total taxes in the framework of the publication "Structures of the taxation systems in the EU" where the ITR on labour is presented, indeed their inclusion or exclusion in the definition of total taxes, and consequently among taxes on labour, is rather controversial. On one hand including imputed social contributions in the definition would correct the downward bias in the total taxes-to-GDP for Member States in which in the government does not make actual contributions for its employees. Another argument for including imputed social contributions is the greater comparability over time for countries whose governments stop paying actual social contributions to a social security fund and instead simply pay social benefits to their employees as their entitlement arises. By this change, the tax-to-GDP ratio decreases if imputed social contributions are omitted. On the other hand imputed social contributions are not based on actual transactions and the method of imputation can involve estimation errors.

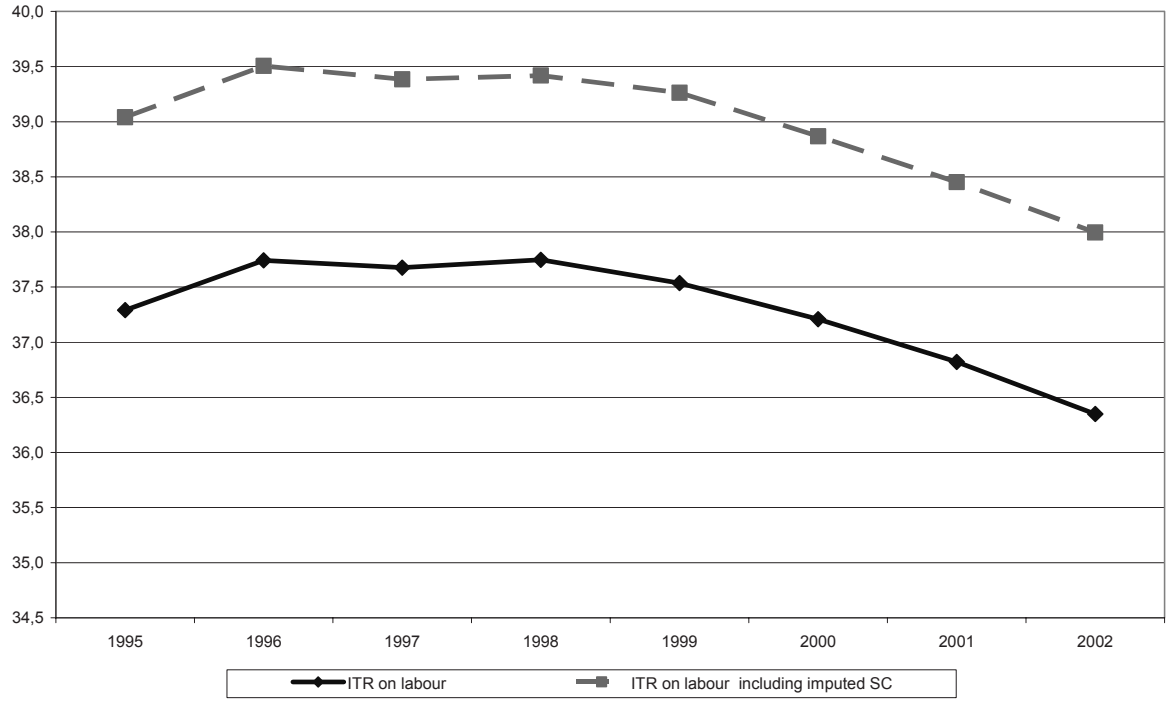
If imputed social contributions were part of the taxes on labour, the ITR on labour would be shifted upwards in several Member States. It should be noted that imputed social contributions are presently part of the denominator of the ITR since they are part of total compensation of employees (D1). Among the arguments in favour of considering imputed social contributions among taxes on labour there is the fact that the ITR on labour is a macro indicator that takes account of all the sectors of the economy. Imputed social contributions represent part of (non wage) labour cost for some public institutions which do not make actual contributions, so omitting them would mean omitting part of non wage labour costs of the economy.

It can be seen from the graphs that the impact of including imputed social contribution in the numerator of the ITR on labour would be quite substantial. The ITR for the EU-15 average would be shifted upwards more than 1.5 percentage points with no impact on the annual trend. Regarding single Member States the highest changes would be found in

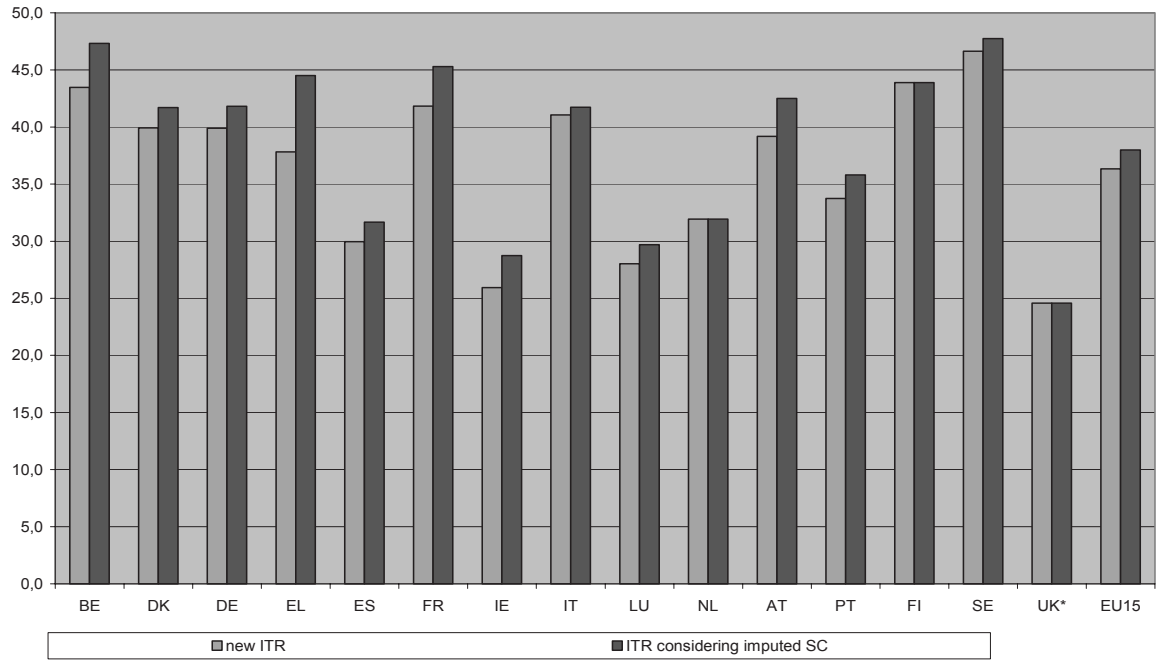
[10] European Commission (1996)

Greece (+6.7%), Belgium (+3.8%), France (+3.5%) and Austria (+3.3%), but all Member States would show a visible increase apart the Netherlands and Finland[11].

Graph 3 Sensitivity analysis for imputed social contributions for the EU-15 average
EU15 average, in %



Graph 4 Sensitivity analysis for imputed social contributions per Member State
2002, in %



[11] Imputed social contributions are not available for the UK.

6. A COMPARISON WITH TAX WEDGES COMPUTED FOR EXAMPLE HOUSEHOLD TYPES

Every year, the OECD releases *Taxing Wages*, a publication providing internationally comparable data of total tax wedges – between labour costs to the employer and the corresponding net take-home pay of the employee – for various example household types and different representative wage levels. It is assumed that the earned income derived from employment is equal to a given fraction of the average gross earnings of adult, full-time workers in the manufacturing sector. The tax wedges are calculated on the basis of the tax legislation, by expressing the sum of personal income tax, employee plus employer social contributions together with any payroll tax, as percentage of total labour costs. They have the theoretical possibility to disentangle discretionary tax policy measures as regards personal income tax and social contributions. However, because of the theoretical approach, this method does not relate to actual tax revenue, nor does it incorporate all the elements of the tax system that may be relevant, such as effects of special tax relief available on the tax base.

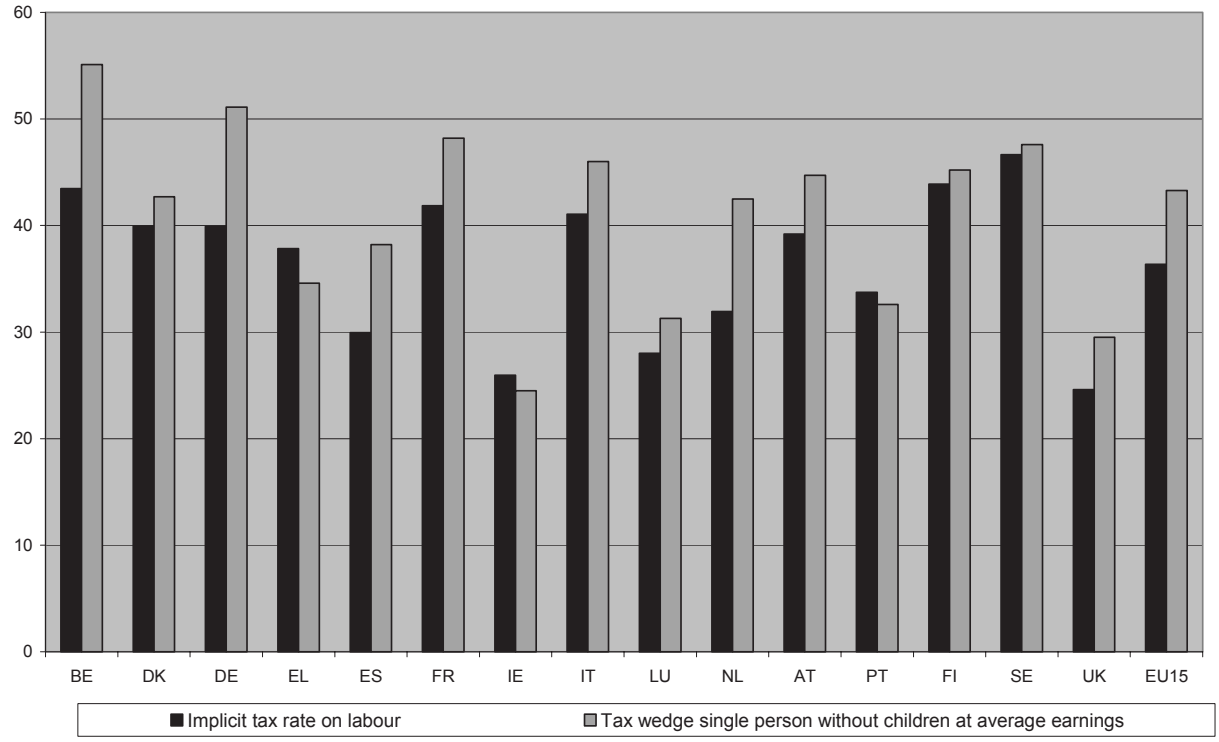
Pair-wise comparisons between the macro - backward looking implicit - tax rates on labour and the - micro example - tax wedge for a single average production worker at average earnings (without children) indicate that the tax wedges are significantly higher than the implicit tax rates of labour for some countries (Graph 5). As a result, the ranking between the Member States may also be quite different. The differences are not specific to a single year. Nevertheless, the correlation between the macro and micro indicators is still moderately strong. Member States with a high tax wedge for an average production worker generally also have relatively high implicit tax rates on labour and the other way around. For example, Sweden and Belgium are consistently in the higher group regarding the taxation of labour, and Ireland and the United Kingdom are always in the lower range (Graph 5).

A complete correlation cannot be expected, due to conceptual and statistical differences between the macro and the micro indicators. The gross wages and salaries from National Accounts which form the basis of the implicit tax rate on labour do not correspond to the particular wage level of an average full-time production worker in the manufacturing industry. The aggregate gross compensation of employees represents the sum of all gross wages paid in a given year, *i.e.* they include all workers, both full-time and part-time and across all economic sectors. Moreover, the denominator of the micro example tax wedge does in some cases not contain information of (employer provided) contributions to private pension and related schemes. Moreover, the macro implicit tax rate uses the *actual* tax revenues raised on total labour income in a certain year with accrual adjustments. The diversity of different household- and wage level situations will be reflected in these actual tax revenues. Another conceptual difference is that the tax wedge includes cash benefits (considered as a negative tax) while they are not considered by the ITR on labour.

Some of the observed differences between the macro and micro indicators can probably be explained by the fact that employees at the lower end of the pay scale are generally subject to relatively lower taxation or even no taxation at all. Such employees with a relatively low tax burden apparently have substantial weight in the calculation of the implicit tax rate on labour. Another explanation for the lower level of the Implicit tax rate on labour with respect to the micro indicator is the fact that the former takes account of non-standard tax reliefs (*e.g.* medical expenses) which are not considered by the latter.

It should be also noted that if imputed social contributions were included in the definition of taxes on labour (see paragraph 5), ITR on labour would be closer to the tax wedge in 9 countries out of 15 and in the EU-15 average. This is probably linked to the fact that omitting imputed contributions means omitting part of non-wage labour costs of some public institutions which do not make actual contributions. This could bias downwards the ITR on labour which is a macro indicator that should take account of all sectors of the economy. On the other hand the tax wedge is a micro indicator of a specific private sector, so it is not affected by imputed social contributions.

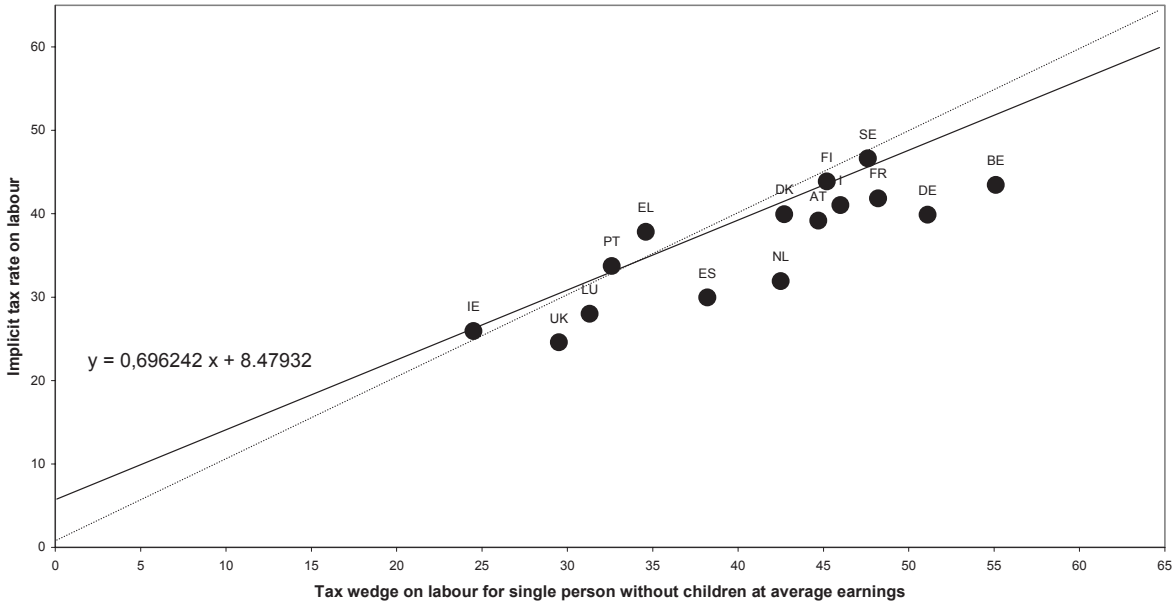
Graph 5 Pair-wise comparisons between macro and micro indicators
2002, in %



Source: Commission Services, using data from *Taxing Wages* (OECD 2004).

Graph 6 Relationship between macro and micro indicators

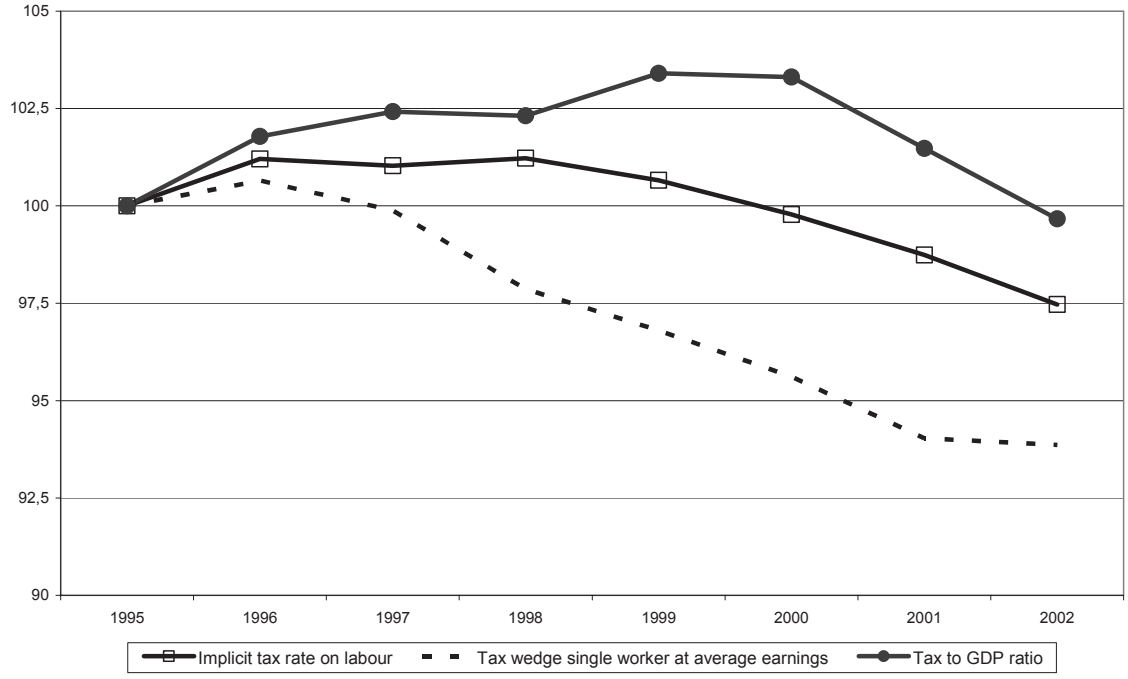
2002, in %



The following graph compares the time-trends between micro tax wedge indicators and two macro backward-looking tax ratios: the implicit tax rate on labour and the total tax-to-GDP ratio. The tax-to-GDP ratio is calculated by expressing all taxes and social contributions as a share of GDP. For each year GDP-weighted averages are computed. Indices representing the trend of each variable have been plotted in Graph 7 (with 1995=100). Over the period 1995-2002, the EU average tax burden on labour visibly starts to decline. This trend is evidenced by the development of both indicators. However, the reductions in the tax wedges for an average production worker are clearly more pronounced for most Member States, as the consequences of the recent tax reforms immediately show up in this indicator. The changes in the tax wedges appear to be particularly large in Ireland, Finland and Italy (see also 0). In year 2002 on the other hand, the ITR on labour decreased much more than the tax wedge, and this could be explained by two reasons. The first one is that the ITR usually follow with some delay the development of the tax wedge; this is due to the fact that ESA95 allows using a time-shifted cash system of booking tax receipts, which means that revenues in a certain year could be still affected by some tax provision of the previous year. The second reason is that the ITR does not disentangle the business cycle, so the development in 2002 of the two indicators could suggest that the reductions in the ITR for 2002 are more linked to the economic slowdown of years 2001-2002 than to tax provisions.

Graph 7 Time trend micro and macro indicators in the Union

1995-2002, weighted averages, index 1995=100



Source: Commission Services, using data from *Taxing Wages* (OECD 2004 and previous editions).

The 2002-2003 edition of *Taxing Wages* (2004) presents highest reductions in the tax wedge for a single worker at average earnings between 2001 and 2002 for Luxemburg (-2.6), Denmark and Sweden (-0.9).

Tax wedges for a single example worker at average earnings

1995-2002, in %

	1995	1996	1997	1998	1999	2000	2001	2002	Diff. 95-02	Diff. 98-02
BE	56,3	56,4	56,6	56,8	56,9	56,2	55,6	55,1	-1,2	-1,7
DK	45,2	44,8	45,1	43,7	44,5	44,4	43,6	42,7	-2,5	-1,0
DE	50,2	51,2	52,3	52,2	51,9	51,8	50,8	51,1	0,9	-1,1
EL	35,6	35,8	35,8	36,1	35,7	36,0	35,7	34,6	-1,0	-1,5
ES	38,5	38,8	39,0	39,0	37,5	37,6	37,9	38,2	-0,3	-0,8
FR	49,1	49,7	48,7	47,6	48,1	48,2	48,3	48,2	-0,9	0,6
IE	36,9	36,1	33,9	33,0	32,4	28,9	25,8	24,5	-12,4	-8,5
IT	50,3	50,8	51,5	47,5	47,2	46,7	46,1	46,0	-4,3	-1,5
LU	34,3	34,5	35,2	33,8	34,6	35,5	33,9	31,3	-3,0	-2,5
NL	44,8	43,8	43,6	43,5	44,3	45,1	42,3	42,5	-2,3	-1,0
AT	41,2	44,8	45,6	45,8	45,9	44,9	44,5	44,7	3,5	-1,1
PT	33,7	33,8	33,9	33,8	33,4	33,5	32,5	32,6	-1,1	-1,2
FI	51,2	49,4	48,9	48,8	47,4	47,3	45,9	45,2	-6,0	-3,6
SE	49,3	50,2	50,7	50,7	50,5	49,5	48,5	47,6	-1,7	-3,1
UK	33,4	32,6	32,0	32,0	30,8	30,1	29,5	29,5	-3,9	-2,5
EU-15	**46,1**	**46,4**	**46,1**	**45,1**	**44,6**	**44,1**	**43,4**	**43,3**	**-2,8**	**-1,8**

Source: Commission Services, using data from *Taxing Wages* (OECD 2004 and previous editions).

Trends in average tax ratios can conceal some important variation in patterns of change across Member States. Graph 8 at the end of this paragraph therefore shows comparisons of trends in the tax ratios for all Member States. Comparisons for the implicit tax rate on labour are not only given with respect to the tax wedge indicator for a single average production worker, but also with respect to tax wedge indicators for a two-earner married couple without children. It appears that the general increasing or decreasing trends in the macro and micro indicators follow each other rather closely in most Member States. However, notable differences in the trends are visible for Greece, Ireland, Portugal and the United Kingdom. In principle, these differences could be explained by the conceptual differences between the two indicators and/or by strong economic growth[12]. A decomposition of the change in the denominator of the implicit tax rate on labour actually suggests that the differences could perhaps partly be attributed to cyclical movements during the period 1995-2002. The figures in table 3 show that the average annual growth rate of the nominal compensation per employee during this period was clearly above the EU average in Greece, Ireland and Portugal. The figures furthermore show that the average annual growth rate of the personal income tax revenue per employee was clearly above the EU average in Greece, Portugal and the United Kingdom[13]. For reasons outlined above, the increases in the average growth rate of the compensation of employees (or the compensation of a group of employees) could have induced a swing in the implicit tax rate on labour in these Member States that, to some extent, has offset the effect of the recent tax policy measures (that are incorporated and more visible in the micro tax wedge indicators that are computed for specific wage levels and household types).

[12] Some notable differences are also visible for Italy. The 1997-98 tax reform in Italy eliminated employer's compulsory health care contributions, bringing the overall employer's social security contribution rate down substantially. At the same time, however, a new tax for employers, called 'IRAP', based on value added was introduced. For reasons of comparability, a part of the revenue of this new tax has in fact been allocated to labour income for the calculation of the implicit tax rate (and has also been included in the denominator of the implicit tax rate), while it is not actually levied on wages and salaries as such. It is not reflected in the micro tax wedge indicators.

[13] For the UK, the revenue effect of the targeted reductions in personal tax at the lower end seem at the aggregate level to have been offset by increases in personal income at the top of the income scale. Some noticeable differences between the two indicators are also visible for Spain in 2000 and 2001. This should be attributed to a substantial increase in wages and salaries subject to tax as a result of a strong job creation process observed in the Spanish economy in the last few years.

Table 2 **Growth rates of nominal compensation per employee, number of employees and personal income tax revenue per employee**

Average annual growth rates in %, total economy, 1995-2002

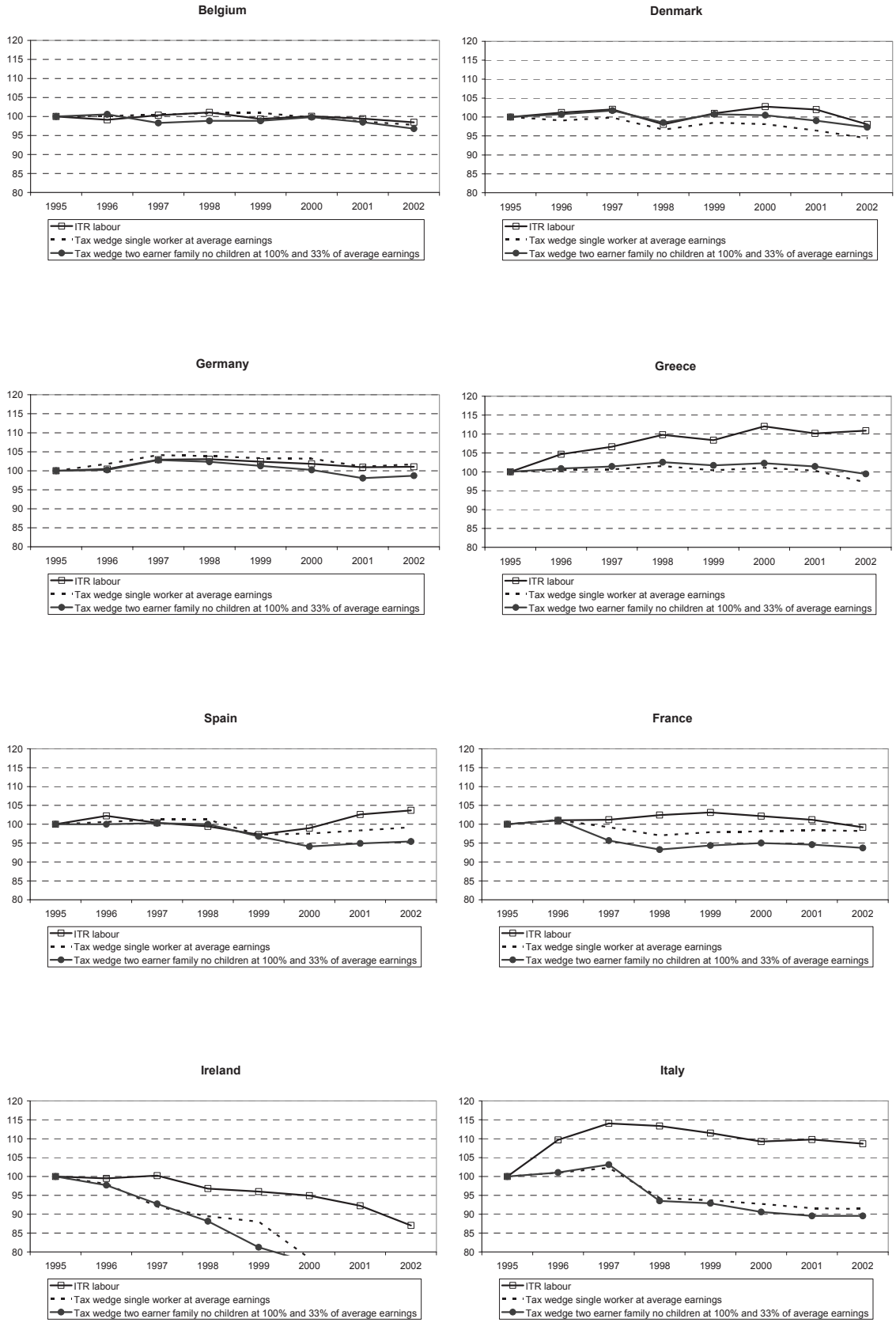
	Nominal compensation per employee	Number of employees	Personal income tax revenue per employee[1]
BE	2,7	1,4	2,2
DK	3,8	1,0	2,1
DE	1,4	0,4	1,1
EL	7,6	1,4	9,2
ES	3,4	3,2	2,5
FR	2,4	1,7	10,2
IE	5,8	5,2	3,0
IT	2,8	1,6	5,5
LU	3,0	2,1	1,0
NL	3,7	2,6	0,8
AT	1,9	0,9	1,8
PT	5,6	1,8	4,6
FI	3,0	2,3	4,0
SE	4,4	1,0	2,2
UK	4,5	1,5	8,5
EU-15	3,0	1,5	4,2

1 Only income tax that is raised on (employed) labour income, excluding Social contributions of any kind

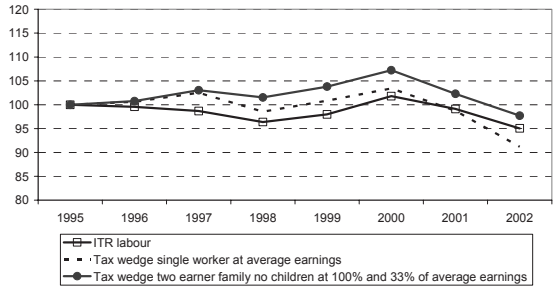
Source: Commission Services

Graph 8 Time trend micro and macro indicators in the EU-15 Member States

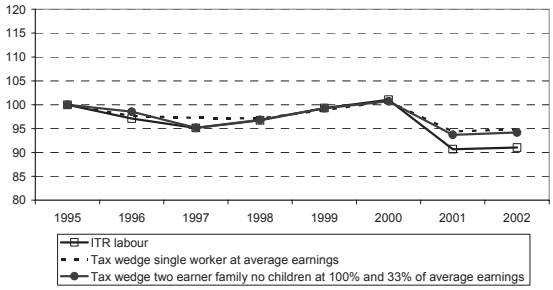
1995-2002, 1995 = 100



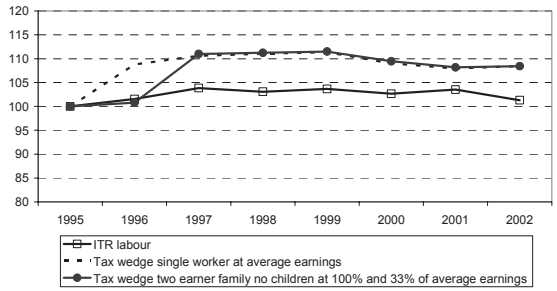
Luxembourg



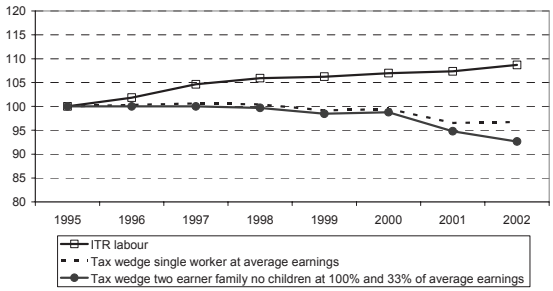
The Netherlands



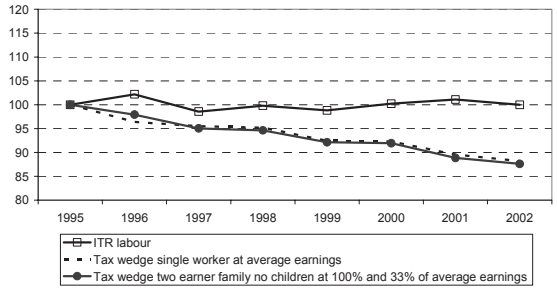
Austria



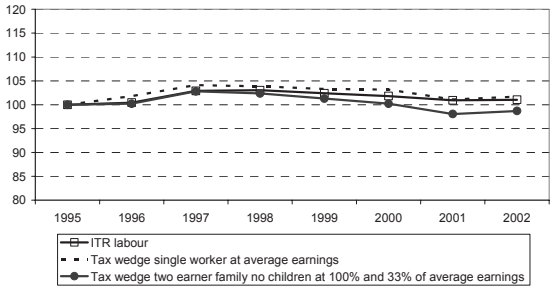
Portugal



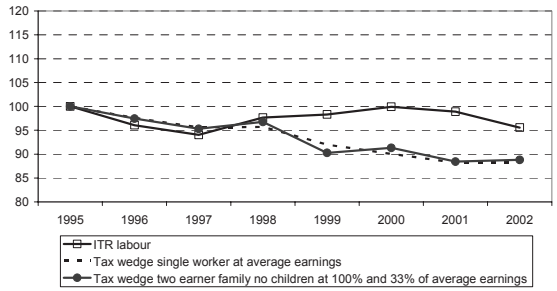
Finland



Sweden



United Kingdom



7. CONCLUSIONS

The conclusions from the examinations undertaken in the Commission Services report should be that:

- Observations at the micro-level for one particular wage level cannot simply be projected onto the implicit tax rate at macro-level, and conversely. This can be attributed the statistical and conceptual differences between the two types of indicators.

- Nevertheless, the correlation between the micro- and the macro indicators seems to be reasonably strong. Countries with a relatively high average tax wedge for production workers at average earnings should generally also have relatively high macro implicit tax rate of labour, and the other way around.

- With a few exceptions, both types of tax indicators also have comparable informative content as regards to general increasing- or decreasing trends in the average tax burden on labour, although there can sometimes be sizeable differences in the level of the changes.

- It should be kept in mind that the changes in the macroeconomic implicit tax rate may reflect structural changes in the entire economy, such as changes in the distribution of wage income. The implicit tax rate relates to actual tax revenue data and it could be, for example, that the revenue effect of targeted reductions in personal income tax, at say, the lower end of the income scale, has been offset by increases in wage income at the top of the wage scale.

Generally, this means that micro and macro indicators should be used in a complementary way and evidence from the implicit tax rate needs to be corroborated by other information and preferably also other tax indicators before policy conclusions can reasonably be drawn.

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[1] As modified – notably – by Regulation 2516/2000 of the European Parliament and Council of 7 November 2000. A consolidated version of the Council Regulation (EC) is available on-line on the Eur-Lex web-site on: http://europa.eu.int/eur-lex/en/consleg/main/1996/en1996/en1996R2223 index.html.

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