

PART V

Methodology and Limitations

Methodology

1. Introduction

The personal circumstances of taxpayers vary greatly. To identify representative taxpayers and to calculate the amount of their taxes, this Report uses a specific methodology. The focus is on employees. It is assumed that their annual income from employment is equal to a given fraction of the average gross wage earnings of adult, full-time production workers in the manufacturing sector of each OECD economy. Additional assumptions are made regarding other relevant personal circumstances of these wage earners to enable their tax/benefit position to be determined. Table V.1 sets out the terminology used in this Report.

Starting with the 1997 edition, the number of family-types covered has been increased from two to eight in order to enhance the descriptive and analytical value of the Report. Taxes paid and cash transfers received by employees are presented for one-earner and two-earner families at various fractions of average gross wage earnings. The number of taxpayers with the defined characteristics and the wage level of average production workers differ significantly between OECD economies. The final two columns of Table V.2 provide a rough indication of the number of wage and salary earners, including white-collar workers, found in the manufacturing sector.

The guidelines described in this part of the Report have been used by all OECD countries to calculate the figures shown in Parts I, II and IV. Where a country had to depart from the guidelines, this is noted in the text and/or in the country chapters contained in Part IV of the Report.

2. Calculation of gross wage earnings

This section sets out the standard definition of “production workers” for which the average earnings figure is then determined. Table V.2 indicates how countries have implemented the standard definition. Levels of gross wage earnings in 2003 have been established using statistical data. Further information on the calculation of the earnings figure is provided in the country chapters in Part IV, and in Annex B. Earnings levels for the edition year 2004 had to be estimated, as relevant statistical data are not yet available. The estimation procedures followed are explained in Section 3 below.

Sector covered

The relevant sector is manufacturing as defined in Division D of the *International Standard Industrial Classification of All Economic Activities* (ISIC Revision 3, United Nations, New York 1990). Column 1 of Table V.2 shows that a few countries include firms in the mining sector. These differences do not significantly affect the comparability of the data since in most of these countries the mining sector is either very small or has wage levels more or less similar to those in the manufacturing sector.

Table V.1. **Terminology**

General terms	
Average production worker (APW)	An adult full-time production worker in the manufacturing sector whose wage earnings are equal to the average wage earnings of such workers.
Single persons	Unmarried men and women.
Couple with two children	Husband and wife with two dependent children between but not including five and twelve years of age.
Labour costs	Gross wage earnings plus employers' social security contributions and payroll taxes.
Net take-home pay	Gross wage earnings less personal income tax and employee social security contributions, plus cash transfers received from general government.
Personal average tax rate	Personal income tax plus employee social security contributions expressed as a percentage of gross wage earnings.
Tax burden	see Personal average tax rate.
Tax wedge	Sum of personal income tax and employee plus employer social security contributions together with any payroll tax, expressed as a percentage of labour costs.
Elasticity of income after tax	Shows percentage change in after-tax income following a 1 per cent change of income before tax (defined more precisely as one minus a marginal tax rate divided by one minus a corresponding average tax rate).
Terms used under the income tax	
Tax reliefs	A generic term to cover all the means of giving favourable income tax treatment to employees, married couples and parents.
Tax allowances	Amounts deducted from gross earnings to arrive at taxable income.
Tax credits	Amounts which a taxpayer may subtract from his tax liability. They are described as wastable if they cannot exceed tax liability and non-wastable if they can exceed tax liability (sometimes the terms "refundable" and "non-refundable" are used).
Standard tax reliefs	Reliefs unrelated to the actual expenses incurred by taxpayers and automatically available to all taxpayers who satisfy the eligibility rules specified in the legislation are counted as standard reliefs, including also deductions for compulsory social security contributions.
Basic relief	Any standard tax relief which is available irrespective of marital or family status
Marriage allowance	Additional tax relief given to married couples. (In some countries, this is not distinguished from the basic relief which may be doubled on marriage.)
Non-standard tax reliefs	Reliefs wholly determined by reference to actual expenses incurred
Average rate of income tax	Amount of income tax payable after accounting for any reliefs calculated on the basis of the tax provisions covered in this Report, divided by gross wage earnings.
Schedule rate	The rate which appears in the schedule of the income tax and in the schedule of social security contributions.
Terms used under cash transfers	
Cash transfers	Cash payments made by general government (agencies) paid to families usually in respect of dependent children.

Geographical coverage

The data relate to average earnings in the manufacturing sector for the country as a whole.

Type of worker

The type of worker referred to is an adult worker directly engaged in a production activity. This definition includes manual workers and minor shop-floor supervisory workers. White-collar workers are excluded, except in New Zealand – where the inclusion of this group of workers probably increases the earnings level by between 5 per cent to 10 per cent – and in Australia and the Netherlands.

Table V.2. Identification of an average production worker and number of employees in the manufacturing sector, 2003

Identification of an Average Production Worker					Wage- and salary-earners in manufacturing (including white-collar workers) 2003	
Sector		Geographical coverage	Type of work	Sex	Thousands	Percentage of all employees
Australia	Manufacturing	Whole country	All workers	Male and female	1 070	11
Austria	Manufacturing	Whole country	Production workers	Male and female	697 ³	21
Belgium	Manufacturing	Whole country	Production workers	Male and female	637 ³	18
Canada	Manufacturing	Whole country	Production workers	Male and female	2 190 ⁴	17
Czech Republic	ISIC C to K ⁷	Whole country	Production workers	Male and female	1 209	32
Denmark	Manufacturing (Members of employers federation)	Whole country	Production workers	Male and female	422	17
Finland	Manufacturing including mining	Whole country	Production workers ¹	Male and female	418	20
France	Manufacturing including mining	Whole country	Production workers	Male and female	3 756 ³	17
Germany	Manufacturing	Whole country	Production workers	Male and female	8 157 ⁶	26
Greece	Manufacturing (Above 10 employees)	Whole country	Production workers	Male and female	397 ³	17
Hungary	Manufacturing (Above 5 employees)	Whole country	Production workers	Male and female	707 ³	26
Iceland	Manufacturing (Members of employers federation)	Whole country	Production workers	Male and female	20 ³	15
Ireland	Manufacturing	Whole country	Production workers ¹	Male and female	260	18
Italy	Manufacturing (Above 500 employees)	Whole country	Production workers ²	Male and female	4 078	26
Japan	Manufacturing (Above 10 employees)	Whole country	Production workers	Male and female	11 850 ⁴	22
Korea	Manufacturing (Above 5 employees)	Whole country	Production workers	Male and female	3 553	25
Luxembourg	Manufacturing	Whole country	Production workers	Male and female	34 ³	13
Mexico	Manufacturing	Whole country	Production workers	Male and female	5 194	21
Netherlands	Manufacturing	Whole country	All workers	Male and female	1 041 ³	15
New Zealand	Manufacturing	Whole country	All workers	Male and female	284 ⁴	14
Norway	Manufacturing (Members of employers federation)	Whole country	Production workers	Male and female	296 ³	13
Poland	Manufacturing	Whole country	Production workers	Male and female	2 635 ³	26
Portugal	Manufacturing	Excludes the Azores and Madeira	Production workers	Male and female	873	24
Slovak Republic	Manufacturing	Whole country	Production workers	Male and female	923 ⁴	44
Spain	Manufacturing	Whole country	Production workers	Male and female	2 312 ⁵	21
Sweden	Manufacturing	Whole country	Production workers	Male and female	709 ³	18
Switzerland	Manufacturing	Whole country	Production workers	Male and female	1 032 ⁵	26
Turkey	Manufacturing (Above 10 employees)	Whole country	Production workers ¹	Male and female	2 954 ⁴	30
United Kingdom	Manufacturing	Excludes Northern Ireland	Production workers	Male and female	4 300 ³	16
United States	Manufacturing	Whole country	Production workers	Male and female	17 695 ⁴	16

1. The data are not limited to adult full-time workers since part-time production workers and youths are also included.
2. As from 1990 on, data on wages have been revised to include only production workers (excluding employees).
3. Year 2002.
4. Year 2001.
5. Year 2000.
6. Year 1998.
7. For explanation and further details see the Special Feature.

Source: National sources and OECD, *Main Economic Indicators*.

Sex

The earnings data refer to the average earnings of all production workers, both male and female.

Full-time worker

The worker is assumed to be fully employed during the year, although Finland, Ireland and Turkey are unable to separate and exclude part-time workers.

Sickness and unemployment

The worker is assumed not to be sick or unemployed during the year.

Determination of earnings

The ways in which earnings data are built up in each country are set out in Table V.3. In most of the OECD countries where sickness payments are made by the employer, either on behalf of the government or on behalf of private sickness schemes, these amounts are included in the wage calculations. It is unlikely that these differences have a marked impact on the results since employers usually make these payments during a short period and the amounts usually correspond very closely to normal hourly wages.

Average amounts of overtime and regular cash supplements (*e.g.* Christmas bonuses, thirteenth month) paid to workers with characteristics similar to those defined above are included in the earnings calculation, as are vacation payments typically paid to production workers. Profit-sharing schemes which take the form of dividend distributions are excluded from the calculations.

Calculation method used

Table V.3 notes the calculation method used in each country and more details are provided in Part IV. It was suggested that countries calculate annual earnings by referring to the average of hourly earnings in the manufacturing sector in each quarter or month, weighted by the hours worked during each period, and multiplied by the average number of hours worked during the year, assuming that the worker is neither unemployed nor sick and including periods of paid vacation. A similar procedure was recommended to calculate overtime earnings. However, most countries cannot follow this procedure because of the ways in which the earnings samples are constructed. In practice, the differences in calculation methods do not influence the results unduly. The sources of the earnings data are provided in Annex B.

The treatment of fringe benefits

Fringe benefits – which include, for example, provision of food, housing or clothing by the employer either free of charge or at below market-price – are, where possible, excluded from the calculation of average earnings. This decision was taken because these types of benefits would be difficult to evaluate in a consistent way (they may be valued at the actual cost to the employer, their taxable value to the employee or their fair market value) and in most countries are of slight importance for production workers at the average wage level. Generally, such benefits rarely account for more than 1 per cent of gross wage earnings.

However, in the case of employers' contributions to private pension, family allowance or health and life insurance schemes, the amounts involved can be significant. In the

Table V.3. Method used to calculate average earnings

	Items included and excluded from the earnings base						Basic method of calculation used	Income tax year ends	Period to which the earnings calculation refers
	Unemployment	Sickness ¹	Vacations	Overtime	Recurring cash payments	Fringe benefits			
Australia	Exc	Inc	Inc	Inc	Inc	Exc	Average weekly earnings × 52	30th June	Tax year
Austria	Exc	Exc	Inc	Inc	Inc	Taxable value inc	Average annual earnings	31st December	Calendar year
Belgium	Exc	Exc	Inc	Inc	Inc	Taxable value inc	Daily average × days worked	31st December	Calendar year
Canada	Exc	Exc	Inc	Inc	Inc	Exc	Average weekly hours × average hourly earnings × 52	31st December	Calendar year
Czech Republic	Exc	Exc	Inc	Inc	Inc	Inc	Average monthly earnings × 12	31st December	Calendar year
Denmark	Exc	Exc	Inc	Exc	Inc	Exc	Hourly earnings × hours worked	31st December	Calendar year
Finland	Exc	Exc	Inc	Inc	Inc	Exc	Hourly wages × usual working time + vacation payments + periodic bonuses	31st December	Calendar year
France	Exc	Exc	Inc	Inc	Inc	Exc	Annual earnings	31st December	Calendar year
Germany	Exc	Exc	Inc	Inc	Inc	Exc	Hourly earnings × hours worked	31st December	Calendar year
Greece	Exc	Exc	Inc	Inc	Inc ²	Inc	Hourly earnings × hours worked	31st December	Calendar year
Hungary	Exc	Exc	Inc	Inc	Inc	Exc	Average monthly earnings × 12	31st December	Calendar year
Iceland	Exc	Exc	Inc	Inc	Inc	Exc	Hourly earnings × hours worked × 12	31st December	Calendar year
Ireland	Exc	Exc	Inc	Inc	Inc	Exc	Hourly earnings × hours worked × 52	5th April	Tax year
Italy	Exc	Inc	Inc	Inc	Inc	Exc	Average monthly earnings × 12	31st December	Calendar year
Japan	Exc	Exc	Inc	Inc	Inc	Exc	Monthly earnings in June × 12	31st December	Calendar year
Korea	Exc	Exc	Inc	Inc	Inc	Exc	Average monthly earnings × 12	31st December	Calendar year
Luxembourg	Exc	Exc	Inc	Inc	Inc	Exc	Hourly earnings × hours worked	31st December	Calendar year
Mexico	Exc	Exc	Inc	Inc	Inc	Exc	Average monthly earnings × 12.5	31st December	Calendar year
Netherlands	Exc	Exc	Inc	Exc	Inc	Exc	90per cent of annual gross earnings	31st December	Calendar year
New Zealand	Exc	Exc	Inc	Inc	Inc	Exc	Average weekly earnings in each quarter × 13	31st March	Tax year
Norway	Exc	Exc	Exc	Inc	Inc	Exc	Annual wages + estimated overtime	31st December	Calendar year
Poland	Exc	Exc	Inc	Inc	Inc	Exc	Average monthly earnings × 12	31st December	Calendar year
Portugal	Exc	Exc	Inc	Inc	Inc	Taxable value inc	Weighted monthly average × 12	31st December	Calendar year
Slovak Republic	Exc	Exc	Inc	Inc	Inc	Inc	Average monthly earnings × 12	31st December	Calendar year
Spain	Exc	Exc	Inc	Inc	Inc	Exc	Weighted monthly average × 12	31st December	Calendar year
Sweden	Exc	Exc	Inc	Inc	Inc	Actual value inc	Average hourly earnings in September × hours worked	31st December	Calendar year
Switzerland	Exc	Exc	Inc	Inc	Inc	Exc	Monthly earnings × 12	31st December	Calendar year
Turkey	Exc	Exc	Inc	Inc	Inc	Actual value inc	Average annual earnings	31st December	Calendar year
United Kingdom	Exc	Exc	Inc	Inc	Inc	Exc	Average weekly earnings at beginning and end of fiscal year × 52	5th April	Tax year
United States	Exc	Exc	Inc	Inc	Inc ²	Exc	Weekly average hourly earnings × 52 + average overtime hours × 50	31st December	Calendar year

Exc = Excluded.

Inc = Included.

1. Usually includes compensation paid by employer whether paid on behalf of the government or as part of a private sickness scheme.
2. In the United States, end of the year bonuses and profit sharing bonuses are excluded. In Greece, Christmas and Easter bonuses are excluded.

United States, for example, these contributions would typically account for more than 5 per cent of the earnings of production workers. While these contributions are excluded from the earnings base (and therefore do not affect the tax calculation), in a number of cases country chapters provide an indication of the schemes which may be relevant for an average production worker. These schemes are excluded from the present Report, because if they act as substitutes for compulsory state social security schemes their inclusion would require employers' contributions to these schemes to be also taken into account for reasons of consistency. Furthermore, the tax treatment of both contributions and benefits paid out would have to be included, which is beyond the scope of this Report.

3. Estimating gross wage earnings in 2004

Statistical data on average gross wage earnings in 2004 are not presently available. Still, it is felt that including estimates of the tax/benefit position of employees in the edition year increases the relevance of the Report for policy-making. Therefore, starting with the 1999 edition, the Report presents preliminary data for the current edition year. Estimates of gross wage earnings of average production workers in 2004 were derived by the Secretariat on the basis of a uniform approach: all year 2003 earnings levels are multiplied by the country-specific annual percentage change of wages reported in the most recently published edition of the *OECD Economic Outlook*.¹ This transparent procedure is intended to avoid any bias in the results. Only in the cases of the Slovak Republic and Turkey are national estimates used as the necessary inputs for Secretariat estimates do not sufficiently reflect wage changes in the manufacturing sector.

There are gaps between wage levels reported in this publication and those contained in the OECD Analytical Data Base (ADB) corresponding to what is shown in the *Economic Outlook*. Presumably, a gap of up to 15-25 per cent might satisfactorily be explained by different definitions used. Data in the ADB include: 1) all employees in the business sector; 2) wages in cash and in kind; 3) fringe benefits and profit sharing schemes; and 4) allowances to cover certain costs, notably to commute to work. In contrast, this Report includes: 1) only employees in the manufacturing sector; 2) cash wages; 3) generally, no fringe benefits and no profit sharing schemes; and 4) generally, no allowances to cover costs. In addition, for a number of countries the methodology for determining the average wage level is different. For year 2001, the gap between average wage levels reported in *Taxing Wages* and in the Analytical Data Base, respectively, exceeded 25 per cent in the case of six countries: Germany, Hungary, Mexico, New Zealand, Portugal, and Turkey.

For the current exercise the most relevant comparison is not between levels of average earnings but between the annual change of wage levels reported in both statistics. A comparison of the wage rises between 2000 and 2001 using data from both sources shows that growth rates differed by more than 2.5 percentage points only in the case of six countries: the Czech Republic, Mexico, Norway, Turkey, the United Kingdom and the United States. It may therefore be concluded that the procedure for estimating wage levels for the year of publication of this Report results in an acceptable approximation of actual wage increases and does not significantly distort the results. In this connection, it is important to realise that – given the rate structure of the personal income tax (brackets taxed at flat rates) and social security contributions (flat rates, with caps that generally only apply to wage levels higher than 167 per cent of average wages) – the impact of a difference of a few percentage points between estimates of wage increases based on sample data and found in the Analytical Data Base, respectively, on measured marginal

and average tax rates will generally be negligible, except in the case of marginal rates where the employee's taxable wage is close to the upper limit of an income tax bracket.

About one-half of the OECD countries have opted to provide national estimates of the level of gross wage earnings of average production workers in 2004. These estimates were not used as they may not be consistent, but they are included in Table V.4 to allow a comparison to be made of estimates by applying the Secretariat formula and those from national sources. In all cases, Secretariat estimates of wage levels in 2004 and wage levels provided by national respondents are (fairly) close.

Table V.4. Estimated gross wage earnings, 2003-2004 (in national currencies)

	APW 2003	APW 2004 (Secret. estim.)	APW 2004 (country estim.)	EO76 forecasted rates for 2004 ¹
Australia	51 190	53 222	53 268	4.0
Austria	24 438	24 946		2.1
Belgium	31 385	32 281		2.9
Canada	39 888	40 912	41 084	2.6
Czech Republic	195 219	213 573	205 969	9.4
Denmark	316 205	327 192		3.5
Finland	28 551	29 449		3.1
France	22 475	23 087		2.7
Germany	33 757	34 088		1.0
Greece	11 805	12 525		6.1
Hungary	1 153 440	1 260 948		9.3
Iceland	2 720 233	2 859 073	2 863 045	5.1
Ireland	25 951	27 291		5.2
Italy	22 120	22 683		2.5
Japan	4 217 856	4 205 596		-0.3
Korea	24 887 904	25 534 233	25 505 724	2.6
Luxembourg	31 763	32 586		2.6
Mexico	63 475	66 432	65 379	4.7
Netherlands	31 895	32 457	32 616	1.8
New Zealand	40 467	41 778	41 452	3.2
Norway	305 653	317 101		3.7
Poland	25 868	26 584		2.8
Portugal	8 671	8 905		2.7
Slovak Republic	150 000	180 000	180 000	n.a.
Spain	17 149	17 913		4.5
Sweden	244 454	251 282		2.8
Switzerland	63 720	64 419	64 185	1.1
Turkey	12 635 661 981	13 670 289 738	13 670 289 738	n.a.
United Kingdom	19 960	21 079	20 560	5.6
United States	33 553	34 934		4.1

1. Increase of compensation per employee in the business sector (EO76 Annex Table 11).

4. Coverage of taxes and benefits

The Report is concerned with personal income tax and employee and employer social security contributions payable on wage earnings. In addition, payroll taxes (see Section 9 below) and in one case church tax (see Section 10 below) are included in the calculation of the total wedge between labour costs to the employer and the corresponding net take-home pay of the employee.

The calculation of the after-tax income includes family benefits paid by general government as cash transfers (see Section 11 below). Income tax due on capital income and non-wage labour income, several direct taxes (net wealth tax, corporate income tax) and all indirect taxes are not considered in this Report. However, all central, state and local government income taxes are included in the data.²

In exceptional cases, the coverage of taxes and benefits in the Report may change, basically for one of two reasons. One reason is a change in the rules determining which government programmes should be taken into account. Such a change must explicitly have been agreed by the Working Party on Tax Policy Analysis and Tax Statistics. The other reason for a change in the taxes and benefits covered is that, upon reconsideration, national correspondents and/or the Working Party may conclude that in the case of a particular country – applying the existing rules – certain taxes or benefits, which previously had been excluded, should be included (or *vice versa*).

In recent years, a number of OECD countries have introduced tax concessions for low-wage workers. Typically, such concessions increase net take-home pay (e.g. the Earned Income Tax Credit in the United States) and/or reduce gross labour costs. For example, employers of low-wage workers may be entitled to a credit against wage tax/social security contributions otherwise due. Such credits for employers exist for example in Belgium, France and the Netherlands. Starting with the 1998 edition, tax concessions for low-wage employees – whether they are aimed at employers or their employees – are mostly included in the description of national tax/benefit systems and – where appropriate – in the relevant tax equations.

In this study, compulsory social security contributions paid to general government are treated as tax revenues. Being compulsory payments to general government they clearly resemble taxes. They may, however, differ from taxes in that the receipt of social security benefits depends, in most countries, upon appropriate contributions having been made, although the size of the benefits is not necessarily related to the amount of the contributions. Countries finance their compulsory public social security programmes to a varying degree from general tax and non-tax revenue and earmarked contributions, respectively. Better comparability between countries is obtained by treating social security contributions as taxes, but they are listed under a separate heading so that their amounts can be identified in any analysis.

5. Taxpayer characteristics

Further assumptions are required to calculate the tax/benefit position of employees. The present Report identifies eight types of taxpayers, as set out in Table V.5:

- a single individual with no children earning 67 (two-thirds), 100 and 167 (five-thirds) per cent of APW earnings, respectively;
- a lone parent with two children earning 67 (two-thirds) per cent of APW earnings;
- a married couple with two children and a single earner at the APW level; and
- three cases of two-earner married couples, with earnings split between the two partners at 100-33 (one-third) per cent of APW earnings, both with and without children, and finally a couple with children with the earnings split 100-67 (two-thirds) per cent of APW earnings.

Table V.5. **Characteristics of taxpayers**

Marital status	Children	Principal earner	Secondary earner
Single individual	No children	67% APW	
Single individual	No children	100% APW	
Single individual	No children	167% APW	
Single individual	2 children	67% APW	
Married couple	2 children	100% APW	
Married couple	2 children	100% APW	33% APW
Married couple	2 children	100% APW	67% APW
Married couple	No children	100% APW	33% APW

In cases of families with children, the children are assumed to be aged between but not including five and twelve.

The family is assumed to have no income source other than employment and cash benefits.

6. Calculation of personal income taxes

The method by which income tax payments are calculated can be gauged from the country tables in Part IV. First, the tax allowances applicable to a taxpayer with the characteristics and income level related to gross annual wage earnings of an average production worker are determined. Next, the schedule of tax rates is applied and the resulting tax liability is reduced by any relevant tax credits. An important issue that arises in the calculation of personal income tax due involves determining which tax reliefs should be taken into account. Two broad categories of reliefs may be distinguished:

- *Standard tax reliefs*: Reliefs which are unrelated to actual expenditures incurred by the taxpayer and are automatically available to all taxpayers who satisfy the eligibility rules specified in the legislation. Standard tax reliefs are usually fixed amounts or fixed percentages of income and are typically the most important set of reliefs in the determination of the income tax paid by workers. Standard reliefs are taken into account in calculating the initial tax position of employees and include:
 - ❖ the *basic relief* which is fixed and is available to all taxpayers or all wage earners, irrespective of their marital or family status;
 - ❖ the *standard relief* which is available to taxpayers depending on their *marital status*;
 - ❖ the *standard child relief* granted to a family with two children between but not including the ages of five and twelve;
 - ❖ the *standard relief* in respect of *work expenses*, which is usually a fixed amount or fixed percentage of (gross) wage earnings; and
 - ❖ tax reliefs allowed for *social security contributions* and other (sub-central government) *income taxes* are also considered as standard reliefs since they apply to all wage earners and relate to compulsory payments to general government.³
- *Non-standard tax reliefs*: These are reliefs which are wholly determined by reference to actual expenses incurred. They are neither fixed amounts nor fixed percentages of income. Examples of non-standard tax reliefs include reliefs for interest on qualifying loans (*e.g.* for the purchase of a house), private insurance premiums, contributions to private pension schemes, and charitable donations.

Standard reliefs are separately identified and their impact on average tax rates is calculated in the country tables. A brief description of the main non-standard reliefs is provided in most country chapters. A comparison of the effect of these reliefs claimed by an average production worker on effective income tax rates is provided in Table V.6.

There are several steps required in calculating the value of non-standard reliefs. First, the reliefs which could be claimed by a taxpayer with the family-type characteristics and income level of an APW, or for a wider group of taxpayers which would include the APW are identified. It follows that allowances that are not consistent with the assumption of an average production worker (*e.g.* allowances for the self-employed) are not taken into account. Then, for each identified relief measure, the average expense-related relief is determined, taking into account also those who do not have that specific income component (and the related tax relief) to give an average value of that relief for all APW-type taxpayers (in the wider group.) The impact of these different reliefs on the average rate of income tax is then calculated. Consider as an example the case where it is determined that 20 per cent of all taxpayers in the income class that includes the APW owns their own house and on average deduct 10 000 currency units in mortgage interest. In this case, taxpayers in the income class that includes the APW would be assumed on average to deduct 2 000 units in mortgage interest (because one in five actually deducts 10 000 units.) At a typical marginal tax rate of 30 per cent, the resulting tax relief is 600 units, and the average tax rate of the APW would be re-calculated accordingly.

Non-standard reliefs which are not related to specific sources of income are wholly offset against the tax liability. In contrast, for reliefs which are related to specific sources of income (*e.g.* mortgage interest reliefs which in some countries must be offset against imputed rent from home ownership), only the excess over the associated income is taken into account in the calculations shown in Table V.6.

7. State and local income taxes

Personal income taxes levied by sub-central levels of government – state, provincial, cantonal or local – are included in the scope of this study. State income taxes exist in Canada, Switzerland and the United States. In 1997, Spain introduced an income tax for the Autonomous Regions. Local income taxes are imposed in Belgium, Denmark, Finland, Japan, Korea, Norway, Sweden, Switzerland and the United States. In Belgium, Canada (other than Quebec), Denmark, Korea, Norway and Spain they are calculated as a percentage of taxable income or of the tax paid to central government. In Finland, Japan, Sweden and Switzerland, local government provides different tax reliefs from central government. In the United States, the sub-central level of government operates a separate system of income taxation under which it has discretion over both the tax base and tax rates (see Table V.7). Except for Canada, Japan, Switzerland and the United States, the rate schedule of these sub-central taxes consists of a single rate.

When tax rates and/or the tax base of sub-central government income taxes vary within a country, it is sometimes assumed that the average production worker lives in a typical manufacturing area. The income taxes (and benefits) applicable in this area are presented. This is the procedure followed in Canada, Switzerland and the United States where the tax base and tax rates vary very widely throughout the country. Denmark, Finland and Sweden have preferred to select the average rate of sub-central government income taxes for the country as a whole. No problem arises in Norway where the local rate

Table V.6. Main non-standard income tax reliefs received by an APW

	Average amount of each relief typically received by APW (national currency) ¹		Rate of income tax paid by an Average Production Worker				Calculations refer to following taxpayers ²
	Single persons	Couples	Before taking into account these reliefs		After taking into account these reliefs		
			Single persons	Couples	Single persons	Couples	
AUSTRALIA (1999-2000)			22.7	21.5	21.5	21.6	All non-business income earners around APW's income level
Work related expenses (TA)	1 271	1 075					
Other deductions (TA)	206	277					
AUSTRIA (1994)		1 400	7.5	1.9	5.9	0.3	Average of all employees
BELGIUM (2000)		8 943	27.9	17.1	17.1	16.3	All workers
CANADA (2000)	2 174	1 898	19.5	9.1	17.5	6.9	APW type taxpayers
Registered pension plan (TA)							
Registered retirement savings plan (TA)							
Union and professional dues (TA)							
Charitable donations (TC)							
Other (TA)							
DENMARK (2001)							All workers around the APW's income level
Contributions/premiums paid to private pension saving plans (TA)	17 000	20 800					
Interest payments (net of interest earned and imputed rent) (TA)	19 400	47 300					
Transportation cost (TA)	4 300	7 400					
Contributions to trade unions (TA)	3 500	6 400					
Other deductions	3 250	1 650					
FINLAND (1997)			28	28	26.4	25.6	APW type
Work related expenses (TA)	3 402	4 032					
Credit for interest expenses (TC)	646	1 611					
HUNGARY (2002)			17.1		13.5		All taxpayers around APW's income level
Family tax credit (TC)	27 431						
Heavily disabled persons (TC)	299						
Payments to insurance funds (TC)	1 471						
Supplementary membership dues in private pension fund (TC)	101						
Intellectual activities (TC)	235						
Amortizing credit related to housing purposes (TC)	3 460						
Tuition fees (TC)	680						
Payments to foundations (TC)	171						
Insurance contracts (TC)	3 664						
Investment tax credit (TC)	207						

Table V.6. **Main non-standard income tax reliefs received by an APW (cont.)**

	Average amount of each relief typically received by APW (national currency) ¹		Rate of income tax paid by an Average Production Worker				Calculations refer to following taxpayers ²
	Single persons	Couples	Before taking into account these reliefs		After taking into account these reliefs		
			Single persons	Couples	Single persons	Couples	
ICELAND (1994)			20.5	3.3	19.6	1.5	All wage earners around APW's income level
Interest paid on personal dwelling (TC)	11 250	22 000					
IRELAND (1999)			19.3	10.1	18.5	9.4	All income earners in the range of IR 15 000-17 500 of total income in manufacturing sector
Work-related expenses (TA)		80					
Medical insurance relief (TC)		17					
Interest paid in full (TC)		75					
ITALY (2001)			18.6	13.3	17.4	12.1	All income earners around APW's income level
Medical expenses (TC)		63.29					
Expenses for disabled persons (TC)		1.03					
Mortgage interest (TC)		43.49					
Payments to insurance funds (TC)		70.80					
Payments to foundations (TC)		1.38					
Expenses to attend school and university (TC)		8.41					
Funeral charges		4.14					
Other (TC)		0.31					
Compulsory contributions (TA)		309.41					
Contributions/premiums paid to private pension saving plans (TA)		7.97					
Charitable donations (TA)		1.23					
Medical and assistance expenses incurred by handicapped persons (TA)		4.53					
Periodical benefits allowed to the spouse fixed by judicial authority (TA)		10.63					
Other deductions (TA)		4.50					
LUXEMBOURG (2001)			10.8				All income earners
Work expenses (5%) (TA)	75 000	75 000					
Special allowances (3.5%) (TA)	45 000	70 000					
Exceptional expenses (1.1%) (TA)	27 000	80 000					
Interest on personal dwelling (TA)	45 000	180 000					

Table V.6. **Main non-standard income tax reliefs received by an APW (cont.)**

	Average amount of each relief typically received by APW (national currency) ¹		Rate of income tax paid by an Average Production Worker				Calculations refer to following taxpayers ²
	Single persons	Couples	Before taking into account these reliefs		After taking into account these reliefs		
			Single persons	Couples	Single persons	Couples	
NORWAY (2001)			29.5		26.2		All income earners around the APW's income level
Travel expenses related to work exceeding NOK 8 800 (TA)		3 800					
Labour union fees (TA)		600					
Premiums and contributions to occupational pension schemes in the private and public sector (TA)		2 400					
Premiums and contributions to individual pension agreement schemes (TA)		400					
Unlimited allowance for interest payments (TA)		31 100					
SPAIN (1995)			13.2	6.4	8.9	2.2	17 per cent of all taxpayers around the APW's income level
Mortgage interest (TA)		123 557					
15% house depreciation (TC)							
SWEDEN (2001)			33.5		31.2		All income earners around APW's income level
Travel expenses to work, exceeding SKR 7 000 (TA)		3 458					
Other work-related expenses (TA)		627					
Premiums to pension schemes (TA)		2 455					
Allowances for interest payments (TC)		11 528					
SWITZERLAND (1994)			10.2	5	9.1	4.3	All income earners around APW's income level
Work-related expenses (TA)		3 200					
UNITED KINGDOM (2002-03)			15.6	10.4	15.6	10.4	All wage earners around APW's income level
Work-related expenses (TA)	10	10					
UNITED STATES (2000)			18		n.a.	n.a.	All taxpayers around APW's wage level
Medical expenses (TA)		376					
Taxes paid (TA)		1 116					
Interest paid (TA)		1 972					
Contributions (TA)		596					

1. TA = Tax Allowance. TC = Tax Credit.

2. Relates to the non-standard tax reliefs typically claimed by taxpayers around the APW's income level. The value of each relief is calculated by dividing the total amount received by APW-type taxpayers by the total number of such taxpayers, including those who do not claim the relief. Calculated this way the amounts of all the separate reliefs are then added up to arrive at the total relief by the APW.

3. Within APW's income range can be taken to mean in most countries within +/-5 per cent of APW's income.

Table V.7. **State and local personal income taxes, 2003**

Tax base		Schedule rate variation within a country or region selected		Region or rate selected here
		Single rate schedule minimum and maximum rate within country	Progressive rate schedule as applied in region selected	
Belgium	Central income tax paid	Up to maximum of 8%		7%
Canada ¹ (excluding Quebec)	Central taxable income		See Part IV	Ontario (progressive rate schedule)
Denmark	Central taxable income	29.5% to 36.7%		Weighted average (33.3%)
Finland	Adjusted central taxable income ²	16.0% to 20.00%		Weighted average (18.13%)
Iceland	Central taxable income	Up to maximum of 13.03%		Weighted average (12.83%)
Italy	Central taxable income	0.9% to 1.9%		1.1% (rate applicable in Rome in the region of Lazio)
Japan	Adjusted central taxable income ²		Standard schedule applies throughout the country (5% to 15% + fixed amount)	Standard schedule
Korea	Central income tax paid	5.0% to 15.0%		10%
Norway	Central taxable income (minus one special deduction)	15.8% throughout the country		15.8%
Spain	Central taxable income		Standard schedule	Standard schedule
Sweden	Central taxable income	Max. 34.04% , min. 28.90%		31.51% (weighted average rate)
Switzerland	Adjusted central taxable income ²		0% to 28.86% (Zurich)	Zurich (progressive rate schedule)
United States	Adjusted central taxable income of separate tax bases		0% to 10%	Michigan and Detroit (flat rate 4.0% and 2.55% respectively)

1. Quebec operates a separate personal income tax system. Provincial tax is calculated as a percentage of taxable income.
2. Income subject to tax is usually the same as under the central government income tax, but tax reliefs are not the same.

does not vary. Japan has used the widely prevalent standard schedule and Belgium the widely prevalent rate of local income tax. Italy has now opted to calculate the local taxes based on the assumption that the average production worker lives in Rome which is situated in the region of Lazio. Table V.7 summarises the ways in which these taxes are calculated and the method used to determine the amount of state and local income taxes paid by an average production worker.

8. Social security contributions

Compulsory social security contributions paid by employees and employers to general government or to social security funds under the effective control of government are included in the coverage of this Report. In most countries, contributions are levied on gross earnings and earmarked to provide social security benefits. In Finland, France, the Netherlands and Norway, some contributions are levied as a function of taxable income (i.e. gross wage earnings after most/all tax reliefs).

Contributions to social security schemes outside the general government sector are not included in the calculations.

9. Payroll taxes

The tax base of payroll taxes is either a proportion of the payroll or a fixed amount per employee. In the OECD *Revenue Statistics* payroll taxes are reported under heading 3000.⁴ Fourteen OECD countries report revenue from payroll taxes: Australia, Austria, Canada, the Czech Republic, Denmark, France, Greece, Hungary, Ireland, Korea, Mexico, New Zealand, Poland and Sweden. In principle, payroll taxes are included in total tax wedges reported in this publication, given that they increase the gap between gross labour costs and net take-home pay in the same way as income tax and social security contributions do. The main difference with the latter is that in the case of payroll taxes a less direct link exists between payment of the tax and the constituent components of individual worker's labour compensation. Also, the tax base of payroll taxes may differ from the tax base of employer social security contributions. For example, certain fringe benefits may only be liable to payroll tax. Because this Report presents the standard case, the payroll tax base is – depending on the relevant legislation – gross wage (excluding fringe benefits and other items of compensation that vary per employee), gross wage plus employer social security contributions, or a fixed amount per employee.

Starting with the 1998 edition, Austria has included its payroll tax in the tax/benefit calculations. For a variety of reasons, several countries reporting payroll tax revenue in *Revenue Statistics* have not included these taxes in the calculations for the present Report.

In the case of the Czech Republic, Greece, Ireland and Poland revenues reported in *Revenue Statistics* are of no quantitative importance or are linked to taxes that are no longer imposed.

In Denmark, employers pay a fixed amount per employee. Tax revenues thus collected are fed into a fund. This fund provides subsidies to employers hiring medium and low-skilled trainees. This payroll tax is not included in the tax equations for Denmark.

Hungary does take into account the employer lump sum health insurance contribution. However, the communal tax on corporations is not included, since not all municipalities levy the tax.

Korea does not take into account the Business Office Tax that is imposed on employers with over 150 employees.

New Zealand has not included its payroll taxes in the tax calculations, mainly because its Fringe Benefit Tax is not a function of the employee's income and the authorities have inadequate information to allocate the tax to all employees, pro-rated by income. An added argument is that probably not all employees in the manufacturing sector receive taxable fringe benefits. It follows that the Fringe Benefit Tax is not a "standard" item; therefore, it should not be included in the tax/benefit calculations.

10. Church tax

Several OECD member countries impose a levy known as "church tax". With one exception, countries do not report revenues from the church tax in the OECD *Revenue Statistics*. Denmark does report revenues from its Church tax since the Danish State Church is classified as a part of general government. Denmark argues that this inclusion of the church in general government is appropriate because of the high degree of control that the government exercises over the church. Since the Working Party on Tax Policy Analysis and Tax Statistics has agreed that church taxes should be treated consistently in its two main statistical publications, only the Danish church tax is included in the calculations for *Taxing Wages*.

11. Family cash benefits from general government

Tax reliefs and family cash transfers universally paid in respect of dependent children between but not including five and twelve years of age who are attending school are included in the scope of the study. It follows that only children of age 6, 7, 8, 9, 10 and 11 are relevant in determining the tax relief for children and/or the amount of child benefit. If tax reliefs or cash transfers vary within this age range, the most generous provisions are taken. The case of twins is explicitly disregarded. Suppose the child benefit programme of a country is structured as follows:

Age group	Benefits per child
Children 6-8	100 units
Children 9-10	120 units
Children 11-14	150 units

The most favourable outcome arises in the case of 11-year old twins: 300 units. However, as the case of twins is excluded, the best outcome now becomes 270 units (one child 11 years old, one child 9 or 10 years old). This amount would be included in the country table. Often, the amount in benefits is raised once children become one year older. By assuming that children have been born on the first of January, the annual amount received in child benefits may be calculated from the benefit schedule that is in place at the start of the year. Revisions of these amounts during the year are taken into account.

Relevant cash payments include those made by central, state and local governments. For most of the families in this study, these constitute the only major cash transfer received from general government. In some cases, the cash benefits include amounts that are paid without consideration to the number of children.

12. Non-wastable tax credits

The 2001 edition of *Taxing Wages* introduced a minor change to include memorandum item reporting of non-wastable tax credits. Non-wastable tax credits are tax credits that can exceed tax liability, where the excess, if any, can be paid as a cash transfer to the taxpayer. In principle, these credits can be treated in different ways according to whether they are regarded as tax provisions or cash transfers or a combination of these. A Special Feature in the 2001 edition of *Revenue Statistics* discusses these alternative treatments and the conceptual and practical difficulties that arise in deciding which is the most appropriate approach for the purpose of reporting internationally comparable tax revenue figures.⁵ Based on this review and assessment, editions of the *Revenue Statistics* from 2002 continue to follow the Interpretative Guide which requires that only the tax expenditure component of non-wastable tax credits be taken into account when measuring tax revenues (see below). However, additional information is provided in *Revenue Statistics* on aggregate tax expenditure components and aggregate transfer components of non-wastable tax credits to show the effect of alternative treatments.⁶

Beginning with the 2001 edition, the treatment of non-wastable tax credits in *Taxing Wages* is also being modified to include memorandum item reporting of tax expenditure and cash transfer components. However, aside from the memorandum reporting, both the treatment of such credits and their impact on figures reported in *Taxing Wages* will remain unchanged. In particular, the taxpayer calculations in the country tables continue to apply the full amount of non-wastable tax credits against personal income tax. As noted above, the Interpretative Guide of the *Revenue Statistics* requires that:

- only the portion of a non-wastable tax credit that is claimed to reduce or eliminate a taxpayer's liability (the "tax expenditure" component)⁷ should be deducted in the reporting of tax revenues;
- the part of the tax credit that exceeds a taxpayer's tax liability and is paid to him (the "cash transfer" component) should be treated as an expenditure item and not deducted in the reporting of tax revenues.

Strict consistency with the Interpretative Guide to the *Revenue Statistics* would require that only the tax expenditure component derived in *Taxing Wages* be offset against derived income tax, with the excess (if any) treated as a cash transfer. However, this approach would diminish rather than strengthen the informational content of the derived results. In particular, limiting tax credit claims to tax expenditure amounts would yield a zero income tax liability and zero average income tax rate where cash refunds are provided. Where tax credits claims are not constrained in this way, negative income tax liabilities and negative average income tax rates would result where cash transfers are provided. Arguably, these negative amounts more clearly convey the taxpayer's position (which is improved relative to the no-tax situation). Also, not including the cash transfer portion of non-wastable tax credits in the Section (11) of the country tables focusing on "pure" cash transfers permits greater transparency of the latter amounts.

Thus, in order to improve the informational content of country tables as regards non-wastable tax credits, the memorandum item reporting at the bottom of the relevant country tables shows tax expenditure amounts on one line, with a second line showing cash transfer amounts. Where more than one non-wastable tax credit program applies, the figures show aggregate tax expenditure and aggregate cash transfer amounts (rather than separate amounts for each program). Total program costs in each of the household cases considered can be derived by adding the tax expenditure and cash transfer amounts.

Notes

1. Wage estimates reported in the *Economic Outlook* are consistent with information in the Analytical Data Base (ADB) of the Economics Department (ECO) of the OECD. These estimates are prepared by the ECO country desks. Data in the ADB/EO76 are consistent with the December 2004 issue (No. 76) of the *Economic Outlook*, at the moment this Report was drafted being the most recent issue.
2. Information on the fiscal powers of sub-central governments may be found in the publication *Taxing powers of state and local government*, OECD Tax Policy Studies No. 1 (Paris, 1999).
3. In this case, the amount of tax relief is related to actual social security contributions paid by the employee or withheld from his wage – thus in this respect this item deviates from the general definition of standard tax relief under which relief is unrelated to actual expenses incurred.
4. OECD, *Revenue Statistics 1965-2002*, p. 291.
5. OECD, *Revenue Statistics 1965-2000*, pp. 28-31.
6. OECD, *Revenue Statistics 1965-2002*, Table D, p. 23.
7. This characterisation must be viewed as informal, as the determination of tax expenditures requires the identification of a benchmark tax system for each country, or preferably, a common international benchmark. In practice it has not been possible to reach agreement on a common international benchmark for such purposes.

Limitations

1. General limitations

The simple approach of comparing the tax/benefit position of example families avoids many of the conceptual and definitional problems involved in more complex international comparisons of tax burdens and transfer programmes. However, a drawback of this methodology is that the earnings of an average production worker will usually occupy a different position in the overall income distribution in different economies, although the earnings relate to workers in similar jobs in various OECD member countries.

Because of the limitations on the taxes and benefits covered in the Report, the data cannot be taken as an indication of the overall impact of the government sector on the welfare of taxpayers and their families. Complete coverage would require studies of the impact of indirect taxes, the treatment of non-wage labour income and other income components under personal income taxes and the effect of other tax allowances and cash benefits. Complete coverage would also require that consideration be given to the effect on welfare of services provided by the state, either free or below cost, and the incidence of corporate and other direct taxes on earnings and prices. Such a broad coverage is not possible in an international comparison of all OECD countries. The differences between the results shown here and those of a full study of the overall impact on employees of government interventions in the economy would vary from one country to another. They would depend on the relative shares of different kinds of taxes in government revenues (see Annex A) and on the scope and nature of government social expenditures.

The Report shows only the formal incidence of taxes on employees and employers. The final, economic incidence of taxes may be quite different, because the tax burden may be shifted from employers onto employees and *vice versa* by market adjustments to gross wages.

The income left at the disposal of a taxpayer may represent different standards of living in various countries because the range of goods and services on which the income is spent and their relative prices differ as between countries. In those countries where the general government sector provides a wide range of goods and services (generous basic old age pension, free health services, public housing, university education, *et cetera*), the taxpayer may be left with less cash income but may enjoy the same living standards as a taxpayer receiving a higher cash income but living in a country where there are fewer publicly provided goods and services.

2. Some specific limitations on the income tax calculation

The exclusion of non-wage income and the limited number of tax reliefs covered imply that the average rates of income tax in the tables in this publication will not necessarily reflect the actual rates confronting taxpayers at these levels of earnings. Actual rates may be lower than the calculated rates because the latter do not take into account non-standard expense-related reliefs (see Table V.6). On the other hand, actual rates may be higher than calculated rates because the latter do not take into account tax on non-wage income received by employees.

The decision to exclude non-wage income (*e.g.* dividends, interest) was taken because the main focus of this study is on the tax treatment of wage income. For taxpayers at the income level of average production workers (APW), non-wage income is generally not significant. In Australia, Austria, Finland and Ireland, for example, non-wage income constitutes less than 0.5 per cent of the average production worker's total earnings. There are, however, some countries where APW-type taxpayers do typically have non-wage income. In the United States, for example, over 60 per cent of such taxpayers have non-wage income which accounts, on average, for about 5 per cent of their incomes.

The decision not to calculate separately average rates of income tax taking into account the effect of non-standard tax reliefs was taken because:

- in many cases, expense-related reliefs are substitutes for direct cash subsidies. To take into account these reliefs while ignoring any corresponding direct subsidies would distort comparisons of take-home pay plus cash transfers;
- the special tax treatment of certain expenses may be linked to special treatment of any income associated with these expenses (*e.g.* the tax treatment of social security contributions and pension income) which is beyond the scope of this study;
- a few countries were unable to estimate the value of these reliefs and even those countries which could do so could not limit their estimates to taxpayers with the characteristics assumed in Sections 2, 4 and 5 in the above part on methodology;
- in the majority of countries these reliefs do not significantly affect the income tax rates shown in this publication and in most cases only a minority of APW-type taxpayers receive a particular relief; and
- not all countries could calculate separately the reliefs available to different family-types. Where a split is provided between single individuals and families with children, there are large differences in the value of the reliefs typically received by these two categories of households.

Table V.6, which was introduced earlier, shows that for most of the countries which can provide information on these reliefs their inclusion would have significantly reduced the income tax rates, notably in Luxembourg and Spain.

When comparisons are made of income tax rates, some readers may prefer to use the sort of rates shown in columns five and six of Table V.6 for countries like Luxembourg and Spain where an APW would typically be able to claim large amounts of non-standard reliefs. Nevertheless, tax rates have been calculated for all countries using the standard methodology and these are the figures used in the main comparative tables and graphs.

3. Limitations to time-series comparisons

It should be noted that previous editions of this publication up to and including the 1995 edition covered just two family-types: single individuals without children and married one-earner couples with two children. The earnings were the same in both cases and equal to those of an average production worker. This limited coverage can explain why the tables in Part III report figures over the 1979-2004 period for these two family-types only.

There are also a number of limitations which apply to the interpretation of the results over time. Any dynamic analysis of the results has to take into account the following qualifications.

The earnings data do not necessarily relate to the same taxpayer throughout the period. The average earnings in manufacturing industry are calculated for each year. As such, the results do not refer to the changing earnings and tax position of particular individuals over time but rather to the position of workers earning a wage equal to average earnings in the manufacturing industry in each particular year. This, in turn, may mean that the earnings levels referred to may be at different points in the income distribution over the period covered and changes in tax rates may be influenced by these trends.

- For technical reasons, the procedures countries follow to determine the benchmark earnings level of the national average production worker may change over time. For example, as from the 1998 edition France establishes the APW wage level on the basis of improved statistical data; as a consequence, the Report registers for 1997 a one-off additional increase in the APW wage level of 5 to 7 per cent. In the same vein, Section 5.1 of the country chapter for the Netherlands sets out that its Central Bureau of Statistics does not report separate earnings data for manual workers. Starting with the 1999 edition, the Netherlands assumes that the wage for manual workers in industry is on average equal to 90 per cent of the wage for all industrial workers, including white collar workers and supervisors.
- In certain cases, the taxes covered in the Report for a given country may differ over the years. For example, starting with the 1998 edition, Korea has extended the coverage of its social security contributions. This extended coverage largely explains why the wedge between labour costs and net take-home pay of a single average production worker in the case of Korea doubles from 6.3 per cent (1996) to 12.4 per cent (1997).
- In three (Canada, Switzerland and the United States) of the twelve countries with state and/or local income taxes, the rates of tax applied to an APW refer to a typical manufacturing region (see Table V.7). Consequently, if movements in tax rates in this region are unrepresentative of changes in income taxes elsewhere in the country, they will provide a poor indication of how country-wide average rates of taxes are evolving.

Particular care is required in interpreting the results where many of the limitations set out above apply to one particular country since, while taken individually, each limitation may not significantly distort the results, cumulatively the impact may be important.

To conclude, the data are comparable for the specific situations referred to and the results show the proportion of gross wage earnings retained. This net cash income (including universal cash benefits) is the amount over which the household is able to exercise a free choice in the allocation of its expenditure.

4. Limitations to marginal rates

In the calculation of marginal tax wedges for the spouse, editions before the 1998 edition considered the situation where the spouse upon entering the labour market saw his or her income increase from zero to one currency unit of employment income. This case seems to be hardly representative and therefore less interesting, given that typically a spouse entering the workforce will experience a more significant (discrete) jump in earnings than of just one single currency unit.

Moreover, the former approach disregarded discrete jumps in social security contributions and wastable tax credits that occur in certain tax/benefit systems when the spouse's employment income increases from zero to one currency unit. Such payments/

transfers which are not proportional to income were not factored into spousal marginal tax rates in the (100-0) case, given that their inclusion would result in misleadingly large (positive/negative) tax wedge values (*e.g.* in excess of 1 000 per cent).

To avoid the necessity of “fudging” the approach in this way, it has been decided – starting with the 1998 edition – to reconstruct the calculation of the marginal tax wedge in the (100-0) case to reflect the situation where the spouse, upon entering the workforce, experiences an increase in labour income from zero monetary units to 33 per cent of the gross wage earnings of an average production worker.

Also, it is important to note that a number of OECD member countries means-test cash benefits and/or tax reliefs: the benefit of these measures is reduced as income increases. For employees the benefit reduction is equivalent to an additional tax, which raises their combined (explicit and implicit) marginal rate.

A Note on the Tax Equations

Each country chapter contains a section that describes the of equations in a standard format which show the calculations required to derive the amounts of income tax, social security contributions and cash transfers. These algorithms represent in algebraic form the legal provisions described in the chapter and are consistent with the figures shown in the country and comparative tables. This section describes the conventions used in the definition of the equations and how they could be used by those wishing to implement the equations for their own research.

The earlier sections of the country chapters describe how the tax and other systems work and present the values of the parameters of those systems such as the levels of allowances and credits, and the schedule of tax rates.

In the first part of the equations section is a table showing a brief description of each parameter (such as “Basic tax credit”), the name of the parameter as used in the algebraic equation (“Basic_cred”) and the actual value for the relevant year (such as “1098”). Where there is a table of values – for example a schedule of tax rates and the associated thresholds of taxable income – a name is given to the entire table (for example “tax_sch”). These variable names are those used in the equations.

After the table of parameters is the table of equations. The four columns contain information as follows:

- The first two columns give a description and a variable name for the result of the equation on that row of the table. These always include the thirteen main financial value entries in the country tables. Additional rows define any intermediate values which are calculated either to show the detail included in the tables (such as the subdivision of total tax allowances into the different categories) or values which make the calculation clearer.
- The third column shows the range of the calculation in that row. This is necessary to allow for the different way that tax may be calculated for married couples. The options are:
 - ❖ B The calculation is carried out separately for both the principal earner and the spouse using their individual levels of earnings. This applies in the case of independent income tax and usually also in respect of social security contributions.
 - ❖ P The calculation applies for the principal earner only. An example is where the principal earner can use any of the basic tax allowance of the spouse which cannot be set against the income of the spouse.
 - ❖ S The calculation applies for the lower earning spouse only.
 - ❖ J The calculation is carried out only once on the basis of joint income. This applies to systems of joint or family taxation and is also usual for the calculation of cash transfers in respect of children.
- The final column contains the equation itself. The equation may refer to the variables in the parameters table and to variables which result from one of the rows of the equations table itself. Use is also made of the two standard variables “Married”, which has the value 1 if the family consists of a married couple and 0 in the case of a single individual,

and “Children” which denotes the number of children. Sometimes there is a reference to a variable with the affix “_total” which indicates the sum of the relevant variable values for the principal earner and the spouse. Similarly, the affixes “_princ” and “_spouse” indicate the value for the principal earner and spouse, respectively.

In the equations a number of functions are used. Some of these are used in the same way as in a number of widely available “spreadsheet” computer packages. For example, $\text{MAX}(X,Y)$ and $\text{MIN}(X,Y)$ find the maximum and minimum of the two values, respectively. $\text{IF}(\text{condition } X,Y)$ chooses the expression X if the condition is true and the expression Y if it is false. Boolean expressions are also used and are taken to have the value 1 if true and 0 if false. As an example, $(\text{Children}=2*\text{CB}_2)$ is equivalent to $\text{IF}(\text{Children}=2, \text{CB}_2, 0)$.

There are also three special functions commonly used which denote calculations often required in tax and social security systems. These are:

- Tax (taxinc, tax_sch): This calculates the result of applying the schedule of tax rates and thresholds in “tax_sch” to the value of taxable income represented by “taxinc”. This function may be used in any part of the equations, not just in the income tax calculation. For some countries it is used for social security contributions or even for allowance levels which may be income dependent.
- Positive (X): This gives the result X when this value is positive and zero otherwise. It is therefore equivalent to $\text{MAX}(0,X)$.
- Taper (value, income, threshold, rate): This gives the amount represented by “value” if “income” is less than “threshold”. Otherwise, it gives “value” reduced by “rate” multiplied by $(\text{income} - \text{threshold})$, unless this produces a negative result in which case zero is returned. This provides the calculation which is sometimes required when a tax credit, for example, is available in full provided that total income is below a threshold but is then withdrawn at a given rate for each currency unit in excess of the threshold until it is withdrawn completely.

In some circumstances, there are country specific special functions. These functions involve programming that is designed to simplify the tax calculations. The programming underlying these functions is based on the description of the particular measure given in the relevant country chapter found in Part IV. For example, the Earned Income Credit in the United States is calculated using the function called EIC.

Anyone wishing to make their own implementation of the equations will have to write functions corresponding to these special functions or make appropriate modifications to any equations that use them.

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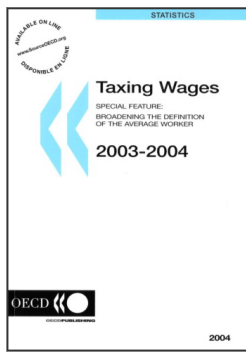
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