Taxing Wages 2014

SPECIAL FEATURE:
CHANGES IN STRUCTURAL LABOUR INCOME TAX PROGRESSIVITY OVER THE 2000-12 PERIOD IN OECD MEMBER COUNTRIES

OECD
BETTER POLICIES FOR BETTER LIVES

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Foreword

This annual publication provides details of taxes paid on wages in all thirty-four member countries of the OECD. The information contained in the Report covers the personal income tax and social security contributions paid by employees, the social security contributions and payroll taxes paid by their employers and cash benefits received by families. The objective of the Report is to illustrate how personal income taxes, social security contributions and payroll taxes are calculated and to examine how these levies and cash family benefits impact on net household incomes. The results also allow quantitative cross-country comparisons of labour cost levels and of the overall tax and benefit position of single persons and families.*

The Report shows the amounts of taxes, social security contributions, payroll taxes and cash benefits for eight family-types, which differ by income level and household composition. It also presents the resulting average and marginal tax rates. Average tax rates show that part of gross wage earnings or total labour costs which are taken in personal income taxes (before and after cash benefits), social security contributions and payroll taxes. Marginal tax rates show the part of an increase of gross earnings or total labour costs that is paid in these levies.

The focus of the Report is the presentation of accurate estimates of the tax/benefit position of employees in 2013. In addition, the Report shows definitive data on the tax/benefit position of employees for the year 2012. It is important to note that, the average worker is designated as a full-time employee (including manual and non-manual) in either industry Sectors C-K inclusive with reference to the International Standard Industrial Classification of All Economic Activities, Revision 3 (ISIC Rev. 3) or industry Sectors B-N inclusive with reference to the International Standard Industrial Classification of All Economic Activities, Revision 4 (ISIC Rev. 4).

The Report is structured as follows:

- *The Overview at the start of the Report reviews the main results for 2013.*
- *Part I (International Comparisons) reviews the main results for 2013 and 2012 and is divided into three sections. The first section reviews the main results for 2013, which are summarised in comparative tables and figures included at the end of that section. The second section presents a graphical exposition of the estimated tax burden on labour income in 2013 for gross wage earnings between 50 per cent and 250 per cent of the average wage. The third section reviews the main results for 2012, which are summarized in the comparative tables at the end of that section and compares them with the 2013 figures.*
- *Part II focuses on the historical trends in the tax burden for the period 2000-13.*
- *Part III contains individual country tables specifying the wage levels considered and the associated tax burdens for eight separate family types, together with descriptions of each tax/benefit system.*
- *The Annex describes the methodology and its limitations.*

* *Previous editions were published under the title* The Tax/Benefit Position of Employees *(1996-98 editions) and* The Tax/Benefit Position of Production Workers *(editions published before 1996).*

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Executive summary

The tax burden on wages continued to rise in OECD countries in 2013 by 0.2 percentage points to an average 35.9%. The rate of increase was higher than in 2012 but slower than in 2011. The tax burden or tax wedge is measured by taking the total taxes and social security contributions paid by employees and employers, minus family benefits received as a proportion of the total labour costs for employers. This makes it possible to examine how these levies and cash benefits affect net household income.

The main contributors to the 2013 increase were changes to personal income taxes, with increases in the statutory income tax rates in eight OECD countries. Increases in employee social security contributions also played a role in some countries. Reductions in employer social security contributions and personal income tax were key factors in those countries where the tax level fell in 2013.

Over the past three years, the tax burden has increased in 21 OECD countries and fallen in 9. At the same time, personal income tax burdens have risen in 25 out of 34 countries, largely because a higher proportion of earnings was subject to tax as the value of tax free allowances and tax credits fell relative to earnings. In 2013, only 6 countries had higher statutory income tax rates for workers on average earnings than in 2010, and in 5 countries they were lower.

This report looks at how these changes affect various types of household, such as single earners, families with or without children, or single parents. In most OECD countries, for example, the tax wedge for families with children is lower than that for single earners without children.

It also looks at how the levels of progressivity of the tax systems in OECD countries – that is how far income tax systems operate to achieve a more equal distribution of income after tax than before it – have changed since the year 2000. On average across the OECD, there have been strong increases in tax progression for low income families with children. Otherwise, there has been little change for the single workers without children and at higher income levels generally, although there are considerable differences between countries.

Key findings

Tax burdens continued to rise in 2013

- Across OECD countries the average tax and social security burden on employment incomes increased by 0.2 of a percentage point to 35.9% in 2013. This followed rises of 0.1 and 0.5 percentage points in 2012 and 2011 respectively, reversing the decline from 36.1% to 35.1% between 2007 and 2010.

- In 2013, the tax wedge increased in 21 of 34 countries, fell in 12 and remained unchanged in 1.
- Changes to the personal income taxes (PIT) were the main contributor to the increase in the average OECD total tax wedge in 2013, with increases in 20 of the OECD countries. The largest increase was in Portugal (+3.5percentage points) due to higher statutory income tax rates.
- Changes to PIT and employer social security contributions were the primary factors in countries where the tax burden fell. The largest decreases in the tax burden were in the Netherlands (-1.8 percentage points), Greece (-1.4 percentage points) and in France (-1.2 percentage points). In France, a tax credit for competitiveness and employment was introduced, which reduced the burden of employer social security contributions by 1.9 percentage points.
- The highest average tax burdens for childless single workers earning the average national wage were in Belgium (55.8%), Germany (49.3%), Austria (49.1%) and Hungary (49.0%). The lowest were in Chile (7%), New Zealand (16.9%), Mexico (19.2%) and Israel (20.7%).

Tax burdens in families with children

- The highest tax wedges for one-earner/two children families at the average wage were in Greece (44.5%), France (41.6%), Belgium (41.0%) and Austria (38.4%). New Zealand had the smallest tax wedge for these families (2.4%), followed by Ireland (6.8%), Chile (7%), and Switzerland (9.5%). The average for OECD countries was 26.4%.
- The largest increases in the tax burden for one earner families with children were in New Zealand and Portugal (both +1.9 percentage points) and the Slovak Republic (+1.8 percentage points) and the largest fall was in France and the Netherlands (-1.5 percentage points). In New Zealand, the tax burden increase for one earner families with children was higher than for the average single worker without children (+0.5 percentage point) because the basic amounts in the Family Tax Credit and the In Work Tax Credit for families with dependent children were frozen.
- In all OECD countries except Mexico and Chile, the tax wedge for families with children is lower than that for single individuals without children. The differences are particularly large in the Czech Republic, Luxembourg, Germany, Ireland and Slovenia.

Tax progressivity between 2000 and 2012

- On average across the OECD, personal income tax systems (as measured by the average PIT rate progression) have become slightly more progressive at lower income levels since the year 2000. The opposite is the case at higher income levels, although the changes at especially higher income levels are very small. There has been little change since 2007, except for the considerable increase in PIT progression for low-income families with 2 children.
- Over the period, increases in average PIT rate progression for single workers without children were highest in Ireland, Sweden and Slovenia. For single parents with 2 children, it increased the most in the Czech Republic, France, Sweden and the United Kingdom. The largest decreases for single taxpayers without children were in Germany, Hungary and Israel, and for single parents with 2 children in Germany, Hungary and Luxembourg.

- The progression of average tax wedges for low-income taxpayers with 2 children increased strongly between 2000 and 2012 as a result of an increased targeting of tax and benefit systems to low income workers (e.g. through in-work tax provisions) and especially lower-income families with children (through child benefits). The corresponding increase for low-income taxpayers without children was less pronounced although it increased considerably before 2007. On average, tax wedge progression for higher-income intervals hardly changed over the 2000-12 period.
- Average tax wedge progression for single workers without children increased the most in Turkey and decreased the most in Hungary, Germany and Mexico. For single parents with 2 children, the largest increases were in Australia, Canada, Hungary, Ireland, New Zealand, Portugal, Spain, Turkey and the United Kingdom. The largest decreases for this family-type were in Estonia, Germany, Iceland, Luxembourg, Norway, Mexico and Poland.

Overview

This Report provides unique information for each of the thirty four OECD countries on the income taxes paid by workers, their social security contributions, the family benefits they receive in the form of cash transfers as well as the social security contributions and payroll taxes paid by their employers. Results reported include the marginal and average tax burden for one- and two-earner households, and the implied total labour costs for employers. These data are widely used in academic research and in the formulation and evaluation of social and economic policies. The taxpayer specific detail in this Report enables it to complement the information provided annually in the Revenue Statistics, *a publication providing internationally comparative data on tax levels and tax structures in OECD countries. The methodology followed in this Report is described briefly in the introduction section below and in more detail in the Annex.*

The tables and charts present estimates of tax burdens and of the tax "wedge" between labour costs and net take-home pay for eight illustrative family types on comparable levels of income. The key results for 2013 are summarised in Section 2 below. Part I of the Report presents more detailed results for 2013, together with definitive results for 2012 and discusses the changes between the two years. Part II of the Report reviews historical changes in tax burdens between 2000 and 2013.

The statistical data for Israel are supplied by and under the responsibility of the relevant Israeli authorities. The use of such data by the OECD is without prejudice to the status of the Golan Heights, East Jerusalem and Israeli settlements in the West Bank under the terms of international law.

1. Introduction

This section briefly introduces the methodology employed for this Report, which focuses on full-time employees. It is assumed that their annual income from employment is equal to a given ratio of the average full-time adult gross wage earnings for each OECD economy, also referred to as the *average wage* (AW). This covers both manual and non-manual workers for either industry Sectors C-K inclusive with reference to the International Standard Industrial Classification of All Economic Activities, Revision 3 (ISIC Rev. 3) or industry Sectors B-N inclusive with reference to the International Standard Industrial Classification of All Economic Activities, Revision 4 (ISIC Rev. 4).[1] Further details are provided in Table 0.6 as well as in the Annex of this Report. Additional assumptions are made about the personal circumstances of these wage earners in order to determine their tax/benefit position. The taxes included in the present Report are confined to personal income tax, social security contributions and payroll taxes (which are aggregated with employer social contributions in the calculation of tax rates) payable on gross wage earnings. Consequently, any income tax that might be due on non-wage income and other kinds of taxes – e.g. corporate income tax, net wealth tax and consumption taxes – is not taken into account. The benefits included are those paid by general government as cash transfers, usually in respect of dependent children.

For most OECD countries, the tax year is equivalent to the calendar year, the exceptions being Australia, New Zealand and the United Kingdom. In the case of New Zealand and the United Kingdom, where the tax year starts in April, the calculations apply a "forward looking" approach. This implies that, for example, the tax rates reported for 2013 are those for the fiscal year 2013-14. However, in Australia, where the tax year starts in July, it has been decided to take a "backward looking" approach in order to present more reliable results. So, for example, the year 2013 in respect of Australia has been defined to mean its fiscal year 2012-13.

The Report presents several measures of taxation on labour. Most emphasis is given to the tax wedge – a measure of the difference between labour costs to the employer and the corresponding net take-home pay of the employee – which is calculated by expressing the sum of personal income tax, employee plus employer social security contributions together with any payroll tax, minus benefits as a percentage of labour costs. Employer social security contributions and – in some countries – payroll taxes are added to gross wage earnings of employees in order to determine a measure of total labour costs. However, it should be recognised that this measure may be less than the true labour costs faced by employers because, for example, employers may also have to make non-tax compulsory payments. The average tax wedge measures identify that part of total labour costs which is taken in tax and social security contributions net of cash benefits. In contrast, the marginal tax wedge measures identify the part of an increase of total labour costs that is paid in these levies.

The calculations also focus on the net personal average tax rate. This is the term used when the personal income tax and employee social security contributions net of cash benefits are expressed as a percentage of gross wage earnings. The net personal marginal tax rate shows the part of an increase of gross wage earnings that is paid in personal income tax and employee social security contributions net of cash benefits.

2. Review of results for 2013

2.1. Tax wedge

Table 0.1 shows that the tax wedge between total labour costs to the employer and the corresponding net take-home pay for single workers without children, at average earnings levels, varied widely across OECD countries in 2013 (see column 1). While in Austria, Belgium, France, Germany and Hungary, the tax wedge is around 50 per cent or higher, it is under 20 per cent in Chile, Mexico and New Zealand. The highest tax wedge is observed in Belgium (55.8 per cent) and the lowest in Chile (7.0 per cent).

The changes in tax wedge between 2012 and 2013 for the average worker without children are described in column 2 of Table 0.1. The tax wedges increased in twenty one countries and fell in twelve. The largest increases were in Portugal (3.54 percentage points), the Slovak Republic and the United States (1.51 percentage points). The Netherlands (-1.78 percentage points), Greece (-1.35 percentage points) and France (-1.20 percentage points) were the countries with a decrease of more than one percentage point. There was no change in the tax wedge for Chile.

In general, the rises in tax wedge rates are driven by higher income taxes (see column 3). This was the major factor in fourteen of the countries showing an overall increase. The largest increases in income taxes as a percentage of labour costs were in Portugal (3.54 percentage points) and in Luxembourg (1.09 percentage points). By contrast, higher employee and employer social security contributions account for virtually all of the increased tax wedge in Canada, Ireland, Israel and Japan. In the Slovak Republic and the United States, the increases in the tax wedge were mainly due to employee or employers' social security contributions that rose by more than one percentage point of labour costs.

Table 0.2 and Figure 0.1 show the constituent components of the tax wedge in 2013, i.e. income tax, employee and employer social security contributions (including payroll taxes where applicable), as a percentage of labour costs for the average worker without children. The labour costs in Table 0.2 are expressed in terms of dollars with equivalent purchasing power. Figure 0.1 shows that the average tax wedge in OECD countries was 35.9 per cent in 2013.

The percentage of labour costs paid in income tax varies considerably within OECD countries. The lowest figures are in Chile (zero) and Korea (4.6 per cent). The highest values are in Denmark (35.8 per cent), with Australia, Belgium and Iceland all over 20 per cent. The percentage of labour costs paid in employee social security contributions also varies widely ranging from zero in Australia and New Zealand to 17.1 per cent in Germany and 19.0 per cent in Slovenia. Employers in France pay 28.7 per cent of total labour costs in social security contributions, the highest amongst OECD countries. The corresponding figures are also more than 20 per cent in ten other countries – Austria, Belgium, the Czech Republic, Estonia, Greece, Hungary, Italy, the Slovak Republic, Spain and Sweden.

As a percentage of labour costs, the total of employee and employer social security contributions exceeds 20 per cent in more than half of the OECD countries. It also exceeds

Table 0.1. **Comparison of total tax wedge**

As % of labour costs[1]

Country[2]	Total tax wedge 2013	Annual change 2013/12 (in percentage points)[3]			
		Tax wedge	Income tax	Employee SSC	Employer SSC[4]
	(1)	(2)	(3)	(4)	(5)
Belgium	55.8	-0.19	-0.06	0.02	-0.16
Germany	49.3	-0.30	0.12	-0.21	-0.21
Austria	49.1	0.28	0.28	0.00	0.00
Hungary	49.0	-0.49	-0.49	0.00	0.00
France	48.9	-1.20	0.39	0.32	-1.92
Italy	47.8	0.08	0.08	0.00	0.00
Finland	43.1	0.56	0.57	-0.01	0.00
Sweden	42.9	0.07	0.09	-0.02	0.00
Czech Republic	42.4	-0.09	-0.09	0.00	0.00
Slovenia	42.3	-0.16	-0.16	0.00	0.00
Greece	41.6	-1.35	-0.79	0.11	-0.67
Portugal	41.1	3.54	3.54	0.00	0.00
Slovak Republic	41.1	1.51	-0.21	-0.27	1.98
Spain	40.7	0.05	0.05	0.00	0.00
Estonia	39.9	-0.51	0.30	-0.59	-0.22
Turkey	38.6	0.26	0.26	0.00	0.00
Denmark	38.2	-0.31	-0.33	0.01	0.00
Norway	37.3	-0.08	-0.01	0.01	-0.08
Luxembourg	37.0	1.09	1.09	0.00	0.00
Netherlands	36.9	-1.78	-0.91	0.48	-1.35
Poland	35.6	0.05	0.05	0.00	0.00
Iceland	33.4	0.05	0.14	-0.01	-0.09
Japan	31.6	0.37	0.00	0.18	0.18
United Kingdom	31.5	-0.61	-0.60	0.00	-0.02
United States	31.3	1.51	-0.29	1.82	-0.02
Canada	31.1	0.24	0.03	0.07	0.14
Australia	27.4	0.20	0.20	0.00	0.00
Ireland	26.6	0.69	-0.05	0.73	0.00
Switzerland	22.0	0.04	0.04	0.00	0.00
Korea	21.4	0.37	0.17	0.13	0.06
Israel	20.7	0.27	0.03	-0.04	0.28
Mexico	19.2	0.22	0.21	0.00	0.02
New Zealand	16.9	0.50	0.50	0.00	0.00
Chile	7.0	0.00	0.00	0.00	0.00

1. Single individual without children at the income level of the average worker.
2. Countries ranked by decreasing total tax wedge.
3. Due to rounding, the changes in tax wedge in column (2) may differ by one tenth of percentage point from the sum of columns (3)-(5). For Denmark, the Green Check (cash benefit) contributes to the difference as it is not included in columns (3)-(5).
4. Includes payroll taxes where applicable.

Sources: Country submissions, *OECD Economic Outlook Volume 2013* (No. 94).

StatLink http://dx.doi.org/10.1787/888933003839

one-third of total labour costs in eight OECD countries: Austria, Belgium, the Czech Republic, France, Germany, Greece, Hungary and the Slovak Republic.

2.2. Personal average tax rates

The personal average tax rate is defined as income tax plus employee social security contributions as a percentage of gross wage earnings.[2] Table 0.3 and Figure 0.2 show the

Table 0.2. **Income tax plus employee and employer social security contributions**

As % of labour costs, 2013[1]

Country[2]	Total tax wedge[3]	Income tax	Social security contributions		Labour costs[5]
			Employee	Employer[4]	
	(1)	(2)	(3)	(4)	(5)
Belgium	55.8	22.0	10.8	23.0	72 974
Germany	49.3	16.0	17.1	16.2	68 962
Switzerland	22.0	10.2	5.9	5.9	68 317
Norway	37.3	18.9	6.9	11.5	67 289
Austria	49.1	12.6	14.0	22.6	64 980
Luxembourg	37.0	15.1	11.0	11.0	64 680
Netherlands	36.9	14.3	14.2	8.4	63 585
France	48.9	10.4	9.8	28.7	61 648
Sweden	42.9	13.7	5.3	23.9	59 649
Finland	43.1	18.4	6.2	18.6	57 406
United Kingdom	31.5	13.3	8.5	9.8	56 797
Australia	27.4	21.8	0.0	5.6	55 766
Japan	31.6	6.7	12.2	12.8	54 790
United States	31.3	15.4	7.0	8.9	53 223
Italy	47.8	16.3	7.2	24.3	52 080
Korea	21.4	4.6	7.5	9.3	51 895
Denmark	38.2	35.8	2.7	0.0	51 772
Spain	40.7	12.8	4.9	23.0	49 723
Iceland	33.4	25.9	0.4	7.1	48 334
Ireland	26.6	13.3	3.6	9.7	44 494
Canada	31.1	13.7	6.6	10.8	43 643
Greece	41.6	7.1	12.9	21.5	40 650
New Zealand	16.9	16.9	0.0	0.0	36 381
Portugal	41.1	13.1	8.9	19.2	35 511
Turkey	38.6	11.6	12.9	14.2	34 293
Slovenia	42.3	9.4	19.0	13.9	34 282
Israel	20.7	8.4	7.5	4.8	34 046
Czech Republic	42.4	8.8	8.2	25.4	30 096
Hungary	49.0	12.5	14.4	22.2	29 465
Estonia	39.9	13.0	1.5	25.4	28 430
Poland	35.6	5.9	15.3	14.4	26 822
Slovak Republic	41.1	7.1	10.2	23.8	25 867
Chile	7.0	0.0	7.0	0.0	18 989
Mexico	19.2	7.5	1.2	10.5	13 964

1. Single individual without children at the income level of the average worker.
2. Countries ranked by decreasing labour costs.
3. Due to rounding, the total in column(1) may differ by one or more percentage points from the sum of columns (2)-(4). For Denmark, the Green Check (cash benefit) contributes to the difference as it is not included in columns (2)-(4).
4. Includes payroll taxes where applicable.
5. Dollars with equal purchasing power.

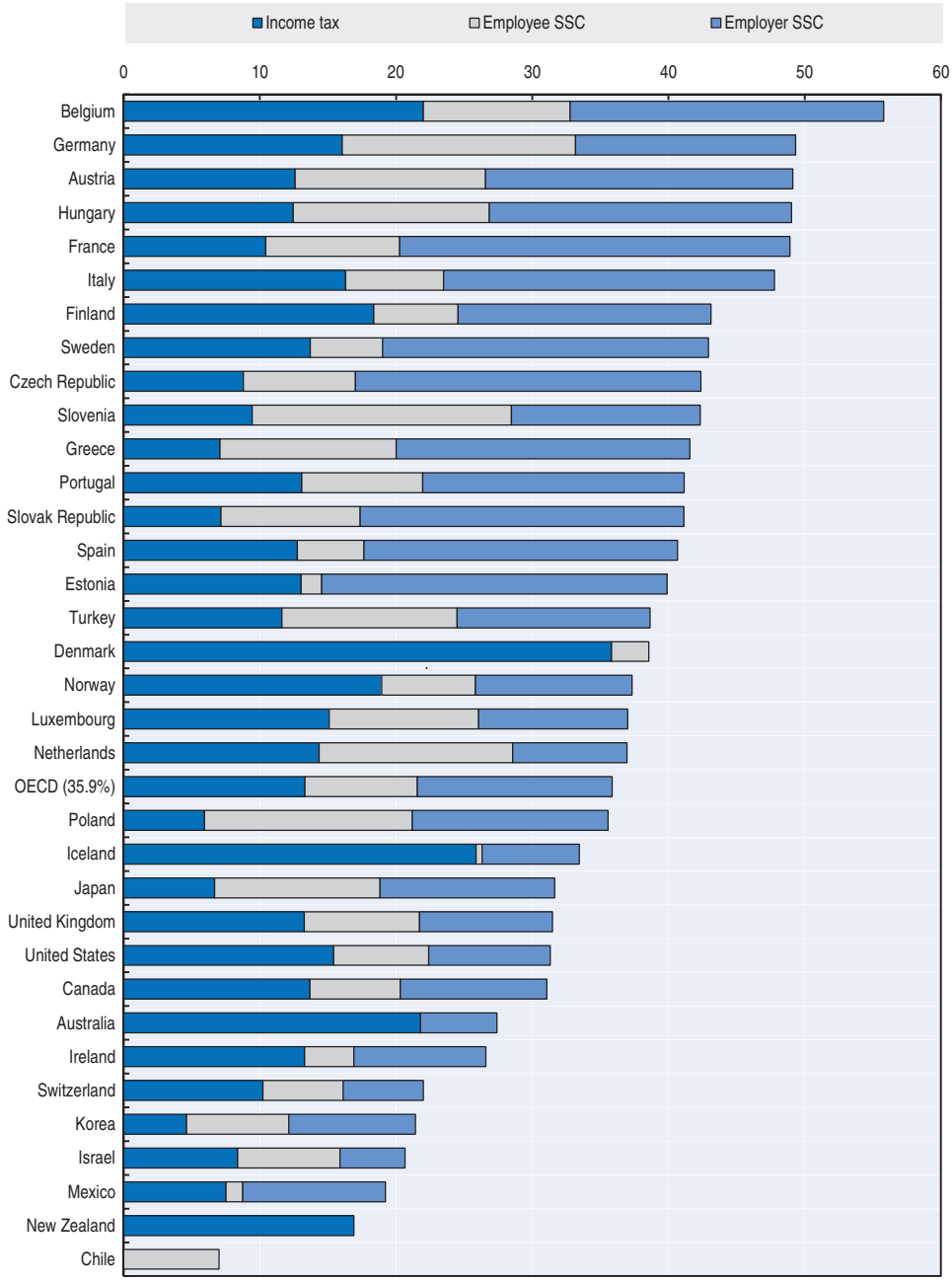
Sources: Country submissions, *OECD Economic Outlook Volume 2013* (No. 94).

StatLink http://dx.doi.org/10.1787/888933003858

personal average tax rates in 2013 for a single worker without children at the average earnings level. The gross wage earnings figures in Table 0.3 are expressed in terms of dollars with equivalent purchasing power. Figure 0.2 provides a graphical representation of the personal average tax rate decomposed between income tax and employee social security contributions.

Figure 0.1. **Income tax plus employees' and employers' social security contributions, 2013**

As a % of labour costs[1, 2]



1. Single individual without children at the income level of the average worker.
2. Includes payroll taxes where applicable.

StatLink http://dx.doi.org/10.1787/888933003782

Figure 0.2 shows that on average, the personal average tax rate in OECD countries is 25.4 per cent. Belgium at 42.6 per cent of gross earnings has the highest rate with Denmark and Germany being the only other countries with rates of more than 35 per cent. Chile and Mexico have the lowest personal average tax rates with 7.0 and 9.8 per cent of gross average earnings respectively. Korea is the only other country with a rate of less than 15 per cent.

Table 0.3. **Income tax plus employee social security contributions, 2013**[1]

As % of gross wage earnings

Country[2]	Total payment[3]	Income tax	Empoyee social security contributions	Gross wage earnings[4]
	(1)	(2)	(3)	(4)
Switzerland	17.1	10.9	6.3	64 298
Norway	29.2	21.4	7.8	59 548
Netherlands	31.2	15.7	15.5	58 252
Germany	39.6	19.1	20.4	57 818
Luxembourg	29.3	17.0	12.3	57 591
Belgium	42.6	28.6	14.0	56 171
Australia	23.1	23.1	0.0	52 639
Denmark	38.6	35.8	2.7	51 772
United Kingdom	24.1	14.7	9.4	51 255
Austria	34.3	16.2	18.1	50 322
United States	24.6	16.9	7.7	48 463
Japan	21.6	7.7	13.9	47 771
Korea	13.4	5.1	8.3	47 075
Finland	30.2	22.5	7.6	46 748
Sweden	25.0	18.0	7.0	45 388
Iceland	28.3	27.9	0.5	44 883
France	28.4	14.6	13.8	43 984
Ireland	18.7	14.7	4.0	40 175
Italy	31.0	21.5	9.5	39 430
Canada	22.7	15.3	7.4	38 948
Spain	22.9	16.6	6.4	38 278
New Zealand	16.9	16.9	0.0	36 381
Israel	16.7	8.8	7.9	32 419
Greece	25.5	9.0	16.5	31 892
Slovenia	33.1	11.0	22.1	29 528
Turkey	28.5	13.5	15.0	29 436
Portugal	27.2	16.2	11.0	28 696
Poland	24.7	6.9	17.8	22 968
Hungary	34.5	16.0	18.5	22 930
Czech Republic	22.8	11.8	11.0	22 460
Estonia	19.5	17.5	2.0	21 217
Slovak Republic	22.8	9.4	13.4	19 716
Chile	7.0	0.0	7.0	18 989
Mexico	9.8	8.4	1.4	12 501

1. Single individual without children at the income level of the average worker.
2. Countries ranked by decreasing gross wage earnings.
3. Due to rounding total may differ one percentage point from aggregate of columns for income tax and social security contributions.
4. Dollars with equal purchasing power.

Sources: Country submissions, *OECD Economic Outlook Volume 2013* (No. 94).

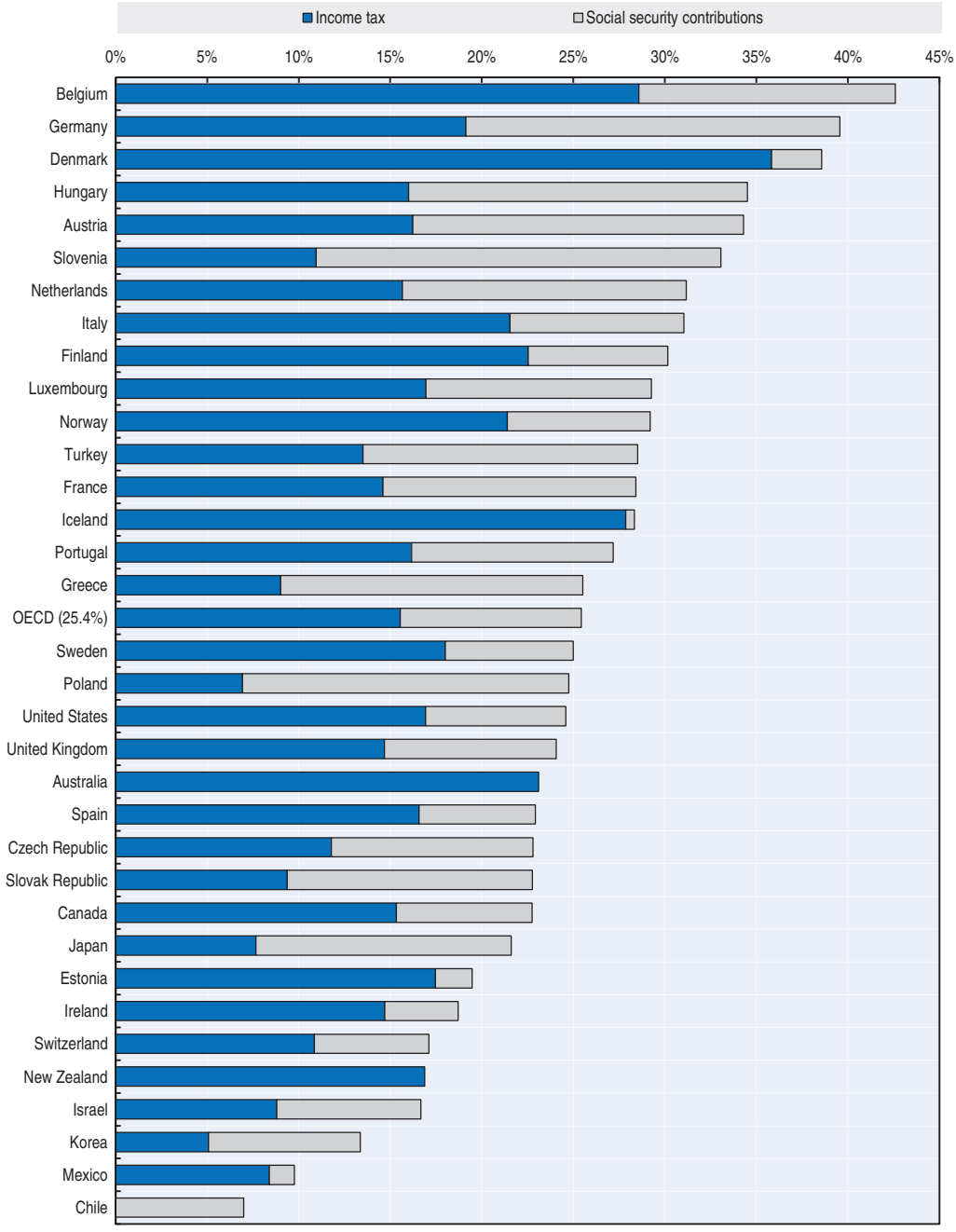
StatLink http://dx.doi.org/10.1787/888933003877

The impact of taxes and benefits on worker's take-home pay varies greatly among OECD countries. Such wide variations in the size and make-up of tax wedges reflect in part differences in:

- the overall ratio of aggregate tax revenues to Gross Domestic Product; and,
- the share of personal income tax and social security contributions in national tax mixes.

The mix of taxes paid out of gross wage earnings also varies greatly between countries as illustrated in Figure 0.2.

Figure 0.2. **Percentage of gross wage earnings paid in income tax and employee social security contributions, 2013**[1, 2]



1. Countries ranked by decreasing tax burden.
2. Single workers at the income level of the average worker.

StatLink http://dx.doi.org/10.1787/888933003801

In 2013, the share of income tax within the personal average tax rate is more important than the share of the employee social security contributions for 23 of 34 OECD member countries. No employee social security contributions are levied in Australia and New Zealand and the rates are comparatively small in Denmark, Estonia, Iceland, Ireland and Mexico. In contrast, the single worker at the average wage level paid substantially

more employee social security contributions than personal income tax in seven countries – Greece, Japan, Korea, Poland, the Slovak Republic and Slovenia plus Chile, where the average worker did not pay personal income tax in 2013. In eight countries – Austria, the Czech Republic, France, Germany, Hungary, Israel, the Netherlands, and Turkey – the income tax and employee social security contributions as percentages of gross earnings are almost equivalent (differences of less than 3 percentage points).

2.3. Family tax rates

Table 0.4 compares the tax wedges for a one-earner married couple with two children and a single individual without children, at average earnings levels. These tax wedges varied widely across OECD countries in 2013 (see columns 1 and 2). The size of the tax wedge for the family is generally lower than the one observed for the individual without children, since many OECD countries provide a fiscal benefit to families with children through advantageous tax treatment and/or cash transfers.

The savings realised by a one-earner married couple compared to a single worker are greater than 20 per cent of labour costs in the Czech Republic and Luxembourg, and greater than 15 per cent of labour costs in three other countries – Germany, Ireland and Slovenia. The tax burdens are the same in Chile and Mexico and different by less than three percentage points in Greece, Korea and Turkey (see columns 1 and 2).

In 28 of 34 OECD countries, the change in the tax wedge of an average one-earner married couple with two children between 2012 and 2013 does not exceed plus or minus one percentage point (see column 3). There are increases of greater than 1 percentage point in four countries: Portugal and New Zealand (1.9), the Slovak Republic (1.8) and the United States (1.6). The tax wedge fell by 1.5 percentage points in France and the Netherlands. In 2013, the tax wedge of families also decreased by less than one percentage point in ten other countries: Belgium, the Czech Republic, Denmark, Estonia, Germany, Hungary, Italy, Slovenia, Switzerland and the United Kingdom. By comparison, the change in the tax wedge of a single taxpayer without children at the average wage level was greater than one percentage point or more in seven OECD countries. Detailed explanations on the latter are given in the above Section 2.1.

A comparison of the changes in tax wedges between 2012 and 2013 between one-earner married couples with two children and single persons without children, at the average wage level, is shown in column 5 of Table 0.4. The fiscal preference for families increased in seven OECD member countries: Belgium, the Czech Republic, France, Italy, Luxembourg, Portugal and Switzerland. Additionally, the effects of changes in the tax system on the tax wedge were independent of the family type in Chile, Denmark, Ireland, Japan, Mexico and Turkey.

Figure 0.3 compares the net personal average tax rate for the average worker between single individuals and a one-earner married couple with two children. These results show the same pattern as those for the tax wedge results. This is because employer social security contributions which are not taken into account in the former but included in the latter are independent of family type. The savings realised by a one-earner married couple are equal to or greater than 20 per cent of earnings in four countries – the Czech Republic (29.3 per cent), Luxembourg (25.5 per cent), Slovenia (22.4 per cent) and Ireland (21.9 per cent). In contrast, the savings as percentage of gross earnings are less than 10 per cent of earnings in eleven countries – Spain (7.6 per cent), Norway (7.0 per cent), Sweden (6.9 per

Table 0.4. **Comparison of total tax wedge by family type**

As % of labour costs

Country[1]	Family[2] total tax wedge 2013	Single[3] total tax wedge 2013	Annual change 2013/12 (in percentage points)		
			Family tax wedge	Single Tax wedge	Difference between single and family (4)-(3)[4]
	(1)	(2)	(3)	(4)	(5)
Greece	44.5	41.6	0.6	-1.4	-2.0
France	41.6	48.9	-1.5	-1.2	0.3
Belgium	41.0	55.8	-0.3	-0.2	0.1
Austria	38.4	49.1	0.5	0.3	-0.3
Italy	38.2	47.8	-0.5	0.1	0.6
Finland	38.1	43.1	0.7	0.6	-0.1
Sweden	37.7	42.9	0.1	0.1	-0.1
Turkey	37.4	38.6	0.2	0.3	0.0
Spain	34.8	40.7	0.1	0.0	0.0
Hungary	34.1	49.0	-0.1	-0.5	-0.4
Germany	33.8	49.3	-0.2	-0.3	-0.1
Estonia	32.3	39.9	-0.1	-0.5	-0.4
Norway	31.2	37.3	0.1	-0.1	-0.1
Netherlands	30.8	36.9	-1.5	-1.8	-0.3
Poland	29.8	35.6	0.2	0.1	-0.1
Portugal	29.8	41.1	1.9	3.5	1.7
Slovak Republic	27.6	41.1	1.8	1.5	-0.3
Denmark	27.6	38.2	-0.3	-0.3	0.0
United Kingdom	27.0	31.5	-0.5	-0.6	-0.1
Japan	26.1	31.6	0.4	0.4	0.0
Slovenia	23.1	42.3	-0.1	-0.2	-0.1
Czech Republic	20.5	42.4	-0.5	-0.1	0.4
United States	20.3	31.3	1.6	1.5	-0.1
Mexico	19.2	19.2	0.2	0.2	0.0
Iceland	19.1	33.4	0.9	0.0	-0.8
Korea	19.0	21.4	0.4	0.4	-0.1
Canada	18.7	31.1	0.4	0.2	-0.1
Israel	17.4	20.7	0.9	0.3	-0.6
Australia	16.9	27.4	0.4	0.2	-0.2
Luxembourg	14.3	37.0	0.8	1.1	0.3
Switzerland	9.5	22.0	-0.4	0.0	0.4
Chile	7.0	7.0	0.0	0.0	0.0
Ireland	6.8	26.6	0.7	0.7	0.0
New Zealand	2.4	16.9	1.9	0.5	-1.4

1. Countries ranked by decreasing tax wedge of the family.
2. One earner married couple with two children and earnings at the average wage level.
3. Single individual without children and earnings at the average wage level.
4. Due to rounding total may differ one percentage point from the subtraction results of columns 4 and 3.

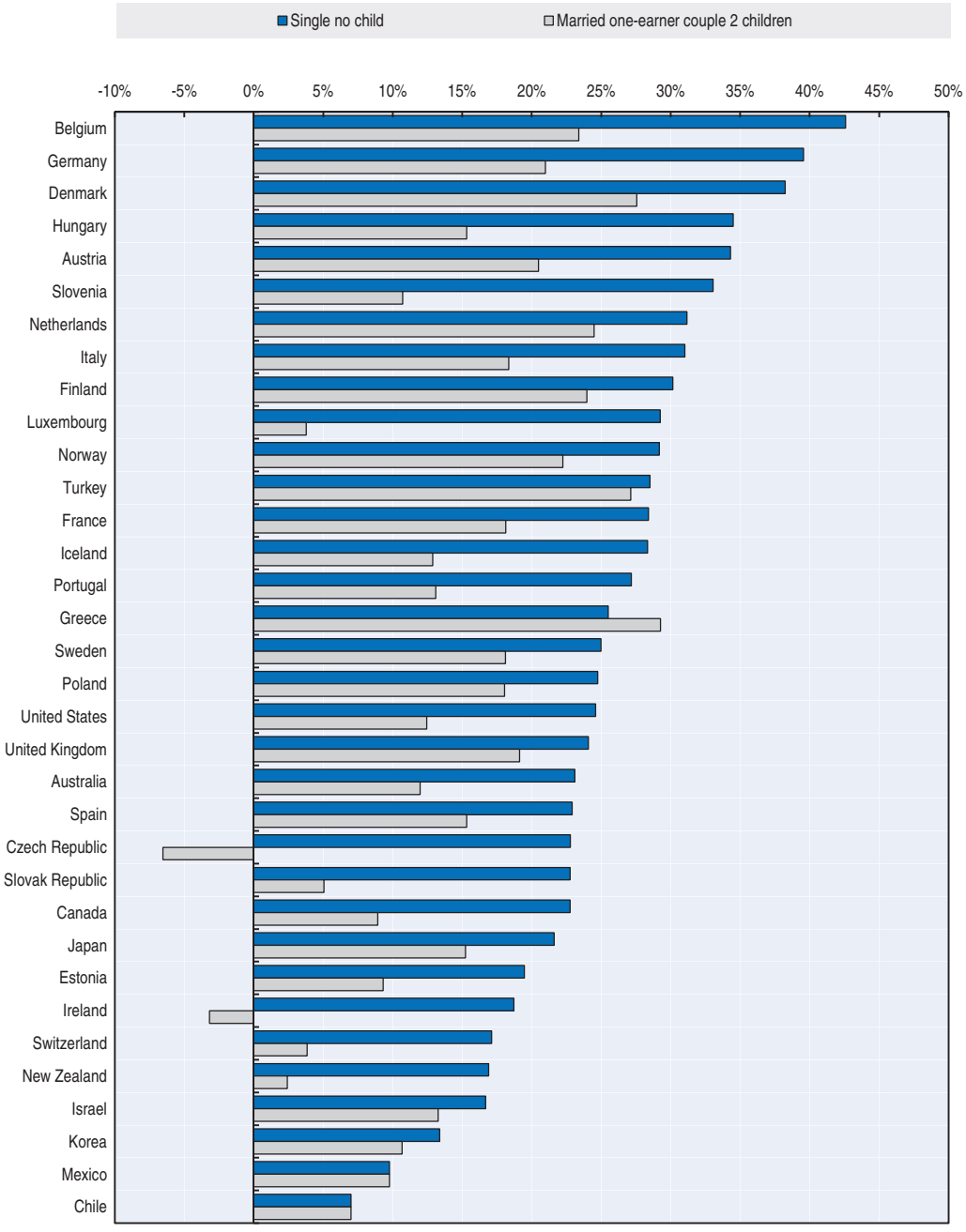
Sources: Country submissions, *OECD Economic Outlook Volume 2013* (No. 94).

StatLink http://dx.doi.org/10.1787/888933003896

cent), the Netherlands and Poland (6.7 per cent), Japan (6.4 per cent), Finland (6.2 per cent), the United Kingdom (4.9 per cent), Israel (3.4 per cent), Korea (2.7 per cent) and Turkey (1.4 per cent). The burden is the same in Chile and in Mexico. It is also interesting to note that when cash benefits are taken into account, the tax burden measure for the average one-earner married couples with two children becomes negative in the Czech Republic and Ireland because cash benefits exceed the income tax and social security payments.

Figure 0.3. **Income tax plus employee contributions less cash benefits, 2013**

As % of gross wage earnings, by family-type[1, 2]



1. Countries ranked by decreasing rates for single taxpayer without children.
2. Family types: a single individual without children and earnings at the average wage level and a one earner married couple with two children and earnings at the average wage level.

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2.4. Wages

Table 0.5 shows the gross wage earnings in national currency of the average worker in each OECD member country for 2012 and 2013. The figures for 2013 are estimated by the OECD Secretariat by applying the change in the compensation per employee in the total

Table 0.5. **Comparison of wage levels**

Country	Gross wage in national currency		Annual change 2013/12 (in percentage)			
	2012	2013	Gross wage	Inflation[1]	Real wage before tax	Change in personal average tax rate[2]
	(1)	(2)	(3)	(4)	(5)	(6)
Australia	73 494	77 530	5.5	2.1	3.3	0.2
Austria	40 708	41 693	2.4	2.0	0.4	0.4
Belgium	45 886	46 810	2.0	1.1	0.9	-0.1
Canada	46 940	48 078	2.4	1.0	1.4	0.1
Chile	6 218 613	6 607 476	6.3	2.0	4.2	0.0
Czech Republic	302 993	298 770	-1.4	1.4	-2.7	-0.1
Denmark	392 000	395 722	0.9	0.7	0.2	-0.3
Estonia	11 004	11 664	6.0	3.6	2.3	-0.4
Finland	41 662	42 493	2.0	2.3	-0.3	0.7
France	36 248	36 980	2.0	1.0	1.0	0.2
Germany	44 300	45 170	2.0	1.7	0.3	-0.2
Greece	22 240	20 604	-7.4	-0.7	-6.7	-1.1
Hungary	2 838 864	2 914 514	2.7	1.9	0.8	-0.6
Iceland	5 856 000	6 191 179	5.7	4.0	1.7	0.1
Ireland	32 514	32 381	-0.4	0.6	-1.0	0.8
Israel	128 549	131 033	1.9	1.5	0.4	0.0
Italy	29 315	29 704	1.3	1.4	-0.1	0.1
Japan	4 893 341	4 901 704	0.2	0.2	0.0	0.3
Korea	38 811 570	39 829 650	2.6	1.2	1.4	0.3
Luxembourg	51 752	52 902	2.2	1.7	0.5	1.2
Mexico	94 875	97 941	3.2	3.8	-0.5	0.2
Netherlands	47 075	48 109	2.2	2.8	-0.6	-0.9
New Zealand	51 278	53 234	3.8	0.9	2.9	0.5
Norway	504 929	524 177	3.8	2.2	1.6	0.0
Poland	40 205	41 442	3.1	1.1	2.0	0.1
Portugal	17 040	17 335	1.7	0.5	1.2	4.4
Slovak Republic	9 810	10 015	2.1	1.6	0.4	0.0
Slovenia	17 538	17 611	0.4	2.2	-1.8	-0.2
Spain	25 894	26 027	0.5	1.6	-1.0	0.1
Sweden	387 960	391 990	1.0	0.1	1.0	0.1
Switzerland	87 662	88 161	0.6	-0.4	0.9	0.0
Turkey	29 209	31 744	8.7	7.5	1.1	0.3
United Kingdom	34 877	35 548	1.9	2.6	-0.7	-0.7
United States	47 960	48 463	1.0	1.5	-0.5	-0.3

1. Estimated percentage change in the total consumer price index.
2. Difference in the personal average tax rate of the average worker (single without children) between 2013 and 2012.

Sources: Country submissions, *OECD Economic Outlook Volume 2013* (No. 94).

StatLink http://dx.doi.org/10.1787/888933003915

economy as presented in the *OECD Economic Outlook* (No 94) database to the final average wage values provided by OECD member countries. More information on the values of the average wage and the estimation methodology is included in Section 1.5 of the Annex of this Report.

The annual change in 2013 – shown in column 3 – varied between a decrease of -7.4 per cent in Greece and an increase of 8.7 per cent in Turkey. To a large extent, the changes reflect the different inflation levels of individual OECD countries – see column 4 of Table 0.5. The annual change in real wage levels (before personal income tax and employee social security contributions) is found to be in the -2 to +2 per cent range for most

Table 0.6. **Average Wage Industry Classification**

	Years for which ISIC Rev. 3.1 or any variant (Sectors C-K) has been used to calculate the AW	Years for which ISIC Rev. 4 or any variant (Sectors B-N) has been used to calculate the AW
Australia[1]		2000-13
Austria[2]	2004-07	2008-13
Belgium	2000-07	2008-13
Canada		2000-13
Chile[3]	2000-13	
Czech Republic		2000-13
Denmark	2000-07	2008-13
Estonia		2000-13
Finland		2000-13
France	2000-07	2008-13
Germany	2000-05	2006-13
Greece[4]	2000-07	2008-13
Hungary		2000-13
Iceland[5]		2000-13
Ireland[6]	2000-07	2008-13
Israel	2000-13	
Italy		2000-13
Japan		2000-13
Korea[7]	2000-07	2008-13
Luxembourg	2000-04	2005-13
Mexico[8]		
Netherlands	2000-07	2008-13
New Zealand[9]	2000-03	2004-13
Norway	2000-08	2009-13
Poland	2000-07	2008-13
Portugal	2000-05	2006-13
Slovak Republic[10]		2000-13
Slovenia		2000-13
Spain		2000-13
Sweden		2000-13
Switzerland		2000-13
Turkey[11]		
United Kingdom	2000-06	2007-13
United States	2000-06	2007-13

1. Australia: Based on ANZSIC06 such that the categories substantially overlap with ISIC 4, Sectors B-N.
2. Austria: 2000-03 average wage values are not based on the NACE (ISIC) classification.
3. Chile: The AW values are based on sectors C to O from years 2006 to 2012. From 2010 onwards Sectors L (7522) and L (7523) are excluded.
4. Greece: The average annual earnings refer to full time employees for the Sectors B to N of NACE Rev. 2, including Division 95 and excluding Divisions 37, 39 and 75 for 2008 onwards.
5. Iceland: Using national classification system that corresponds with the NACE Rev. 2 classification system.
6. Ireland: Values from 2000 to 2007 are based on Sectors C-E (NACE). From 2008 onwards, they are based on Sectors B-E (NACE Rev. 2).
7. Korea: Average wage values are based on 6th Korean Standard Industrial Classification (KSIC) C-K for 2000-01, 8th KISC C-M for 2002 to 2007 and 9th KISC B-N except E for 2008 onwards.
8. Mexico: 2000-13 AW values are based on the Mexican Classification of Economic Activities (Clasificación Mexicana de Actividades Económicas [CMAE]) which is based on one of the first versions of ISIC.
9. New Zealand: See the note for Australia which applies from 2004.
10. Slovak Republic: Average wage values based on ISIC Rev. 4 classification (B to N) and still include the self-employment data.
11. Turkey: The average wage is based on the average production worker wage ISIC Rev. 3.1, Sector D.

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countries; see column 5 of Table 0.5. Greece (-6.7 per cent), the Czech Republic (-2.7 per cent), Estonia (2.3 per cent), New Zealand (2.9 per cent), Australia (3.3 per cent) and Chile (4.2 per cent) show changes that are outside this range.

When comparing wage levels, it is important to note that the definition of average wage earnings can vary between countries due to data limitations. For instance, some countries do not include the wages earned by supervisory and managerial workers and not all countries exclude the wage earnings from part-time workers.

Table 0.6 provides more information on whether the average wages for the years 2000 to 2013 are based on industry Sectors C-K inclusive with reference to the International Standard Industrial Classification of All Economic Activities, Revision 3 (ISIC Rev. 3) or industry Sectors B-N inclusive with reference to the International Standard Industrial Classification of All Economic Activities, Revision 4 (ISIC Rev. 4).

Most OECD countries have calculated average wage earnings on the basis of Sectors B-N in the ISIC Rev. 4 Industry Classification at least since 2008. Some countries have revised the average wage values using the ISIC Rev. 4 Classification or any variant for prior years as well. This is the case, for example, in Australia, Canada, the Czech Republic, Estonia, Finland, Hungary, Iceland, Italy, Japan, the Slovak Republic, Slovenia, Spain, Sweden and Switzerland. Australia (for all years) and New Zealand (years 2004 to 2013) have provided values based on the 2006 ANZSIC industry classification, divisions B to N, which substantially overlaps the ISIC Rev. 4, Sectors B to N. For New Zealand, the years prior 2004 continue to be based on Sectors C-K in ANZSIC. In general, the change in the industry classification has had only a small impact on the level of the average wage earnings but the results reported in this Report for the years before 2013 may slightly deviate from the values reported in last year's edition on this account.

Notes

1. Not all national statistical agencies use ISIC Rev. 3 or Rev. 4 to classify industries. However, the Statistical Classification of Economic Activities in the European Community (NACE Rev. 1 or Rev. 2), the North American Industry Classification System (US NAICS 2002) and the Australian and New Zealand Standard Industrial Classification (ANZSIC 2006) include a classification which broadly conforms either with industries C-K in ISIC Rev. 3 or industries B-N in ISIC Rev. 4.
2. In the Netherlands, the division made between personal income taxes and employee social security contributions is slightly different to the methodology generally applied in this Report.

Special Feature: Changes in structural labour income tax progressivity over the 2000-12 period in OECD member countries

This Special Feature analyses the changes in the progressivity of taxes on wage earnings in OECD countries over the 2000-12 period. This chapter also studies changes in progressivity over the 2000-07 and the 2007-12 periods, and whether changes in personal income taxes, benefits or social security contributions have been the drivers of these changes.

The statistical data for Israel are supplied by and under the responsibility of the relevant Israeli authorities. The use of such data by the OECD is without prejudice to the status of the Golan Heights, East Jerusalem and Israeli settlements in the West Bank under the terms of international law.

1. Introduction

This Special Feature analyses the changes in the progressivity of taxes on wage earnings in OECD countries over the 2000-12 period. This chapter also studies changes in progressivity over the 2000-07 and the 2007-12 periods, and whether changes in personal income taxes, benefits or social security contributions have been the drivers of these changes.

The progressivity of the taxes on wage earnings depends on the design and interaction of the personal income tax (PIT) system, social security contributions (SSCs) and the benefit system. First, the progressivity of the PIT depends on the progressivity of the statutory PIT rate schedule, which depends on the number and width of the tax brackets and on the difference between the tax rates and especially between the top and bottom tax rates.

Second, the progressivity also depends on the specific design of "standard" and "non-standard" PIT provisions that reduce the taxpayer's tax liability. Provisions can take the form of allowances, deductions, exemptions and credits and may depend on the level of income (e.g. in-work tax credits and other make-work-pay provisions) and/or specific family characteristics (e.g. the number of children, a dependent spouse, etc.). As is the case in *Taxing Wages*, non-standard PIT reliefs are not taken into account in the analysis of PIT progressivity in this Special Feature.

Third, in addition to PIT, wage earnings are also subject to employee and employer SSCs and possibly payroll taxes. As these are often levied at flat rates, they tend to reduce the progressivity of the tax system. SSC ceilings may result in regressive taxes on wage earnings. SSC ceilings will typically have an impact on the social security benefits that can be received, but a discussion of this impact goes beyond the scope of this Special Feature. On the other hand, provisions in social security contributions, which are typically targeted at low-income earners, may (locally) increase the tax system's progressivity.

Also, taxpayers may receive direct benefits, which are typically targeted at lower income households and especially at families with children. These benefits make the tax system more progressive as lump-sum benefits reduce the average tax burden more for low income households. Benefits that are decreasing in income, as often is the case, also result in higher marginal tax rates (and therefore increased progressivity) over the tapering interval.

In order to capture the impact and interaction of all features of the tax and benefit system, this paper calculates average-rate progression indicators, which measure the change in the average tax rates over a particular income interval and for different family types. As average PIT rates and average tax wedges are (amongst) the key indicators included in the OECD's *Taxing Wages* report, the tax progressivity indicators that are presented in this Special Feature have been calculated using the *Taxing Wages* country calculation models.

The Special Feature builds on and extends last year's Special Feature (Paturot, Mellbye and Brys, 2012), which has calculated statutory progressivity indicators for OECD member countries in 2011. As last year's Special Feature included a detailed discussion of the advantages and disadvantages of different types of structural progressivity indicators, including the structural average tax rate progression indicator, this discussion is not repeated here.

This Special Feature is organized as follows. Section 2 briefly reviews the structural labour income tax progressivity indicators that are presented and discussed in this Special Feature. Section 3 presents results for the average PIT rate and average tax wedge progression on average across the OECD. The overall average PIT rate and average tax wedge progression and the deviation across income intervals is presented in Section 4. Section 5 analyses the level of country-specific progression rates and aims at identifying the tax systems that are the most and the least progressive in the OECD. Section 6 identifies the countries that have increased the progressivity of their tax system the most over time.

An analysis of the drivers of the changes in progressivity over time (e.g. changes in PITs, SSCs and payroll taxes and/ or benefits) is left for future work.

A selection of the charts that have been prepared for this analysis has been included in the main part of the text. The remaining charts can be found in the Annexes to this Special Feature.

2. Structural labour income tax progressivity indicators

This Special Feature presents results on average PIT rate and average tax wedge progression for 7 income intervals: 50%-67%, 67%-100%, 100%-133%, 133%-167%, 167%-200%, 200%-300% and 300%-500% of the AW in OECD countries in 2000, 2007 and 2012 as well as changes in these progression rates over time.

The average PIT rate and tax wedge progression is calculated for 6 different household types: singles without children, single parents with 2 children, one-earner married couples without and with 2 children and two-earner married couples without and with 2 children. In case of two-earner couples, it is assumed that one partner earns 67% of the AW while the other partner's earnings vary between 50% and 500% of the AW.

For each family type, also the overall progression rate for the 50%-500% of the AW income interval is presented, as well as the standard deviation in progression across the 7 income intervals.

Please note that the standard deviations in progression across income intervals should be interpreted with care, as similar standard deviations can hide large differences in actual tax progressivity across countries (as the standard deviation is calculated using the mean progression over the intervals and this mean progression deviates across countries and over time). Alternatively, coefficients of variation, which divide the standard deviation by the mean as a way to show normalized dispersion, could be calculated using the progression results. Also, the standard deviations would change if the number of intervals would increase or decrease (keeping the 50%-500% of the AW income interval fixed).

The "structural" tax progression indicator is defined as:

(AETR X_2% AW – AETR X_1% AW) / (X_2% AW – X_1% AW)

Where AETR X_1%AW and AETR X_2%AW are the average effective tax rates or tax wedges corresponding to two different income levels X_1 and X_2, respectively. The income levels are expressed as multiples of the average wage (AW). *The indicator measures how the average PIT rate or the average tax wedge increases per percentage point increase in income, measured as a multiple of the AW, over the X_2%AW – X_1%AW income range.*

The value of this indicator is zero, and hence the slope of the average effective tax rate curve is flat, in case of a proportional tax (in the absence of a basic allowance). A progressive tax is reflected by a positive value of the indicator, and a regressive tax by a negative value. The higher is the value of this indicator, the higher is the increase in the average tax rate with income and therefore the more progressive is the tax system. (Average tax rates that increase with income or marginal tax rates that are higher than average tax rates at any income level are similar definitions of tax progressivity).

The average PIT rate progression captures the progressivity of the PIT system in isolation. The average tax wedge progression takes also into account the effect of employee and employer social security contributions, payroll taxes and cash benefits on progressivity.

The following example shows how to interpret the progression rates. An average personal income tax rate progression of 0.4 over the 50%-67% of the AW income interval means that the personal average tax rate increases with 0.4 percentage points per percentage point increase in the AW over the 50%-67% income level. The increase in the average PIT rate at 67% of the AW compared to the rate at 50% of the AW then equals 0.4 multiplied by 17, i.e. 6.8 percentage points.

This example shows that values of progression rates are dependent on the level of the average tax burden. Information on progression rates, as well as standard deviations in progression rates across income intervals, should therefore be complemented with levels of average effective tax rates. This information is included in the main *Taxing Wages* report.

Compared to the Special Feature prepared for the 2013 edition of *Taxing Wages*, this Special Feature extends the analysis by adding two additional income intervals (200%-300% and 300%-500% of the AW) in order to capture the effect of top PIT rates which are levied in some countries at very high incomes, and two additional family types (two-earner married couples without and with 2 children).

Because the extension of the range of the analysis to 500% of the AW has an impact on the overall PIT rate and tax wedge progression and the standard deviation in progression across income intervals, the analysis not only focuses on changes in progressivity over time, but also presents results for the individual years (i.e. 2000, 2007 and 2012).

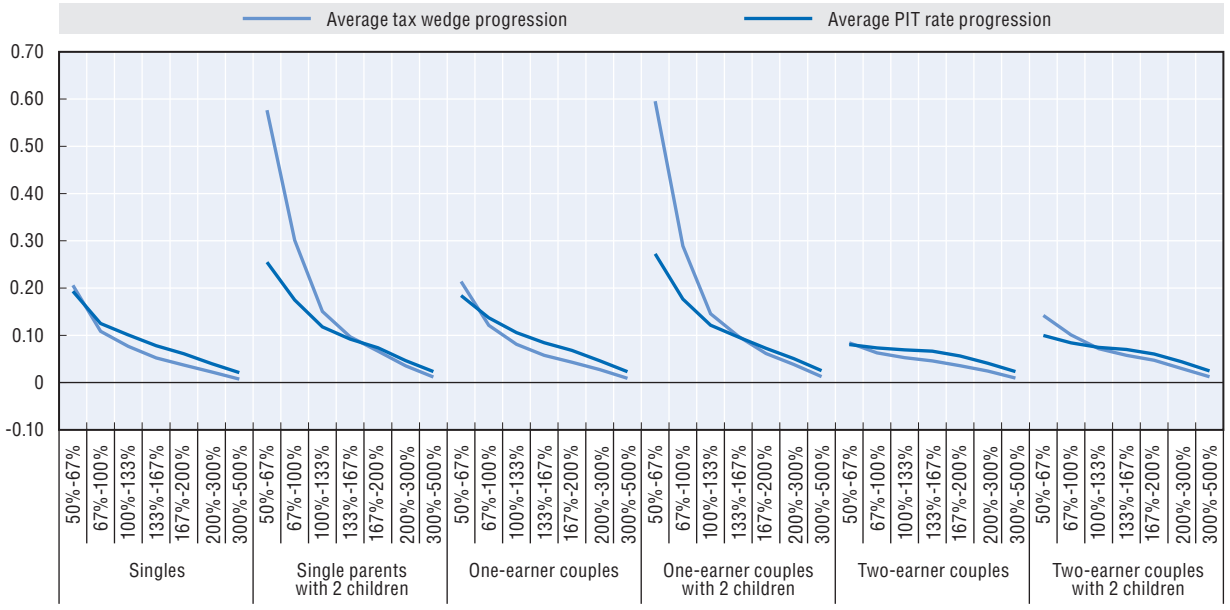
Note that small changes in progressivity may not necessarily reflect the impact of tax reforms, but may reflect the effect on tax burdens of, for instance, fiscal drag. Throughout this paper, small changes in progression rates should therefore be interpreted with care.

3. The average PIT rate and tax wedge progression on average across the OECD

Figure S.1 shows average PIT rate and tax wedge progression on average across the OECD in 2012 for the six family types and the seven income intervals that are considered in the analysis. The graph indicates that when only PIT is considered, the OECD average progression rate is the highest at the bottom income interval and that it decreases with income regardless of the family situation. These results are strongly driven by the impact of basic and other types of tax allowances or credits which, as they are not increasing in

Figure S.1. **Average PIT rate and tax wedge progression on average across the OECD in 2012**

For 6 household types, by income intervals



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income, reduce average tax rates more at lower income levels.* The average tax wedge progression, which takes also social security contributions and cash transfers into account, shows a similar pattern.

However, some differences between average PIT rate and tax wedge progression indicators can be observed. First, the average tax wedge progression is lower than the average PIT rate progression for households without children except at the bottom income interval. As families without children usually do not receive benefits, this result shows that SSCs tend to reduce tax progressivity because they are typically levied at flat rates (and in some cases because ceilings apply). The higher tax wedge progression at the bottom income interval is the result of SSC provisions targeted at lower income levels. Second, the average tax wedge progression is higher than the average PIT rate progression for households with children, except at higher income intervals. Thus, for households with children, the effect of cash benefits, which reduce the tax wedge, and the fact that these benefits are i) lump-sum amounts and ii) typically phased out when income increases, result in an increase in tax progressivity. This effect tends to be stronger than the flattening effect from social security contributions at the lower and middle-income intervals.

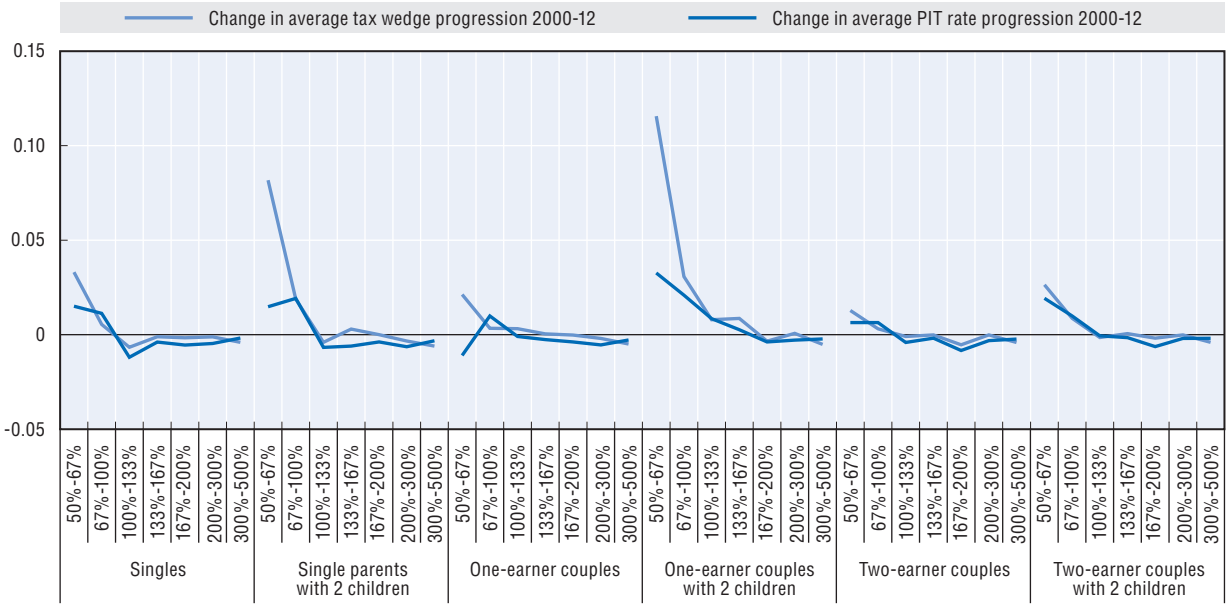
Average PIT rate and tax wedge progression on average across the OECD has followed a similar pattern in 2007 and 2000 (see Annex A), although progression has slightly changed when progression rates in 2012 are compared with the rates in 2000. To show this more clearly, Figure S.2 presents the change in the average PIT rate and tax wedge progression on average across the OECD over the 2000-12 time interval.

Compared to the year 2000, personal income tax systems (as measured by the average PIT rate progression) have become slightly more progressive in 2012 at lower income levels

* This is in line with the analysis in OECD (2006) which demonstrated that a significant amount of progressivity can be achieved in a flat tax system through a basic allowance.

Figure S.2. **Change in the average PIT rate and tax wedge progression on average across the OECD over the 2000-12 time interval**

For 6 household types, by income intervals



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while they have turned slightly less progressive at higher income levels, on average across the OECD, although the differences at especially higher income levels are very small.

In addition to the fact that small changes do not necessarily reflect tax reforms but rather fiscal drag, these results should be interpreted with care because higher progressivity can arise as a result of a drop in the tax burden on the income at the "start" of a particular income interval or an increase in the tax burden on the income at the "end" of that interval. In fact, higher progressivity because of an increase in the tax burden on income at the end of the interval may result in a drop in progressivity in the following interval if the tax burden on income at the end of the following income interval has not changed. Hence, progression points are (possibly) interlinked.

Also, when comparing tax wedges in 2012 with 2000, we notice highly increased progressivity for families with children at bottom income intervals (as measured by the change in the average tax wedge progression). This may be the result of more generous child benefits and/ or that child benefits in 2012 are more targeted at children living in lower-income families compared to 2000 (e.g. that benefits are tapered out more rapidly with income).

Figure S.3 presents the change in the average PIT rate, on average across the OECD, over the 2000-12 time interval as well as its decomposition in changes that occurred during the sub-periods 2000-07 and 2007-12. The analysis shows that the decrease in progressivity over the 2000-12 interval for higher incomes is a result of personal income tax changes which have been implemented before 2007, and that the increase in progressivity for low-income single parents and one-earner married couples with 2 children is a result of changes that have occurred after 2007. In fact, since 2007, the progressivity of the personal income tax for all intervals except the bottom income interval, on average across the OECD, has hardly changed.

Figure S.3. **Change in the average PIT rate progression on average across the OECD over time**

For 6 household types, by income intervals

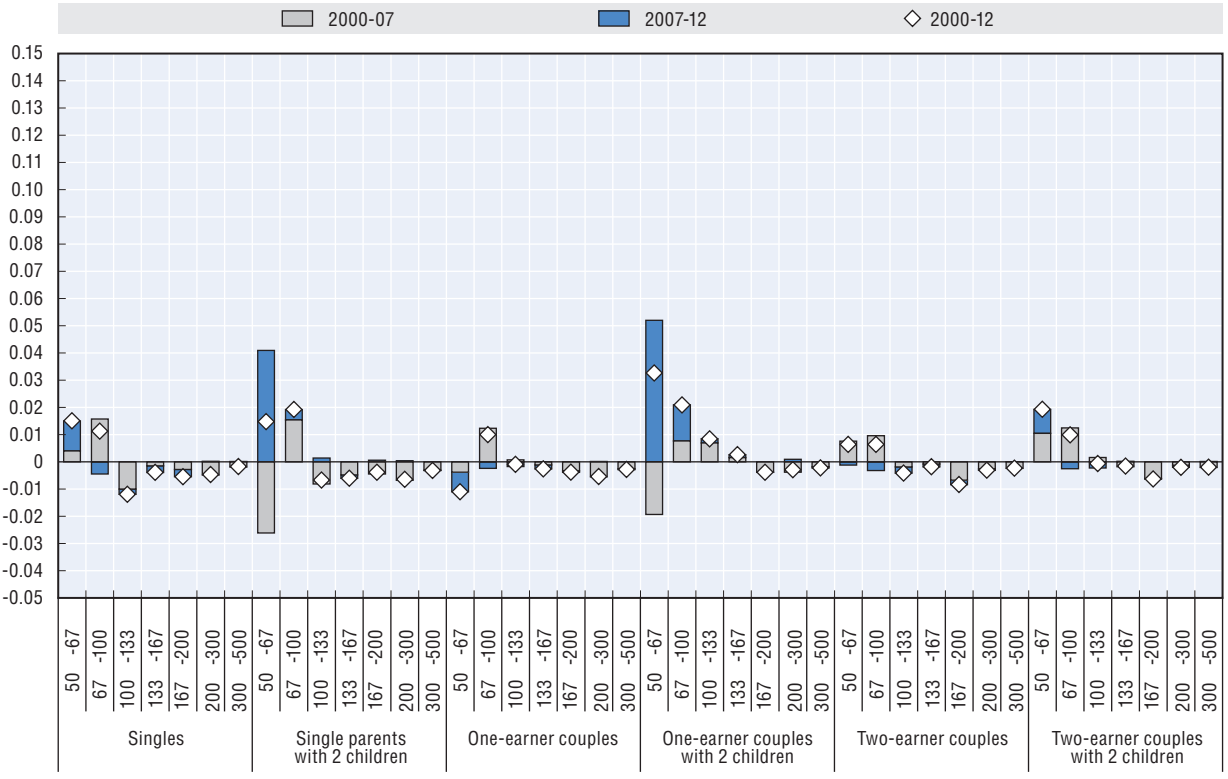

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Figure S.4 presents the change in the average tax wedge, on average across the OECD, over the 2000-12 time interval as well as its decomposition over the sub-periods 2000-07 and 2007-12. The increased progressivity for families with children at bottom income intervals, and to a much lower extent also for other low-income families, is the results of increased progressivity implemented before 2007. Only progressivity for one-earner married couples with 2 children, and to a smaller extent, single parents with 2 children at the bottom income interval increased considerably after 2007. The progressivity of the tax burden on bottom-income one-earner couples without children has decreased since 2007. Although the changes are very minor, there seem to be a slight trend of a decrease in tax wedge progressivity since 2007 for all families and income levels, except bottom-income families with 2 children. This decrease has offset the slight increase in progressivity that occurred before 2007. Although this result is relatively small, it likely is the result of the increased SSCs in some countries as part of their fiscal consolidation efforts.

Table S.1 summarizes the changes in progressivity over time for the lower income intervals (i.e. the lowest 3 to 4 intervals) and the higher income intervals (i.e. the top 3 to 4 intervals). The direction and number of arrows indicates approximately whether progressivity has increased (↗) or decreased (↘).

Figure S.4. **Change in the average tax wedge progression on average across the OECD over time**

For 6 household types, by income intervals

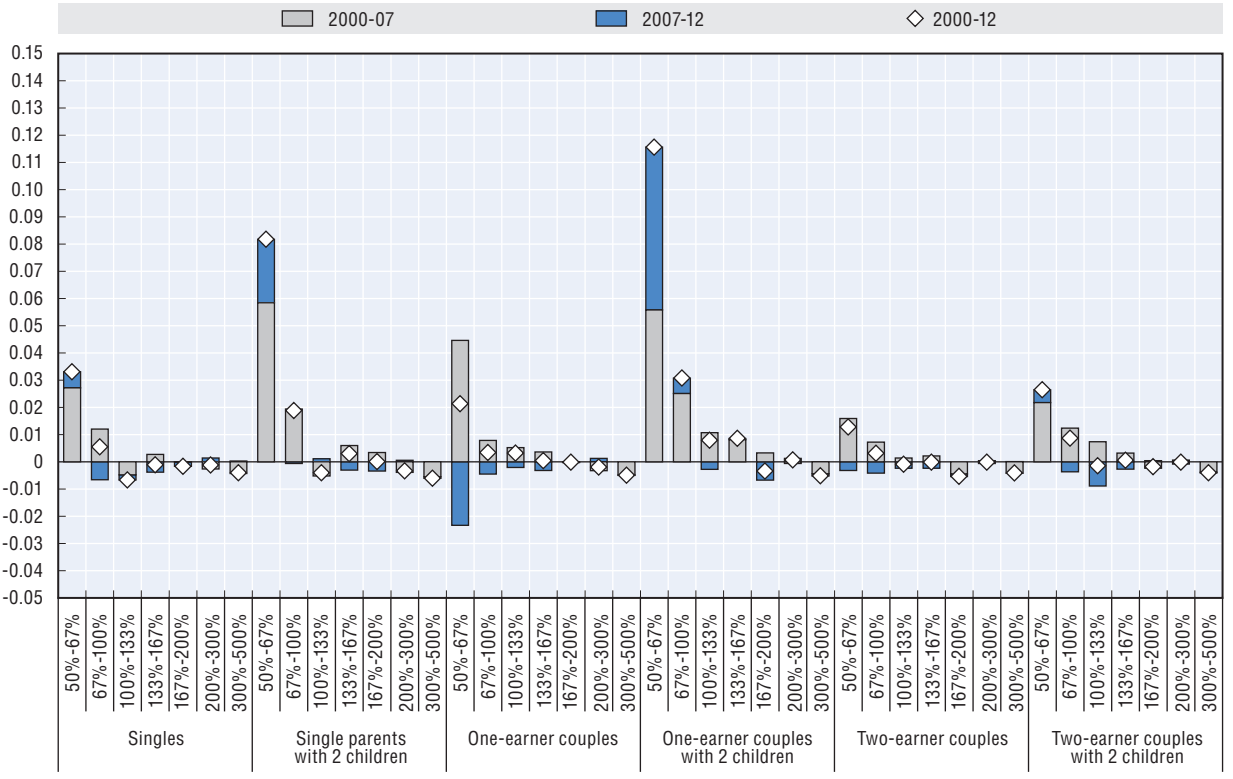

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Table S.1. **Changes over time in average PIT rate and tax wedge progression on average across the OECD: Summary table**

			2000-12	2000 – 2007	2007 – 2012
PIT progression	Lower-income intervals	0 children	↗	↗	–
		2 children	↗	↘	↗↗
	Higher-income intervals	0 children	↘	↘	–
		2 children	↘	↘	–
Tax wedge progression	Lower-income intervals	0 children	↗	↗↗	↘
		2 children	↗↗↗↗	↗↗	↗↗
	Higher-income intervals	0 children	–	–	–
		2 children	–	–	–

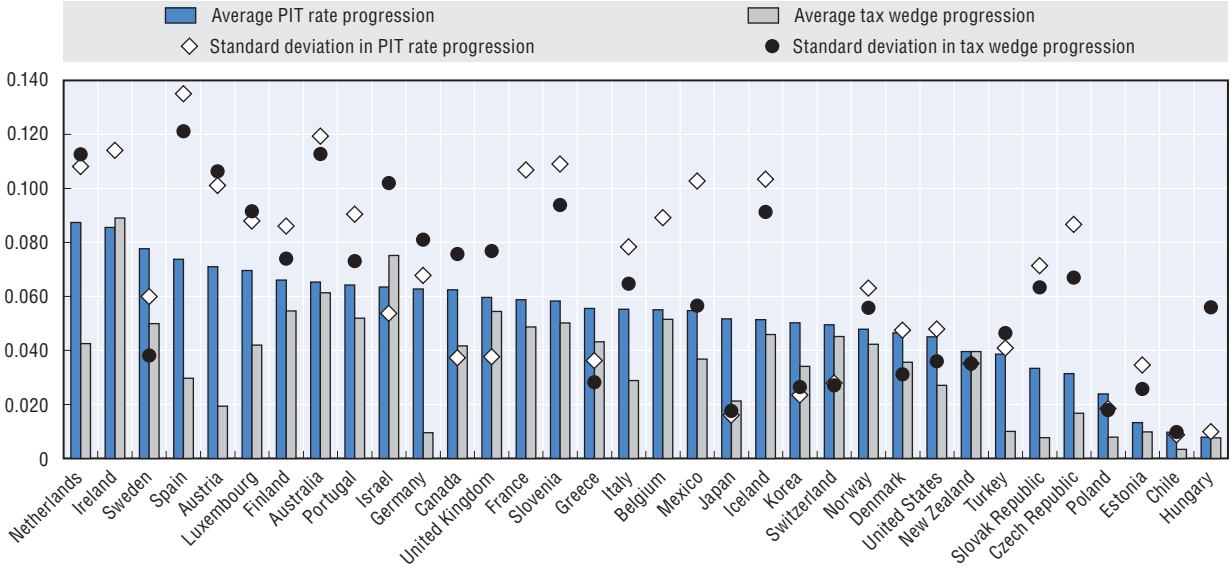
4. Overall average PIT rate and tax wedge progression and deviation across income intervals

Figure S.5 shows the overall PIT rate progression level over the 50% to 500% of the AW income interval for single taxpayers in 2012. The highest overall PIT progression can be observed in the Netherlands (0.087), Ireland (0.086) and Sweden (0.078), while the lowest overall PIT rate progression is observed in Poland (0.013), Estonia (0.010), Chile (0.008) and Hungary (0.008).

The standard deviations in Figure S.5 show the degree of variation in PIT rate progression across the seven income intervals for each country. Countries with similar overall PIT rate progression (over the 50% to 500% of the AW income range) may differ considerably in their rate progression across the seven income intervals. France and the United Kingdom, for instance, face almost the same overall PIT rate progression for earnings ranging from 50% to 500% of the AW (around 0.06), but the PIT rate progression is relatively more constant across income intervals in the United Kingdom than it is in France (see also Figure S.E.1).

Figure S.5. **Overall average PIT rate and average tax wedge progression and standard deviation for single tax payers without children**[1, 2]

Across income intervals ranging from 50% to 500% of the AW, in 2012



1. The standard deviation indicates the level of variation in the average PIT rate progression across the 7 income intervals for each country.
2. STD in tax wedge progression in France is 0.243, in Ireland it is 0.186 and in Belgium 0.158.

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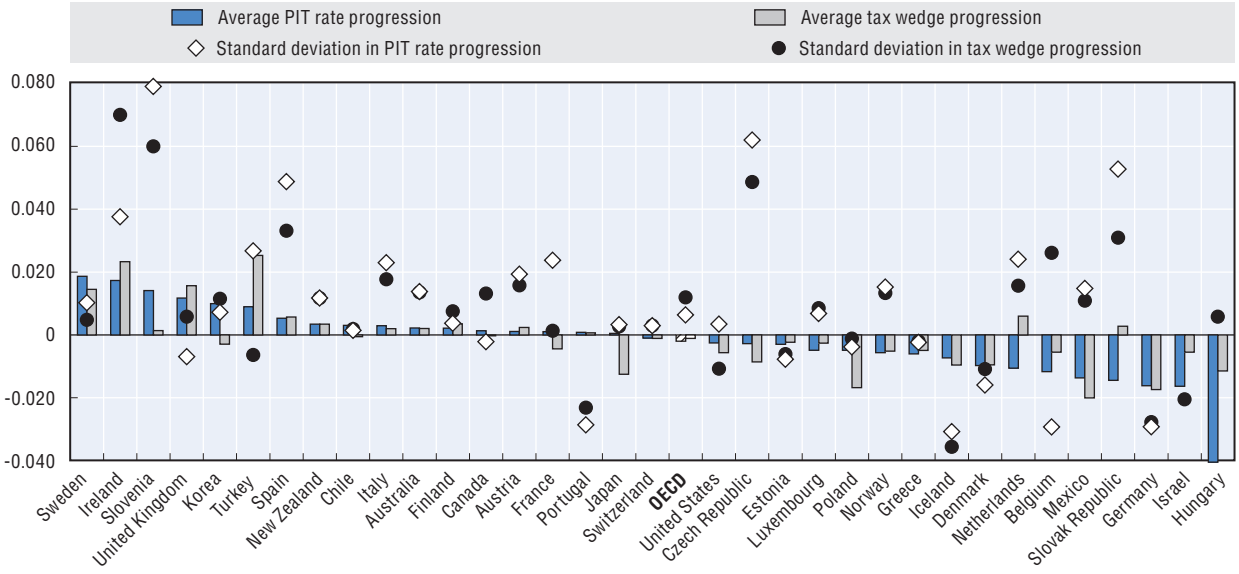
Figure S.5 also presents the overall tax wedge progression for the 50% to 500% of the AW income interval. It shows that the overall progression decreases for most OECD member countries, except in Ireland and Israel, when the flattening effect of social security contributions – although the inclusion of benefits might go in the opposite direction – are taken into account. This also explains why, for most countries, the standard deviation in tax wedge progression across income levels is substantially lower (or very similar) than the standard deviation in PIT progression. However, cuts in SSCs targeted at lower incomes and/ or child benefits result in a higher standard deviation of the tax wedge progression in Canada, the United Kingdom, Hungary, Israel, Belgium, Ireland and especially France.

Figure S.6 shows the change in the overall PIT rate and tax wedge progression, as well as the change in the standard deviations of the progression rates across income intervals, over the 50% to 500% of the AW income interval over the 2000-12 time period for single taxpayers (measured as the difference in the corresponding values in 2012 and 2000). The strongest increase in overall PIT rate progression, over the 2000-12 period, has taken place in the United Kingdom, Slovenia, Ireland and especially Sweden, while the strongest

Figure S.6. **Change in the overall average PIT rate and average tax wedge progression and standard deviation for single taxpayers without children**[1, 2]

Over the 2000-12 time interval, income ranging from 50% to 500% of the AW



1. The standard deviation indicates the level of variation in the average PIT rate progression across the 7 income intervals for each country.
2. Change in STD in PIT rate progression in Israel is -0.058 and in Hungary -0.07.

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decrease occurred in Germany, Israel and especially Hungary. Progressivity of personal income tax systems, measured in this way, has hardly changed on average across OECD countries (i.e. increased PIT progressivity in some countries offset decreased progressivity in other countries).

Figure S.6 also shows that the largest increase in the variation of PIT rate progression over the 2000-12 period, as measured by the increase in the standard deviation in the PIT rate progression over the 7 income intervals (note that this is not necessarily a measure of increased "global" but rather of "local" PIT progressivity) has occurred in Ireland, Spain, the Slovak Republic, the Czech Republic and especially Slovenia. The largest decrease in the standard deviation, reflecting the flattening of personal income taxes over time, is observed in Iceland, Israel and especially Hungary.

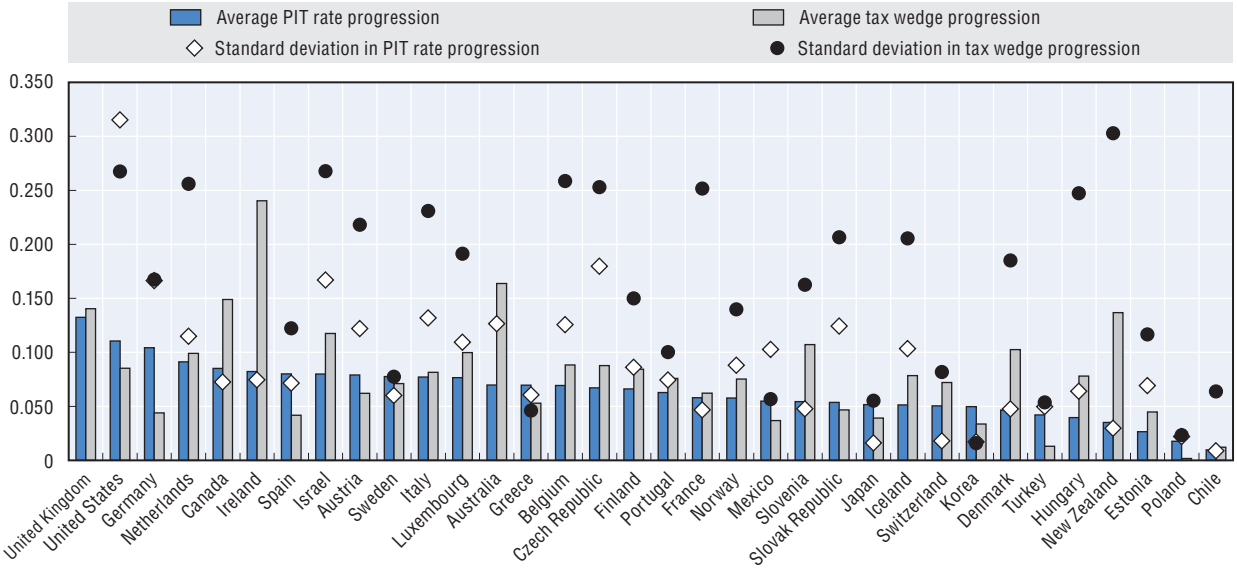
For single taxpayers, Figure S.6 also shows that the strongest increase in overall tax wedge progression (i.e. over the 50% to 500% of the AW income range), over the 2000-12 period, has taken place in the United Kingdom, Ireland and especially Turkey, while the strongest decrease occurred in Poland, Germany and especially Mexico. On average across the OECD, average tax wedge progression, measured in this way, has hardly changed.

Figure S.7 shows the same data as Figure S.5 but focuses on single parents with 2 children instead. Progression is considerably higher, as are the differences across income intervals, in the presence of children. This result holds for other family types as well.

Figure S.8 is similar to Figure S.6 but focuses on single parents with 2 children instead of single taxpayers. The analysis shows that overall PIT rate and tax wedge progression has changed more significantly for this family type. The strongest increase in PIT rate progression has occurred in the United Kingdom while the strongest decrease occurred in

Figure S.7. **Overall average PIT rate and average tax wedge progression and standard deviation for single parents with 2 children**[1, 2]

Across income intervals ranging from 50% to 500% of the AW, in 2012



1. The standard deviation indicates the level of variation in the average PIT rate progression across the 7 income intervals for each country.
2. STD in tax wedge progression not included in chart: Australia (0.557), Canada (0.457), Ireland (0.751) and the United Kingdom (0.513). The STD in PIT rate progression in the United Kingdom is 0.439.

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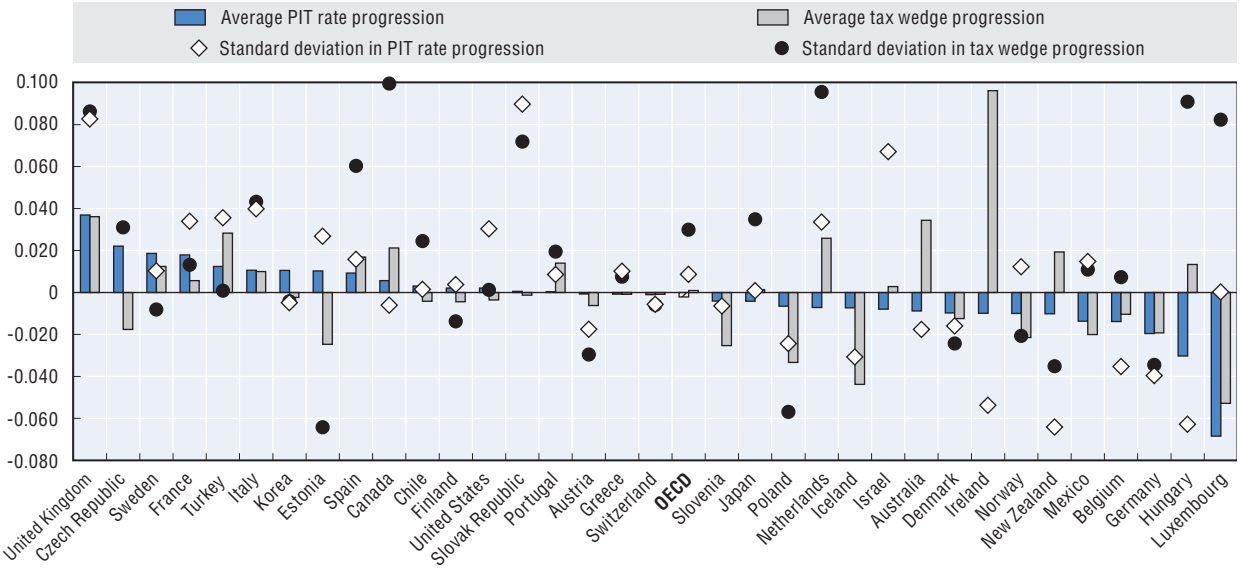
Figure S.8. **Change in the overall average PIT rate and average tax wedge progression and standard deviation For single parents with 2 children**[1, 2]

Over the 2000-12 time interval, income ranging from 50% to 500% of the AW



1. The standard deviation indicates the level of variation in the average PIT rate progression across the 7 income intervals for each country.
2. Change in STD in PIT rate progression in the Czech Republic is +0.14. Change in the STD of the tax wedge progression in Israel is +0.147, in Australia +0.153 and in Ireland +0.292; while the decrease was -0.08 in Iceland and -0.105 in Slovenia.

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Luxembourg. Note also the strong increase in tax wedge progression in Canada, the Netherlands, Turkey, Australia, the United Kingdom and especially Ireland, while the overall tax wedge progression decreased strongly Norway, Estonia, Slovenia, Poland, Iceland and especially Luxembourg.

Table S.2 shows the average PIT rate and tax wedge progression over the 50% to 500% of the AW income range as well as the standard deviation in the progression rates across the 7 income intervals on average across OECD member countries in 2000, 2007 and 2012 for the 6 family types included in the analysis. The average progression rates for families without children are considerably lower than the rates for the same family type (i.e. a single taxpayer, a one-earner married couple, or a two-earner married couple) with 2 children. The variation in progression rates over the 7 income intervals, on average across the OECD, is positively related to the level of the average progression.

Table S.2 shows also that the average PIT rate progression has decreased slightly while the average tax wedge progression has hardly changed for most family types. However, the variation in average PIT rate as well as tax wedge progression has considerably increased over time, in line with previous observations of increased targeting by personal income tax and benefit systems to lower income workers (through in-work tax provisions) and especially lower-income families with children (through child benefits).

The changes in the overall PIT rate and tax wedge progression over the 2000-12 period for each country can be decomposed in changes that occurred during the sub-periods 2000-07 and 2007-12. The corresponding charts with the changes in the sub-periods for all family types are available upon request.

Table S.2. **Average PIT rate and tax wedge progression over the 50% to 500% of the AW income range and standard deviation in progression rates across the 7 income intervals on average across the OECD in 2000, 2007 and 2012 for 6 family types**

Summary table

		Average PIT rate progr.	STD in av. PIT rate progr.	Average tax wedge progr.	STD in av. tax wedge progr.
Single, 0 children	2012	0.053	*0.058*	0.036	*0.068*
	2007	0.053	*0.055*	0.037	*0.066*
	2000	0.055	*0.052*	0.037	*0.056*
Lone parent, 2 children	2012	0.064	*0.080*	0.080	*0.201*
	2007	0.062	*0.068*	0.080	*0.193*
	2000	0.066	*0.071*	0.079	*0.171*
One-earner couples, 0 ch.	2012	0.057	*0.055*	0.041	*0.070*
	2007	0.057	*0.057*	0.042	*0.078*
	2000	0.059	*0.055*	0.042	*0.062*
One-earner couples, 2 ch.	2012	0.067	*0.085*	0.080	*0.206*
	2007	0.064	*0.068*	0.079	*0.185*
	2000	0.066	*0.071*	0.075	*0.164*
Two-earner couples, 0 ch.	2012	0.042	*0.020*	0.027	*0.025*
	2007	0.043	*0.021*	0.028	*0.026*
	2000	0.044	*0.018*	0.029	*0.020*
Two-earner couples, 2 ch.	2012	0.046	*0.025*	0.038	*0.044*
	2007	0.046	*0.024*	0.039	*0.043*
	2000	0.046	*0.019*	0.038	*0.035*

Figures S.9 and S.10 show that changes in the overall PIT rate progression and tax wedge progression in 2000-07 for single parents with 2 children are hardly correlated with the changes that occurred in 2007-12. These results hold for other family types as well. On the basis of this overall progressivity measure (i.e. for the 50% to 500% of the AW income range), there is no evidence that countries which have increased progressivity over the 2000-07 period have continued doing so afterwards or have reversed their policies.

Figure S.9. **Correlation in the changes in the overall average PIT rate progression for single parents with 2 children over time**

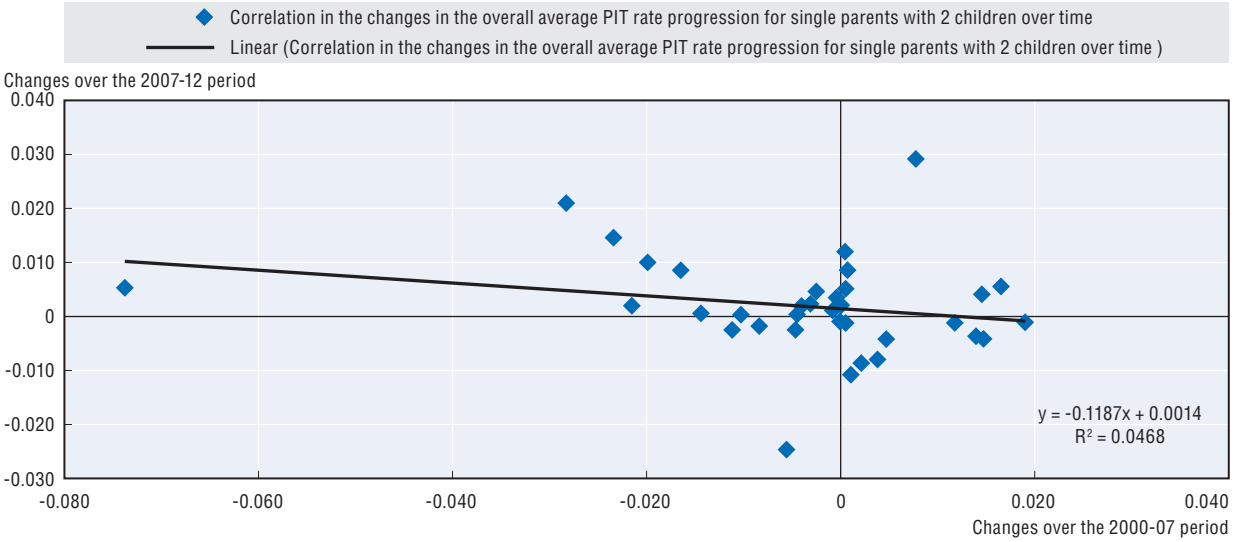

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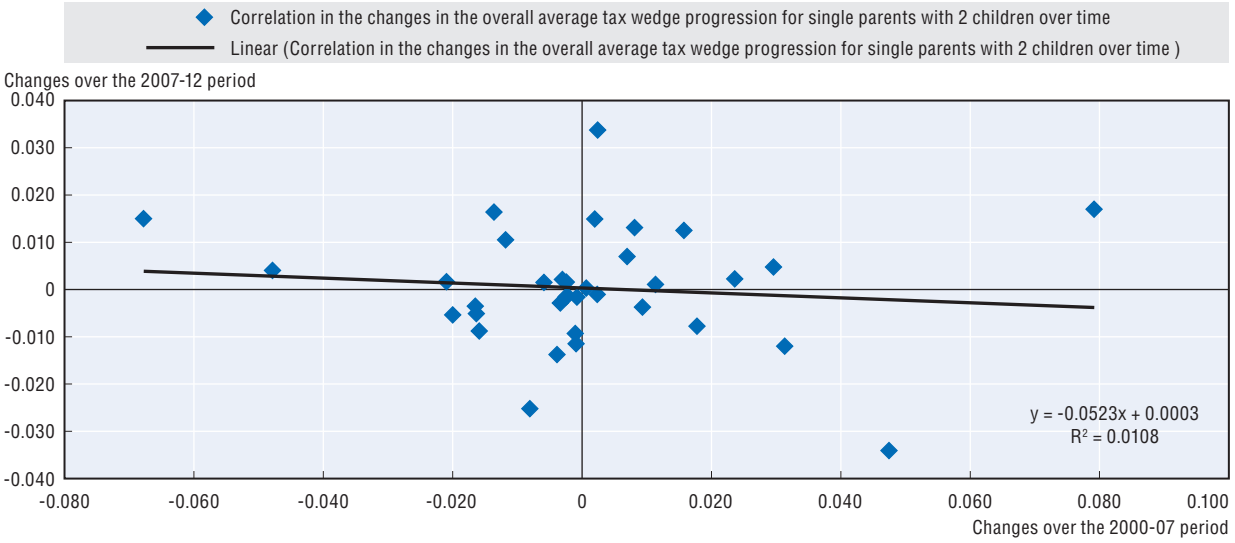
Figure S.10. **Correlation in the changes in the overall average tax wedge progression for single parents with 2 children over time**



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5. Average tax rate progression varies widely across OECD countries

Average rate progression in 2012 varies considerably across countries and family types, as can be observed from the data charts included in Annex E. As an example, Figure S.11 shows the average rate progression for single parents with 2 children in 9 OECD countries in 2012.

PIT rate progression for single parents with 2 children

Single parents with 2 children in 2012 face average PIT rate progression rates in 3 or more income intervals of at least 50% *above* the OECD average PIT rate progression in that income interval in the following countries:

- *Germany*: All income intervals except the top interval.
- *Ireland*: Third, fourth and fifth income interval.
- *The Netherlands*: Second, third and fourth income interval.
- *Sweden*: Third, fourth, fifth and sixth income interval.
- *The United States*: First, second and fifth income interval.

High local PIT progression does not necessarily indicate that the overall PIT system is highly progressive, as high progression in one income interval might be offset by low progression in the preceding or following income intervals. It therefore is useful to complement the above analysis with the overall PIT rate progression which single parents face in each country (i.e. over the 50% to 500% of the AW income interval). Figure S.7 shows that the United Kingdom, the United States, Germany and the Netherlands are characterized by the highest overall PIT rate progression with an overall rate which is at least 40% above the OECD average.

The United Kingdom has the highest overall PIT rate progression because of its highly progressive personal income tax system at the second but especially at the bottom income interval. In the other income intervals, the progression is also considerably above the OECD average. In Ireland, the low progression (only 25% of the average) at the bottom income interval offsets, to some extent, the high progression in other income intervals. Also in Sweden, the very low progression at the bottom offsets the high progression at other income intervals.

Single parents with 2 children in 2012 face average PIT rate progression rates in 3 or more income intervals of at least 50% *below* the OECD average PIT rate progression in that income interval in the following countries:

- *Chile:* All income intervals.
- *Estonia*: All except first and second income interval.
- *Japan*: First, second and third income interval.
- *Poland*: All income intervals.

Figure S.7 shows that New Zealand, Estonia, Poland and especially Chile are characterized by the lowest overall PIT rate progression with an overall rate which is at least 40% below the OECD average, closely followed by Hungary. Japan's PIT system is considerably less progressive at lower income levels but the low bottom-income progression rates are somewhat compensated for by average progression rates on middle incomes and a progression rate which is at least 50% above the average in the top income

interval. Single parents in New Zealand face progression rates which are below average but especially low progression rates in the 2 bottom income intervals.

In summary, the least progressive PIT systems for single parents with 2 children are found in Hungary, New Zealand, Estonia, Poland and especially Chile, while they face the most progressive tax system in the Netherlands, Germany, the United States and the United Kingdom and also in Ireland and Sweden although not at the bottom income interval(s) in these last 2 countries.

PIT rate progression for single taxpayers without children

Single taxpayers without children in 2012 face average PIT rate progression rates in 3 or more income intervals of at least 50% *above* the OECD average PIT rate progression in that income interval in the following countries:

- *Ireland:* First, third, fourth and fifth income interval.
- *The Netherlands:* Second, third, fourth and fifth income interval.
- *Sweden:* Second, third, fourth and fifth income interval.

In addition to these three countries, also Spain has an overall average PIT rate progression (over the 50% to 500% of the AW income range) which is at least 40% above the OECD average (see Figure S.5). Spain has very high progression in the first and second income interval as well as in the top three income intervals, but below average progression on income ranging between 100%-133%-167% of the AW (third and fourth income interval).

In contrast to single parents with 2 children, the PIT system in Germany and the United Kingdom is not amongst the most progressive tax systems for single taxpayers without children. This is especially the case in the United States.

Single taxpayers without children in 2012 face average PIT rate progression rates in 3 or more income intervals of at least 50% *below* the OECD average PIT rate progression in that income interval in the following countries:

- *Chile:* All income intervals.
- *The Czech Republic*: Fourth, fifth, sixth and seventh income interval.
- *Estonia*: All except the first income interval.
- *Hungary*: All income intervals.
- *Japan*: First, second and third income interval.
- *Poland*: All except sixth and seventh income interval.
- *The Slovak Republic*: Fourth, fifth and seventh income interval.

Figure S.5 shows that the Slovak Republic, the Czech Republic, Poland, Estonia, Chile and especially Hungary are characterized by the lowest overall PIT rate progression with an overall rate which is about 40% or more below the OECD average. Single taxpayers in Japan face very low progression at lower income intervals but above average progression at middle and high income intervals.

Single taxpayers without children in the Slovak Republic and the Czech Republic face especially low progression rates (see Figure S.5). In both of these countries, the tax system is more progressive for single parents with 2 children (see Figure S.7).

In summary, the least progressive PIT systems for single taxpayers without children are found in the Slovak Republic, the Czech Republic, Poland, Estonia, Chile and Hungary,

while they face the most progressive tax system in Spain (but not "middle" income earners), Sweden, Ireland and the Netherlands.

Tax wedge progression for single parents with 2 children

Single parents with 2 children in 2012 face average tax wedge progression rates in 3 or more income intervals of at least 50% above the OECD average tax wedge progression in that income interval in the following countries:

- *Australia*: All income intervals except 3th and 5th income interval.
- *Canada*: First, second and last income interval.
- *Denmark*: All income intervals except first and second income interval.
- *Ireland*: All income intervals.
- *Israel*: All except first two income intervals.
- *Luxembourg*: All except the first and last 2 income intervals.
- *New Zealand*: Second, third and fourth income interval.
- *Slovenia*: Third and last 2 income intervals.
- *The United Kingdom*: First, second and last income interval.

Note also that Finland, Sweden and Switzerland face high (i.e. 50% above the average) average tax wedge progression in the last two income intervals. A similar observation holds for Portugal where single parents face high progression in the 5th and 7th income interval, while the progression in the 6th income interval is at about the OECD average.

Local average tax wedge progression does not necessarily indicate that the overall tax system is progressive, as high progression in one income interval can be offset by low progression in the preceding or following income intervals. It therefore is useful to complement the above analysis with the overall average tax wedge progression rate single parents face in each country (i.e. over the 50% to 500% of the AW income interval). In Australia, Canada, Ireland, Israel, New Zealand and the United Kingdom, the overall progression is at least 40% above the OECD average progression rate (see Table S.2 and Figure S.7). Denmark, Luxembourg and Slovenia face an overall tax wedge progression of at least 25% above the OECD average.

In summary: single taxpayers with 2 children face a relatively highly progressive tax (including the effect of SSCs and benefits) system in Luxembourg, Denmark and Slovenia, and even more so in Israel, New Zealand, the United Kingdom, Canada and Australia. The most progressive tax system can be found in Ireland.

The highly progressive tax systems in New Zealand, the United Kingdom, Canada, Australia and Ireland are, to a large extent, the result of the withdrawal of the generous benefits (e.g. in relation to children and/ or in-work benefits). While strengthening equity, these benefits have to be designed with care in order to prevent too large work disincentives.

Single parents with 2 children in 2012 face average tax wedge progression rates in 3 or more income intervals of at least 50% below the OECD average tax wedge progression in that income interval. This is the case in:

- *Austria*: All except first three income intervals.
- *Chile*: All income intervals.

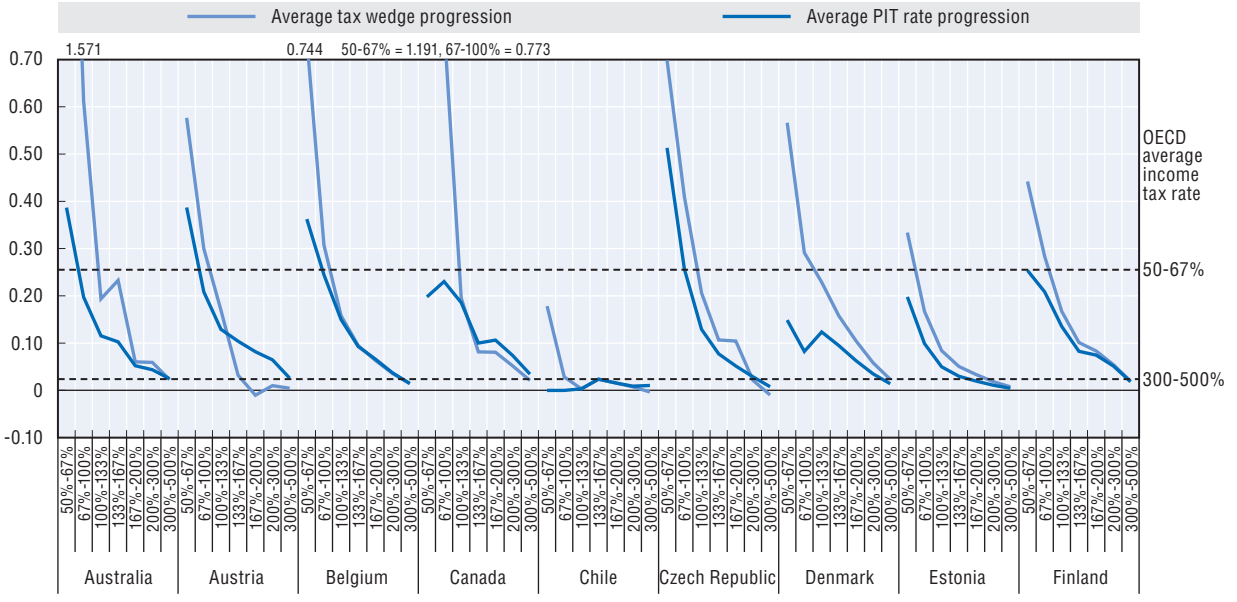
- *France*: Second, third and fourth income interval.
- *Germany*: All except first and second income interval.
- *Japan*: All except fourth and last two income intervals.
- *Korea*: All except last two income intervals.
- *Mexico*: All except second and last two income intervals.
- *Poland*: All income intervals.
- *Spain*: Fourth, fifth and sixth income interval.
- *Turkey*: All income intervals.

Figure S.7 shows that the overall average tax wedge progression for single parents in Germany, Spain, Japan, Mexico, Korea, Turkey, Chile and especially in Poland is less than 55% of the OECD average progression rate.

The low overall progressivity of the tax system in Spain and Germany is a result of the SSC ceiling, which turns the tax system regressive at higher income levels. France has a considerably higher tax wedge progression at the first income interval, partly offsetting the effect of the low progression rates in the second to fourth interval. In Austria the progression in the first two income intervals is equal to the OECD average; it is even higher than the average in the third income interval. Again, these progression results offset the lower than average progression for higher incomes (as a result of the SSC ceiling).

In summary, single taxpayers with 2 children face a relatively low progressive tax (including the effect of SSCs and benefits) system in Japan, Mexico, Korea, Turkey and Chile. The least progressive tax system can be found in Poland.

Figure S.11. **Average rate progression in 2012 for single taxpayers with 2 children for 9 OECD countries**



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Tax wedge progression for single taxpayers without children

Single taxpayers without children in 2012 face average tax wedge progression rates in 3 or more income intervals of at least 50% *above* the OECD average tax wedge progression in that income interval in the following countries:

- *Australia*: First, second, sixth and seventh income interval.
- *Belgium*: First and second income interval (third income interval is considerably above the average as well).
- *Finland*: Second, fifth, sixth and seventh income interval.
- *Greece*: Fifth, sixth and seventh income interval.
- *Ireland*: All income intervals.
- *Israel*: All income intervals.
- *Luxembourg*: Second, third and fourth income interval.
- *Portugal*: Fourth, fifth and seventh income interval.
- *Slovenia*: Fourth, fifth, sixth and seventh income interval.
- *Sweden*: All except first and second income interval.
- *The United Kingdom*: Fourth, sixth and seventh income interval.

Figure S.5 shows that the overall progression over the 50% to 500% of the AW income interval in Ireland, Israel, Australia, Finland, the United Kingdom, Portugal, Belgium, Slovenia and Sweden is at least 40% above the OECD average progression over that income interval. In Greece, the relatively high progression at top income intervals (in comparison to other countries) is to some extent offset by the very low progression in the bottom income interval. A similar conclusion can be drawn for Denmark. In Luxembourg, the high progression at the bottom income intervals is partly offset by the regressivity in the sixth and seventh income interval.

Single taxpayers without children in 2012 face average tax wedge progression rates in 3 or more income intervals of at least 50% *below* the OECD average tax wedge progression in that income interval in the following countries:

- *Austria:* Fourth, fifth, sixth and seventh income interval.
- *Chile*: All income intervals.
- *Estonia*: All income intervals.
- *Germany*: Fourth, fifth, sixth and seventh income interval.
- *Hungary*: All except first income interval.
- *Japan*: First, second, third and fifth income interval.
- *Poland*: All income intervals.
- *Slovak Republic*: Fourth, fifth, sixth and seventh income interval.
- *Spain*: Fourth, fifth and sixth income interval.

Figure S.5 also shows that the overall progression over the 50% to 500% of the AW income interval in Japan, Austria, the Czech Republic, Turkey, Estonia, Germany, Poland, the Slovak Republic, Hungary and Chile is at least 40% below the OECD average progression over that income interval. In Spain, the low progression at top income intervals is partly offset by the high progression at the bottom interval. The tax system is also weakly progressive and even regressive at the top 2 income intervals in Turkey.

Single taxpayers without children face a regressive tax system (when personal income taxes, SSCs and benefits are taken into account) in:

- *Austria*: Fourth to the seventh income interval.
- *Chile*: Seventh income interval.
- *Czech Republic*: Seventh income interval.
- *Germany*: Fifth to the seventh income interval.
- *Hungary*: Seventh income interval.
- *Italy*: Seventh income interval.
- *Luxembourg*: Sixth and seventh income interval.
- *Slovak Republic*: Seventh income interval.
- *Spain*: Fifth income interval.
- *Turkey*: Sixth and seventh income interval.

In summary, single taxpayers without children face the least progressive tax system (when also SSCs and benefits are taken into account) in Spain, Japan, Austria, the Czech Republic, Turkey, Estonia, Germany, Poland, the Slovak Republic, Hungary and especially in Chile; they face the most progressive tax system (across all income levels) in Ireland, Israel, Australia, Finland, the United Kingdom, Portugal, Belgium, Slovenia and Sweden.

6. Changes in average tax rate progression over time vary widely across OECD countries

The changes in the average rate progression over time are presented in Figure S.12 for the 2000-12 time period for a random selection of countries. Information on changes for the 2000-12 period for all countries is included in Annex F; graphical representation of the changes in the 2 other periods has not been included but is available upon request.

For single taxpayers without children, the personal income tax has become considerably more progressive over the 2000-12 period (increase of at least 0.05 in at least two income intervals) in the Czech Republic, Ireland, the Netherlands, and the Slovak Republic; and has become considerably less progressive (decrease of at least 0.05 in at least two income intervals) in Hungary, Israel and the Netherlands.

Note that this type of analysis does not indicate whether the tax system has become globally more progressive, but focuses rather on local progression (i.e. at one or more income intervals). This explains why progressivity has both increased and decreased considerably in the Netherlands.

More specially, Figure S.6 shows that the largest increases in the overall PIT rate progression have occurred in Sweden, Ireland and Slovenia, while the overall PIT rate progression has decreased the most in Germany, Israel and especially Hungary. In the Czech Republic, the strong increases in PIT progression at the bottom income intervals is offset by very modest increases in progression at middle income intervals and decreases in progression at the top income intervals. In the Slovak Republic and the Netherlands, the strong increases in PIT progression at the first two income intervals is offset by decreases in progression in all other income intervals. The strong overall increase in progression in Sweden is the result of increases in progression in the middle income intervals. The PIT system has become less progressive in Germany at most but especially at the lower income intervals (Figure S.F.1).

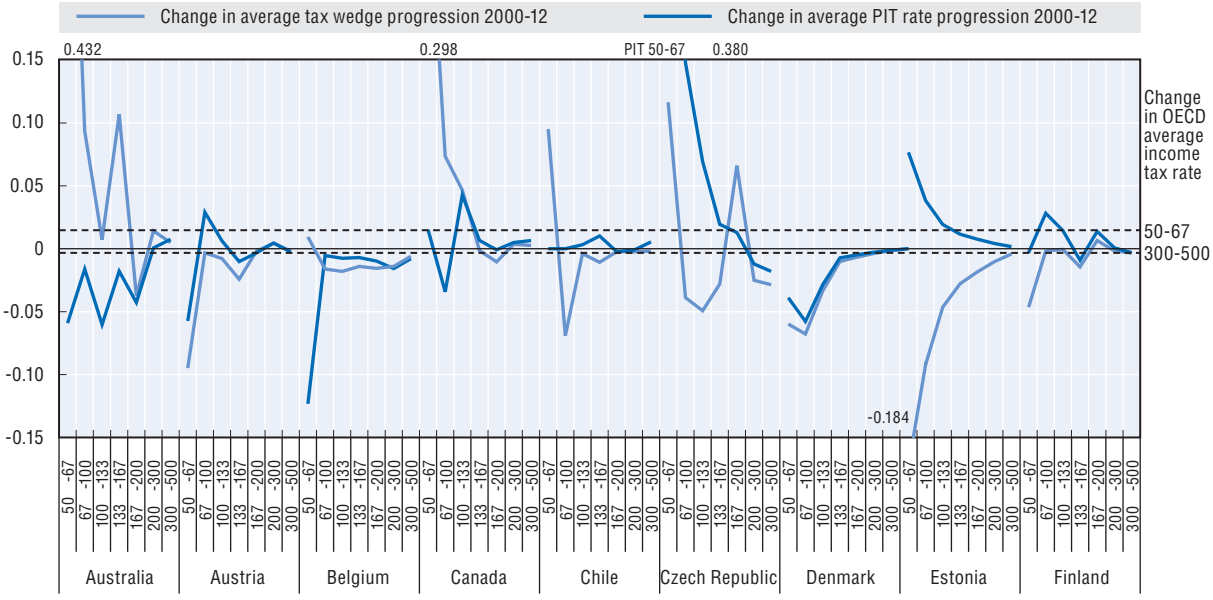
When also SSCs and benefits are taken into account, single taxpayers without children face in 2012 a considerably more progressive tax system (increase of at least 0.05 in at least two income intervals) in the Czech Republic, the Netherlands and Turkey. Similarly to the results for the PIT, however, the overall tax wedge progression did not strongly increase in the Czech Republic and the Netherlands because the strong increases at the bottom income intervals are offset by decreases in progression as from the fourth or third income interval, respectively. When also SSCs and benefits are taken into account, single taxpayers without children face a considerably less progressive tax system (decrease of at least 0.05 in at least two income intervals) in Hungary (but not single taxpayers with income at the bottom income interval). Strong decreases in progression are also noted for Germany and Mexico.

For single parents with 2 children, the personal income tax has become considerably more progressive over the 2000-12 period (increase of at least 0.05 in at least two income intervals) in the Czech Republic, the Slovak Republic, Spain and the United Kingdom, while the PIT has become considerably less progressive (decrease of at least 0.05 in at least two income intervals) in Australia, Germany, Hungary, Luxembourg, the Netherlands and Poland.

Figure S.8 shows that the largest increases in the overall PIT rate progression have occurred in the United Kingdom, the Czech Republic, Sweden and France, while the overall PIT rate progression has decreased the most in Germany, Hungary and especially Luxembourg. In Spain and the Slovak Republic, the strong increase in progression at lower income intervals is partly offset by low increases or decreases in progression at other income intervals. In France, the PIT has become especially more progressive at the bottom income interval while in Sweden the progressivity of the PIT system focused on middle-income intervals. In the Netherlands, the decrease in progression at middle and top income intervals is largely offset by an increase in progression at the bottom income intervals. The reverse happened in Poland, where the strong decrease in progression at the bottom income intervals is offset by increased progression at especially the middle income intervals.

When also SSCs and benefits are taken into account, single parents with 2 children face in 2012 a considerably more progressive tax system (increase of at least 0.05 in at least two income intervals) in Australia, Canada, the Czech Republic, Hungary, Ireland, Japan, Luxembourg, New Zealand, Portugal, Spain, Turkey and the United Kingdom, while they face a considerably less progressive tax system (decrease of at least 0.05 in at least two income intervals) in Estonia, Germany, Iceland, Luxembourg, Poland and the Slovak Republic. In the list of countries which are characterized by considerable increased "local" progression, only Japan, the Czech Republic and especially Luxembourg do not face an increase in "global" progression as measured by an increase in the overall progression rate (i.e. measured over the 50% to 500% of the AW income range). Figure S.F.2 shows that, to some extent, progression also decreased considerably in Norway and Mexico while it decreased considerably at lower income intervals only in Slovenia. In the Slovak Republic, the decreased progression at middle income intervals is offset by increased progression at the bottom (and also 6th) income interval.

Figure S.12. **Change in the average rate progression over the 2000-12 time interval for singe taxpayers with 2 children in 9 OECD countries**



StatLink http://dx.doi.org/10.1787/888933005625

7. Conclusion

This paper has analysed average PIT rate and average tax wedge progression for 7 income intervals (50%-67%, 67%-100%, 100%-133%, 133%-167%, 167%-200%, 200%-300% and 300%-500% of the AW) in OECD countries in 2000, 2007, 2012 and the corresponding changes that have occurred over time. The average PIT rate progression captures the progressivity of the PIT system in isolation. The average tax wedge progression takes also the effect of employee and employer social security contributions, payroll taxes and cash benefits on progressivity into account. Average rate progression has been calculated for 6 different household types: singles without children and single parents with 2 children, one-earner married couples without and with 2 children, and two-earner married couples without and with 2 children (it is assumed that one partner earns a fixed gross wage of 67% of the AW, while the other partner's gross wage earnings vary between 50% and 500% of the AW). The overall progression rate for the 50%-500% of the AW income interval has also been presented, as well as the standard deviation in progression across the 7 income intervals.

Similarly to the analysis in the Special Feature of the 2013 edition of *Taxing Wages*, the results show a clear pattern of progression rates across the 7 income intervals. On average across the OECD, the highest tax progression can be observed at the bottom income interval, while progression decreases for each higher income interval. This pattern emerges for the 6 household types considered and for the average PIT rate as well as the average tax wedge progression. These results indicate that this pattern is observed in many OECD countries, although considerable differences among countries exist. In most countries, however, the top average rate progression can be found at the bottom income interval and the lowest average rate progression is reached at the top income interval, as the country charts in Annex E clearly show.

On average across the OECD, personal income tax systems (as measured by the average PIT rate progression) have become slightly more progressive at lower income levels over time, while they have turned slightly less progressive at higher income levels, although the changes at especially higher income levels are very small. Over the 2007-12 period, the PIT progressivity hardly changed, except for the considerable increase in PIT progression for low-income families with 2 children.

On average, tax wedge progression for higher-income intervals hardly changed over the 2000-12 period. Low-income taxpayers without children face decreased progression since 2007, but because progressivity for these taxpayers has increased considerably over the 2000-07 period, there is a moderate increase in progression when 2012 average tax wedges are compared with tax wedges in 2000. However, the progression of average tax wedges for low-income taxpayers with 2 children has increased strongly in both periods, resulting in a much higher progressive tax and benefit system for low-income families with 2 children over the 2000-12 period.

The highest average PIT rate progression for single taxpayers over the 50% to 500% of the AW income range in 2012 is observed in the Netherlands, Ireland and Sweden, while the lowest progression can be found in Poland, Estonia, Chile and Hungary. For single parents with 2 children in 2012, the highest PIT rate progression over the 50% to 500% of the AW income range is observed in the United Kingdom, the United States and Germany while the lowest progression is found in Estonia, Poland and Chile.

The average PIT rate progression over the 50% to 500% of the AW income range has decreased slightly while the corresponding average tax wedge progression has hardly changed over time for most family types. However, the variation in average PIT rate as well as tax wedge progression has considerably increased over time as a result of an increased targeting of the tax and benefit system to lower-income workers (e.g. through in-work tax provisions) and especially lower-income families with children (through child benefits).

The analysis has also shown that changes in PIT rate and tax wedge progression in the 2000-07 and the 2007-12 period are not significantly related. On average, countries that changed tax progression in 2000-07 have not made changes along the same lines in the 2007-12 period, nor have they reversed in 2007-12 the previously implemented reforms.

Although tax progression tends to be relatively similar for both one-earner married couples and single taxpayers without children, some countries do have a more progressive PIT system for married couples as a result of a dependent spouse allowance. However, progressivity might also decrease if some taxable income can be transferred from the principal earner to the spouse.

SSCs and cash benefits have a strong impact on tax progressivity, as reflected by the considerable differences between average PIT rate and average tax wedge progression on average across the OECD. The direction of the difference in these rates strongly depends on whether the taxpayer has children or not.

First, the average tax wedge progression is lower than the average PIT rate progression for households without children except at the bottom income interval. As families without children typically do not receive cash benefits, this result shows that SSCs tend to reduce tax progressivity because they are typically levied at flat rates. A SSC ceiling might even lead to overall regressivity at the top income intervals. The higher tax wedge progression at the bottom income interval is the result of SSC provisions targeted at lower income

levels in some countries. This result is driven by the low-income SSC provisions in Canada, the United Kingdom, Israel, the Netherlands, and especially in Ireland, Belgium and France.

Second, the average tax wedge progression is higher than the average PIT rate progression for households with children, except at the top income intervals. Thus, for households with children, the effect of cash benefits, which reduce the tax wedge, and the fact that these benefits are typically phased out when income increases, results in an increase in (local) tax progressivity in a large majority of OECD countries. This effect tends to be stronger than the flattening effect from social security contributions, except at the top income intervals.

The variation in progression over the 7 income intervals, on average across the OECD, is positively related to the level of the average progression. For instance, the higher OECD average PIT rate progression for families with children compared to families without children results also in a higher deviation across the 7 income levels, basically indicating that PIT provisions for children reduce the average effective tax rate more for lower-income than for higher-income earners.

Across the OECD, single taxpayers without children face the least progressive PIT system in the Slovak Republic, the Czech Republic, Poland, Estonia, Chile and Hungary, while single taxpayers with 2 children face the least progressive PIT system in Hungary, New Zealand, Estonia, Poland and especially Chile. The most progressive PIT system for single taxpayers without children is found in Spain (but not for Spanish middle income families), Sweden, Ireland and the Netherlands and for single parents with 2 children in the Netherlands, Germany, the United States and the United Kingdom and also in Ireland and Sweden although not at the bottom income interval(s) in these last 2 countries.

Over the 2000-12 period, average PIT rate progression increased the most in Ireland, Sweden and Slovenia for single taxpayers without children; for single parents with 2 children, it increased the most in the Czech Republic, France, Sweden and the United Kingdom. For single taxpayers without children, average PIT rate progression decreased the most in Germany, Hungary and Israel, while for single parents with 2 children it decreased the most in Germany, Hungary and Luxembourg.

Single taxpayers without children face the least progressive tax system, when also SSCs and benefits are taken into account, in Spain, Japan, Austria, the Czech Republic, Turkey, Estonia, Germany, Poland, the Slovak Republic, Hungary and especially in Chile. Single parents with 2 children face the lowest average tax wedge progression in Japan, Mexico, Korea, Turkey and Chile. The least progressive tax system can be found in Poland. Single taxpayers without children face the most progressive tax system (across all income levels) in Ireland, Israel, Australia, Finland, the United Kingdom, Portugal, Belgium, Slovenia and Sweden. Single parents with 2 children face a relatively highly progressive average tax wedge in Luxembourg, Denmark and Slovenia, and even more so in Israel, New Zealand, the United Kingdom, Canada and Australia. The most progressive tax system can be found in Ireland.

Over the 2000-12 period, average tax wedge progression increased the most in Turkey for single taxpayers without children; for single parents with 2 children, it increased the most in Australia, Canada, Hungary, Ireland, New Zealand, Portugal, Spain, Turkey and the United Kingdom. For single taxpayers without children, average tax wedge progression decreased the most in Hungary, Germany and Mexico, while for single parents with 2 children it decreased the most in Estonia, Germany, Iceland, Luxembourg, Norway, Mexico and Poland.

Bibliography

Musgrave, R.A. and P.B. Musgrave (1989), *Public finance in theory and practice,* 5th edition, McGraw-Hill Book Company.

Musgrave, R.A. and T. Thin (1948), "Income tax progression, 1929-1948", *Journal of Political Economy, Vol. 56*, No. 6, pp. 498-514.

OECD (2006), "Fundamental reform of personal income tax", *OECD Tax Policy Studies*, No. 13, OECD Publishing.

Paturot, D., K. Mellbye and B. Brys (2013), "Average personal income tax rate and tax wedge progression in OECD countries", *OECD Taxation Working Papers*, No. 15, OECD Publishing.

Torres, C., K. Mellbye and B. Brys (2012), "Trends in personal income tax and employee social security contribution schedules", *OECD Taxation Working Papers*, No. 12, OECD Publishing.

ANNEX S.A

Average personal income tax rate and tax wedge progression on average across the OECD in 2007 and 2000, for 6 household types, by income intervals

Figures available online only:

Figure S.A.1. **Average PIT rate and tax wedge progression on average across the OECD in 2000**

StatLink http://dx.doi.org/10.1787/888933005644

Figure S.A.2. **Average PIT rate and tax wedge progression on average across the OECD in 2007**

StatLink http://dx.doi.org/10.1787/888933005663

ANNEX S.B

Changes over time in the average personal income tax rate and tax wedge progression on average across the OECD

Figures available online only:

Figure S.B.1. **Change in the average PIT rate and tax wedge progression on average across the OECD over the 2007-12 time interval**

StatLink http://dx.doi.org/10.1787/888933005682

Figure S.B.2. **Change in the average PIT rate and tax wedge progression on average across the OECD over the 2000-07 time interval**

StatLink http://dx.doi.org/10.1787/888933005701

ANNEX S.C

Overall average pit tax rate and tax wedge progression and standard deviation across 7 income intervals in 2012 for 6 family types

Figures available online only:

Figure S.C.1. **Overall average rate progression and standard deviation for single taxpayers without children**
StatLink http://dx.doi.org/10.1787/888933005720

Figure S.C.2. **Overall average rate progression and standard deviation for single parents with 2 children**
StatLink http://dx.doi.org/10.1787/888933005739

Figure S.C.3. **Overall average rate progression and standard deviation for one-earner married couples without children**
StatLink http://dx.doi.org/10.1787/888933005758

Figure S.C.4. **Overall average rate progression and standard deviation for one-earner married couples with 2 children**
StatLink http://dx.doi.org/10.1787/888933005777

Figure S.C.5. **Overall average rate progression and standard deviation for two-earner married couples without children**
StatLink http://dx.doi.org/10.1787/888933005796

Figure S.C.6. **Overall average rate progression and standard deviation for two-earner married couples with 2 children**
StatLink http://dx.doi.org/10.1787/888933005815

ANNEX S.D

Changes in the overall average tax rate progression and changes in the standard deviation across 7 income intervals over the 2000-12 time interval for 6 family types

Figures available online only:

Figure S.D.1. **Changes in overall average rate progression and standard deviation for single taxpayers without children**
StatLink http://dx.doi.org/10.1787/888933005834

Figure S.D.2. **Changes in overall average rate progression and standard deviation for single parents with 2 children**
StatLink http://dx.doi.org/10.1787/888933005853

Figure S.D.3. **Changes in overall average rate progression and standard deviation for one-earner married couples without children**
StatLink http://dx.doi.org/10.1787/888933005872

Figure S.D.4. **Changes in overall average rate progression and standard deviation for one-earner married couples with 2 children**
StatLink http://dx.doi.org/10.1787/888933005891

Figure S.D.5. **Changes in overall average rate progression and standard deviation for two-earner married couples without children**
StatLink http://dx.doi.org/10.1787/888933005910

Figure S.D.6. **Changes in overall average rate progression and standard deviation for two-earner married couples with 2 children**
StatLink http://dx.doi.org/10.1787/888933005929

ANNEX S.E

Average tax rate progression in 2012: Country charts

Figures available online only:

Figure S.E.1. **Average rate progression in 2012 for single taxpayers without children**

StatLink http://dx.doi.org/10.1787/888933005948

Figure S.E.2. **Average rate progression in 2012 for single parents with 2 children**

StatLink http://dx.doi.org/10.1787/888933005967

Figure S.E.3. **Average rate progression in 2012 for one-earner married couples without children**

StatLink http://dx.doi.org/10.1787/888933005986

Figure S.E.4. **Average rate progression in 2012 for one-earner married couples with 2 children**

StatLink http://dx.doi.org/10.1787/888933006005

Figure S.E.5. **Average rate progression in 2012 for two-earner married couples without children**

StatLink http://dx.doi.org/10.1787/888933006024

Figure S.E.6. **Average rate progression in 2012 for two-earner married couples with 2 children**

StatLink http://dx.doi.org/10.1787/888933006043

ANNEX S.F

Change in average tax rate progression over the 2000-12 time interval: Country charts

Figures available online only:

Figure S.F.1. **Change in average rate progression over the 2000-12 time interval for single taxpayers without children**
StatLink http://dx.doi.org/10.1787/888933006062

Figure S.F.2. **Change in average rate progression over the 2000-12 time interval for single parents with 2 children**
StatLink http://dx.doi.org/10.1787/888933006081

Figure S.F.3. **Change in average rate progression over the 2000-12 time interval for one-earner married couples without children**
StatLink http://dx.doi.org/10.1787/888933006100

Figure S.F.4. **Change in average rate progression over the 2000-12 time interval for one-earner married couples with 2 children**
StatLink http://dx.doi.org/10.1787/888933006119

Figure S.F.5. **Change in average rate progression over the 2000-12 time interval for two-earner married couples without children**
StatLink http://dx.doi.org/10.1787/888933006138

Figure S.F.6. **Change in average rate progression over the 2000-12 time interval for two-earner married couples with 2 children**
StatLink http://dx.doi.org/10.1787/888933006157