OECD Tax Policy Studies

Taxation and Employment

OECD

No. 21

OECD Tax Policy Studies

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OECD

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Please cite this publication as:
OECD (2011), *Taxation and Employment*, OECD Tax Policy Studies, No. 21, OECD Publishing.
http://dx.doi.org/10.1787/9789264120808-en

ISBN 978-92-64-12059-4(print)
ISBN 978-92-64-12080-8 (PDF)

Series: OECD Tax Policy Studies
ISSN 1990-0546 (print)
ISSN 1990-0538 (online)

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Foreword

Taxes on labour income – including social security contributions – account for around one half of total tax revenue, on average, in OECD countries. As such, it is unsurprising that these taxes can have a significant impact on employment. This report examines in detail the effects of taxation on employment, highlights the resulting policy challenges, and discusses options for responding to these challenges.

While the effects of taxation on employment have always been of particular interest to tax policy makers, the topic takes on greater importance in light of the high unemployment rates that have occurred in the wake of the recent financial and economic crisis. Additionally, population aging has highlighted the importance of increasing the labour force participation of older workers if social security costs are to be contained. Meanwhile, increasing international labour mobility, particularly among the high-skilled, is creating new challenges for tax systems across the world that have traditionally assumed low migration.

The report provides both a broad overview of the effects of taxation on employment as well as a detailed analysis of selected issues. Chapter 1 of the report provides the overview, examining how taxes on labour income can affect both the size of the labour force and the level of (involuntary) unemployment, and highlighting key areas of concern for tax policy makers. This analysis is then augmented in Chapters 2 to 4 by the more detailed analysis of the effects of taxation on the employment of three key groups: low-income workers, older workers, and mobile high-skilled workers.

As well as discussing key areas of concern for tax policy makers, the report places a particular focus on the different measures that have been adopted by countries to overcome these problems. It discusses the main design features, and the advantages and disadvantages of the different approaches that have been adopted. This analysis draws heavily on information gathered from a questionnaire issued to OECD countries in early 2010. The questionnaire sought information as of 1 January 2010 and the material presented in the report relates to that date unless otherwise specified.

This report was prepared by Alastair Thomas of the OECD Secretariat. It draws on information and comments received from Delegates to Working Party No. 2 on Tax Policy Analysis and Tax Statistics of the OECD Committee on Fiscal Affairs.

Table of Contents

Executive Summary 9

Chapter 1. **The Effects of Taxation on Employment: An Overview** 13
1.1. Employment in OECD countries 15
1.2. The taxation of labour income in OECD countries 18
1.3. Taxation and unemployment 23
1.4. Taxation and labour supply 28
1.5. Non-labour taxes and employment 32
1.6. Key employment-related tax policy challenges 33
1.7. Summary and Conclusions 43
Notes 45

Chapter 2. **The Taxation of Low-Income Workers** 49
2.1. Trade-offs in designing tax-benefit systems: Consequences for employment . . . 51
2.2. Quantifying the financial disincentives to work 55
2.3. Reducing the tax burden on labour 61
2.4. In-work tax credits or benefits 67
2.5. The effect of taxation on the demand for low-income workers 85
Notes 89

Chapter 3. **The Taxation of Older Workers** 91
3.1. The retirement behavior of older workers 93
3.2. Factors affecting retirement behavior 95
3.3. Quantifying the financial incentive to retire 98
3.4. The tax treatment of older workers and retirees 107
3.5. Policies to improve work incentives for older workers 115
3.6. The effect of taxation on the demand for older workers 117
Notes 120

Chapter 4. **The Taxation of Mobile High-Skilled Workers** 123
4.1. The mobility of high-skilled workers 125
4.2. The effect of tax on migration decisions 125
4.3. Tax concessions for high-skilled workers: arguments for and against 131
4.4. Tax concessions for high-skilled workers: key design issues 137
Notes 146

References 148

Annex A. Additional Labour Force and Tax Burden Information 155
Annex B. Additional Retirement Incentive Modelling Results 164

Boxes

1.1. The effect of taxes on unemployment: Theoretical models 25
1.2. Labour taxation, demand shocks and unemployment 26
1.3. Comparing tax wedges for single individuals and second earners in OECD countries 39
2.1. Taxing low-income workers: Lessons from optimal income tax theory 53
2.2. Calculating PTRs and METRs 55
2.3. Defining an "in-work credit" 67
2.4. Employment effects of in-work credits: Theory and evidence 69
2.5. Assessing the effectiveness of tax measures to increase demand for low-income workers 88
3.1. The effect of taxes on the financial incentive to retire 100
3.2. OECD pensions models: Underlying assumptions 101
3.3. Assessing the effectiveness of tax measures to increase demand for older workers: Finland 120
4.1. Take-up of targeted tax concessions for high-skilled workers 139

Tables

1.1. Average and marginal tax wedges for eight family types: OECD averages, 2010 21
2.1. Permanent in-work tax credits (and equivalent benefit schemes) in OECD countries, 2010 71
2.2. Tax measures to increase demand for low-income workers, 2010 87
3.1. Tax concessions for older people in OECD countries (2010, unless otherwise specified) 108
3.2. Tax measures to increase labour demand for older workers, 2010 119
4.1. Tax concessions for high-skilled workers in OECD countries, 2010 138

Figures

1.1. OECD average unemployment rate (age 15-64): 2000-09 15
1.2. OECD average employment-to-population rates (age 15-64): 2000-09 16
1.3. OECD average employment-to-population rates (age 55-64): 2000-09 16
1.4. OECD average employment-to-population rates (age 25-64) by education level: 2000-08 17
1.5. OECD average hours worked per worker per year: 2000-09 17
1.6. Average tax wedge for single individual earning 67% of the average wage: 2010 19
1.7. Average tax wedge for single individual earning 100% of the average wage: 2010 19
1.8. Average tax wedge for single individual earning 167% of the average wage: 2010 19
1.9. Marginal tax wedge for single individual earning 67% of the average wage: 2010 20
1.10. Marginal tax wedge for single individual earning 100% of the average wage: 2010 20
1.11. Marginal tax wedge for single individual earning 167% of the average wage: 2010 20

1.12. Average combined (income plus consumption) and income tax wedges for single individual earning 100% of the average wage 23
1.13. Average tax wedge – Single individual *versus* second earner; income = 67% of AW; (primary earner income = 100% of AW) 39
1.14. Average tax wedge – Single parent *versus* second earner (two children); income = 67% of AW; (primary earner income = 100% of AW) . . 39
1.15. Marginal tax wedge – Single parent *versus* second earner (two children) income = 67% of AW; (primary earner income = 100% of AW) . . 40
2.1. Decomposition of Participation Tax Rate: Moving from short-term unemployment to full-time work at 50% of AW (wage before unemployment = 50% of AW), 2009 . 56
2.2. Decomposition of Participation Tax Rate: Moving from long-term unemployment or inactivity to full-time work at 50% of AW, 2009 58
2.3. Decomposition of Marginal Effective Tax Rate: Increasing hours worked, moving from earning 50 to 55 per cent of the AW, 2009. 59
2.4. Average tax wedge for a single individual earning 50% of the AW, 2000-09. . . . 61
2.5. Average tax wedge for a single parent with two children earning 50% of the AW, 2000-09 62
2.6. Average tax wedge for one-earner family with two children earning 50% of the AW, 2000-09 62
2.7. Targeting of in-work credits in OECD countries (for single parent with two children), 2010 77
2.8. Maximum credit size of in-work tax credit schemes (for single parent with two children), 2010 79
2.9. Primary phase-out rates of in-work tax credit schemes (for single parent with two children), 2010 80
2.10. Fiscal cost of in-work tax credit schemes, 2009 (or most recent year available) 80
3.1. Labour force participation of workers, by age: 2009. 94
3.2. Average age of labour-market exit and normal pensionable age. 94
3.3. Retirement windows: Normal and early pension ages for men, 2008. 102
3.4. The financial incentive to retire (single male earning 100% of AW; deferring retirement from age 60-65) 103
3.5. The financial incentive to retire (single male earning 100% of AW; deferring retirement from age 65-66) 103
3.6. Gross and net pension wealth as a multiple of the AW (single male earning 100% of AW; aged 65) 106
4.1. Stock of foreign-born high-skilled workers as a percentage of employment, 2000-2005 126
A.1. Unemployment rates (age 15-64): 2009 155
A.2. Unemployment rates (age 15-24): 2009 155
A.3. Unemployment rates (age 55-64): 2009 156
A.4. Unemployment rates (age 25-64) by education level: 2008 156
A.5. Employment-to-population rates (age 15-64): 2009 156
A.6. Employment-to-population rates (age 55-64): 2009 157
A.7. Employment-to-population rates (age 25-64) by education level: 2008. 157
A.8. Hours worked per worker per year: 2009. 157
A.9. OECD average unemployment rates (age 15-64): 2000-09 158

A.10. OECD average unemployment rates (age 55-64): 2000-09 158
A.11. OECD average unemployment rates (age 25-64) by education level: 2000-08. . . 158
A.12. OECD average participation (labour force-to-population) rates (age 15-64): 2000-09 159
A.13. OECD average participation (labour force-to-population) rates (age 55-64): 2000-09 159
A.14. OECD average participation (labour force-to-population) rates (age 25-64) by education level: 2000-08 159
A.15. Average tax wedge for single parent with two children earning 67% of the average wage: 2010 160
A.16. Average tax wedge for one-earner family with two children earning 100% of the average wage: 2010 160
A.17. Average tax wedge for two-earner family with two children earning 100%/33% of the average wage: 2010 160
A.18. Average tax wedge for two-earner family with two children earning 100%/67% of the average wage: 2010. 161
A.19. Average tax wedge for two-earner family with no children earning 100%/33% of the average wage: 2010. 161
A.20. Marginal tax wedge for single parent with two children earning 67% of the average wage: 2010. 161
A.21. Marginal tax wedge for one-earner family with two children earning 100% of the average wage: 2010. 162
A.22. Marginal tax wedge for two-earner family with two children earning 100%/33% of the average wage: 2010. 162
A.23. Marginal tax wedge for two-earner family with two children earning 100%/67% of the average wage: 2010. 162
A.24. Marginal tax wedge for two-earner family with no children earning 100%/33% of the average wage: 2010. 163
B.1. Disincentive to continue working from 60-65 (left) and 65-66 (right) 164
B.2. Gross and net pension wealth as a multiple of the AW (Single male earning 100% of AW; aged 60) 165

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Executive Summary

Achieving a high level of employment is generally considered desirable for a number of economic and social reasons. However, tax systems will generally act to deter employment by reducing the returns to working received by employees, and/or increasing the labour costs faced by employers. This publication examines the effects of taxation on employment, considers the resulting policy challenges, and discusses the ways governments endeavour to address these challenges.

The report provides both a broad overview of the effects of taxation on employment as well as a detailed analysis of selected issues. Chapter 1 of the report provides the overview, examining how taxes on labour income can affect both the size of the labour force and the level of unemployment, and highlighting key areas of concern for tax policy makers. This analysis is then augmented in Chapters 2 to 4 by the more detailed analysis of the effects of taxation on the employment of three groups where empirical research suggests that responses of labour supply to taxation may be relatively large: low-income workers, older workers, and mobile high-skilled workers. As well as highlighting key challenges for tax policy makers, the report places a particular focus on the different measures that have been adopted by countries in response. It discusses, where possible, the main design features, and the advantages and disadvantages of the different approaches that have been adopted. This analysis draws heavily on practical country experiences as reported by Delegates to Working Party No. 2 on Tax Policy Analysis and Tax Statistics of the OECD Committee on Fiscal Affairs.

Overall, employment rates in the OECD area have remained stable at around 65 per cent for the working age population over the 10 years before the financial crisis, though average hours worked per worker have been falling over the same period. However, employment rates are particularly low for three groups: older workers, second earners (who are often women), and low-skilled (generally low-income) workers. The low employment rates of older workers and women are driven predominantly by substantially lower than average labour force participation, while both higher (involuntary) unemployment and lower participation contribute to the low employment rates of low-skilled workers.

Tax burdens on labour income vary significantly depending on income and family characteristics, with substantial variation also across countries. For a single individual earning the average wage in their country, income tax and social security contributions can result in tax wedges ranging from as low as seven per cent to as high as 55 per cent, and marginal tax wedges ranging from seven to 66 per cent. Looking across all OECD countries, the (unweighted) average tax wedge for a single individual earning the average wage is 35 per cent, and the marginal wedge is 44 per cent. In general, taxpayers with children face lower tax wedges than taxpayers without children, while second earners often face higher average and marginal tax wedges than primary earners. Consumption taxes can add as

much as 12 percentage points more to these burdens. Furthermore, the interaction of benefit and pension systems with the tax system can lead to even greater effective tax burdens. For example, in a small number of countries the income-based withdrawal of benefit payments can create effective tax rates on entering employment, or on increasing the number of hours worked once in employment, of more than 100 per cent.

These tax burdens can influence the level of employment in an economy through their effect on both labour supply and the level of (involuntary) unemployment. Labour taxes may also result in some individuals working in the informal sector rather than taking formal employment.

The effect of taxation on labour supply decisions will reflect the heterogeneous nature of the potential labour force. That is, different individuals will respond differently to a change in the real consumption wage depending on their individual preferences and family characteristics. In modelling the responsiveness of different demographic groups, labour supply is often assumed in simple models to be homogenous and described in terms of two characteristics – participation, and number of hours worked. However, labour taxes will also affect a number of other labour supply decision margins. In particular, tax will affect the amount of effort an individual is willing to put into his or her work. Longer term labour supply decisions, such as choice of occupation, and whether to undertake further education, may also be tax influenced.

Empirical evidence suggests that low-income workers, single parents, second earners and older workers are relatively responsive to changes in labour income taxation, particularly at the participation margin. In addition, taxable income elasticities suggest that higher-income individuals are more responsive to taxes than middle- and lower-income workers. The variation in empirical estimates highlights the need for tax policy makers to be aware of the groups likely to be affected by a tax change, and their likely response to the change, in order to understand the overall impact of the reform on employment, tax revenue and the income distribution.

Tax will also affect a number of margins that may not generally be considered as affecting employment, *per se*, but that still carry with them significant efficiency consequences – the decision to engage in tax avoidance or evasion (including working in the informal sector) is clearly tax motivated. Tax may also influence the form in which compensation is taken (biasing towards tax-favoured forms such as pensions, or fringe benefits, including less obvious forms such as improved working conditions), and create a bias towards tax-favoured forms of consumption (for example, charitable giving and housing).

While labour taxes will, in general, reduce the level of employment in (the formal sector of) an economy, whether they affect (involuntary) unemployment is slightly less clear. Nevertheless, the weight of both theoretical and empirical evidence tends to suggest that labour taxes may interact with other labour market institutions – such as unionised bargaining and minimum wage laws – to push wages above market clearing levels, thereby increasing long-run "equilibrium" unemployment. In particular, strong but decentralised (*i.e.* sectorial) unions may push for higher wages to compensate for a tax increase without fully accounting for any unemployment that may result. Meanwhile, generous minimum wage laws in combination with substantial payroll taxes and/or employer social security contributions may price some low-skilled workers out of employment. As institutional settings vary significantly across OECD countries, the effect of taxation on long-run unemployment is likely to be highly country specific.

While taxes on labour income have the clearest and most direct impact on employment, almost all taxes can have some effect on employment, indirectly, by distorting economic decisions, and thus leading to an inefficient allocation of resources and reduced labour demand. Perhaps the most significant indirect effect on employment is likely to come from the corporate income tax, which may be borne by capital, labour, consumers, or (more likely) some combination of the three. While empirical evidence on the incidence of the CIT is limited, it does suggest that at least some of the burden is borne by labour (through, for example, lower investment leading to lower capital/labour ratios, and hence lower wages).

Drawing together the analysis in the report, a number of key employment-related tax policy challenges can be identified. These arise, in general, where high tax burdens are imposed on groups whose labour supply is relatively responsive to economic incentives. Such cases provide significant scope for tax reforms to increase employment. These areas of concern are briefly outlined below, along with potential reform options drawn from the country examples discussed in this report.

- *Low-income workers.* Effective tax burdens on low-income workers are often very high due to the combined impact of taxation and benefit withdrawal on entering employment, or on increasing hours worked once in employment. Furthermore, empirical evidence highlights the high responsiveness of low-income workers to these disincentives, particularly at the participation margin. Possible options to improve work incentives include: reducing personal income tax and social security contribution burdens on low-income workers (*e.g.* by raising personal allowances), and introducing in-work tax credits (or equivalent benefit schemes). The latter have become an increasingly popular tool to both increase work incentives and alleviate in-work poverty. However, the fiscal costs of such tax reliefs and credits limit their affordability; and in the latter case this often leads governments to impose high marginal effective tax rates as credits are withdrawn as income rises (or to provide less generous credits or benefits).
- *Older workers.* Tax and pension systems often combine to create significant incentives for older workers to retire and empirical evidence suggest that the retirement decision of older workers is highly responsive to such incentives. Where work disincentives are extremely strong, they tend to be driven by pension systems – in which case pension reforms will be the most appropriate means of addressing the problem. While the contribution of tax factors to these employment disincentives is often subsidiary, in many countries there is substantial scope for tax reform to improve work incentives for older workers. Possible options to improve work incentives include: providing age-based rather than pension-specific tax concessions; reducing social security contribution burdens on older workers to match those due on pension income; and providing in-work tax credits targeted at older workers.
- *Mobile high-skilled workers.* Tax systems often impose high tax burdens on high-skilled workers, and estimates of taxable income elasticities suggest that high income recipients are more responsive than most taxpayers to tax rates. Migration does not appear to be a significant driver of these elasticities and the limited empirical evidence does not suggest migration decisions are highly responsive to tax. Nevertheless, international mobility may still be a concern for governments as high-skilled workers can add significant value to an economy. As such, there may be merit, in certain cases, in introducing tax concessions targeted at mobile high-skilled workers. This may

particularly be the case in countries with higher than average taxation of labour income, and high and/or complex taxation of foreign sourced capital income. Such schemes have become increasingly popular in OECD countries. However, scheme design can become complex, imposing substantial compliance and administrative costs relative to the potential gains in employment.

- *Second earners.* Tax systems often create significant work disincentives for second earners, while empirical evidence highlights the higher responsiveness of second earners to these disincentives. Possible options to improve second earner work incentives include: moving from family-based towards individual based taxation; increasing individual allowances; and removing dependent spouse allowances. Where equity-based objectives do not allow a shift away from family-based taxation, the introduction (or increase in value) of an independent allowance for second earners will increase second earner work incentives.
- *Pricing low-skilled workers out of employment.* As well as reducing the supply of low-income workers, the high taxes imposed on low-income workers in many countries may also reduce labour demand. This may cause some low-skilled workers to be "priced out" of employment by high employer social security contributions, generous minimum wage laws, or a combination of both. Possible options to improve demand for low-skilled workers include: reducing employer social security contributions and providing employer tax credits targeted at low-skilled workers.

A number of the reforms discussed above would involve a revenue cost and therefore would require either a reduction in public expenditure, or an increase in taxes – either on other tax bases or on different workers. In many cases, reductions in expenditure may conflict with other government goals. Meanwhile, shifting the tax burden towards another base requires a trade-off to be made between the employment gains from reducing the taxation of labour income, and the distributional and efficiency consequences of increasing the tax burden on the other base. A detailed country-specific analysis of the pros and cons of such a shift would be necessary before implementing any such reform.

However, even where reducing the overall tax burden on labour is not feasible, increases in employment may still be possible through a redistribution of the labour tax burden. Employment gains may be made by reducing marginal and/or average tax burdens faced by more responsive groups, such as those highlighted above, at the expense of less responsive groups. In doing so, the distributional consequences of such reforms must also be considered.

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Chapter 1

The Effects of Taxation on Employment: An Overview

This chapter provides a broad overview of how taxation affects employment. This analysis is then augmented in the following chapters of the report by the more detailed analysis of the effects on three groups where empirical research suggests that responses of labour supply to taxation may be relatively large: low-income workers, older workers and mobile high-skilled workers.

The chapter focuses predominantly on taxes on labour income – personal income taxes, and employer and employee social security contributions – as these taxes have the clearest and most direct effect on employment. That said, as consumption taxes are also borne at least in part by labour, their effects on labour markets are also considered, while the effects of other taxes are discussed briefly as well.

Employment can occur in the formal sector of the economy, in the "informal" sector (where information is not reported to authorities), and in the home through the provision of unpaid domestic services (such as childcare). While recognising that taxation may affect choices between paid work in the formal sector, paid work in the informal sector, and unpaid work on domestic activities, this report focuses on employment in the formal sector.

Achieving a high level of employment is generally considered desirable for a number of economic and social reasons. In particular, this is because the level of employment in an economy is a key determinant of output. Furthermore, in the context of rapidly aging populations and longer life expectancies in most OECD countries, increasing labour force participation is likely to be an important factor in ensuring the sustainability of social security systems (both in terms of reducing benefit payments and increasing tax revenues). These benefits from increased employment need, of course, to be considered alongside wider effects on welfare.

The taxation of labour income can influence the level of employment in an economy through its effect on both the level of unemployment and the size of the labour force. Labour taxation drives a wedge between the total labour costs faced by employers and the real consumption wage received by employees. This will generally affect both labour demand and labour supply decisions. In imperfect labour markets, taxes may increase long-run "equilibrium" unemployment by interacting with other labour market institutions – such as unionised bargaining and minimum wage laws – to push market wages above market clearing levels.

Irrespective of the level of unemployment, labour taxes may affect the size of the labour force by reducing the incentive to work (at all, or in the formal sector). The effect of taxation on labour supply decisions will reflect the heterogeneous nature of the potential labour force – different individuals will react differently to a change in the real consumption wage depending on their individual preferences and family characteristics. For example, second earners may be more responsive to tax changes than primary earners, and so a tax of the same magnitude on both groups may result in a greater fall in the labour supply of second earners than primary earners. Furthermore, there are various decision margins that the taxation of labour income may impact on. While the two most commonly considered

margins relate to participation (including the retirement decision) and the number of hours worked, labour taxes may also, for example, affect decisions relating to effort, education, training and career choice (including whether to be an employee or self-employed).

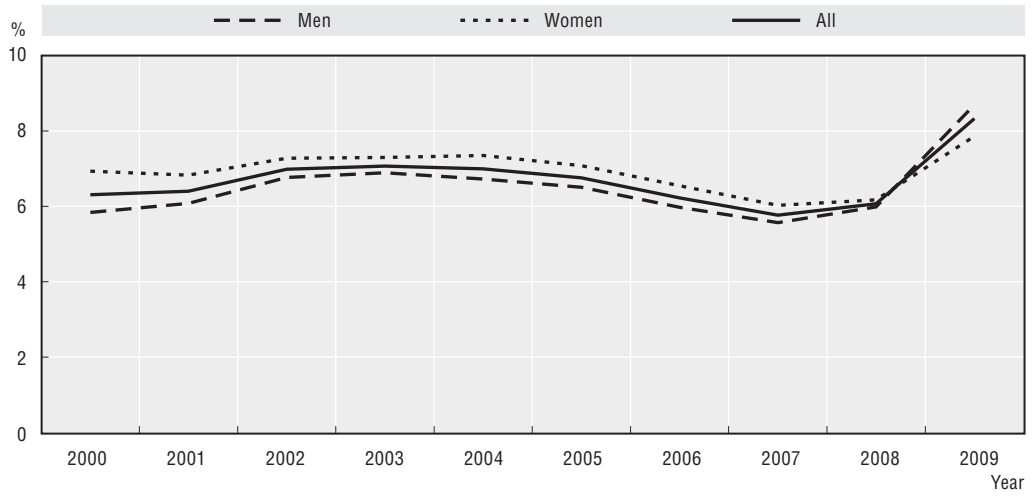
The chapter proceeds as follows: First we consider the varying employment levels and trends across different population groups in OECD countries. We then outline the size of the tax burden imposed on labour income, before explaining how that burden may affect, in turn, long-run unemployment and the supply of labour. We then turn briefly to the impact of non-labour taxes on employment, before drawing together the preceding information to highlight a number of key employment-related tax policy challenges.

1.1. Employment in OECD countries

This section provides background information on both employment levels and recent trends in OECD countries. It presents both unemployment and employment rates before turning to broader measures of labour utilisation. While the section presents OECD average rates, individual country data is provided in Annex A.

Figure 1.1 presents the OECD average unemployment rate (weighted by population).[1] It has stayed relatively stable at between roughly six and seven per cent over most of the period considered, with figures slightly higher for women than men. The impact of the recent global financial and economic crisis can be seen in the increase in unemployment to around eight per cent in 2009, with a slightly higher figure for men than women.

Figure 1.1. **OECD average unemployment rate (age 15-64): 2000-09**

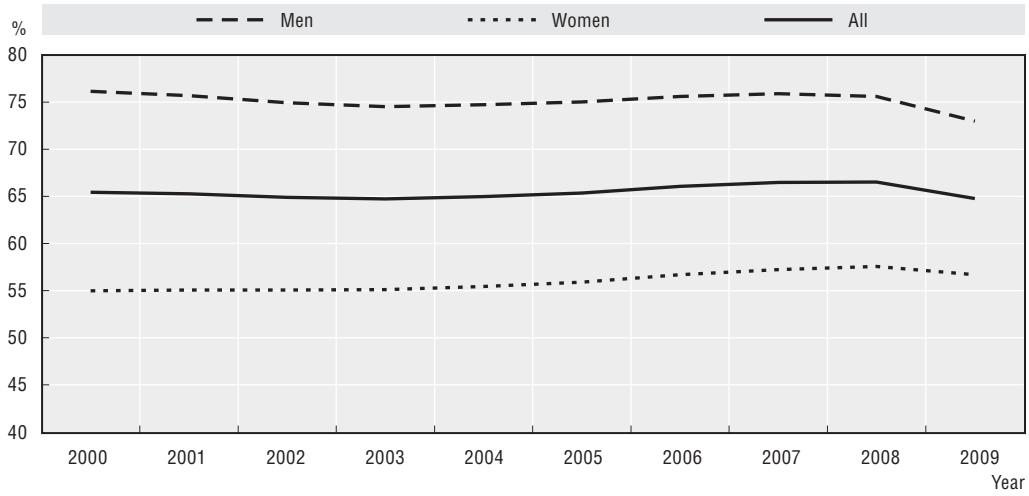


Source: OECD *Employment Database.*

StatLink http://dx.doi.org/10.1787/888932482479

Figures 1.2 and 1.3 present OECD average employment-to-population rates (weighted by working age population) broken down by gender and age group, while Figure 1.4 presents a breakdown across education levels.[2] Figure 1.2 shows that around 65 per cent of the working age population (15-64 year olds) are employed, but with employment substantially higher for men than women. There is however a trend increase in female employment, particularly since 2003 (although this is interrupted by the crisis in 2009). The same gap between men and women is present for older workers (55-64 year olds, see Figure 1.3), yet a clear trend increase can be seen, particularly in female employment.

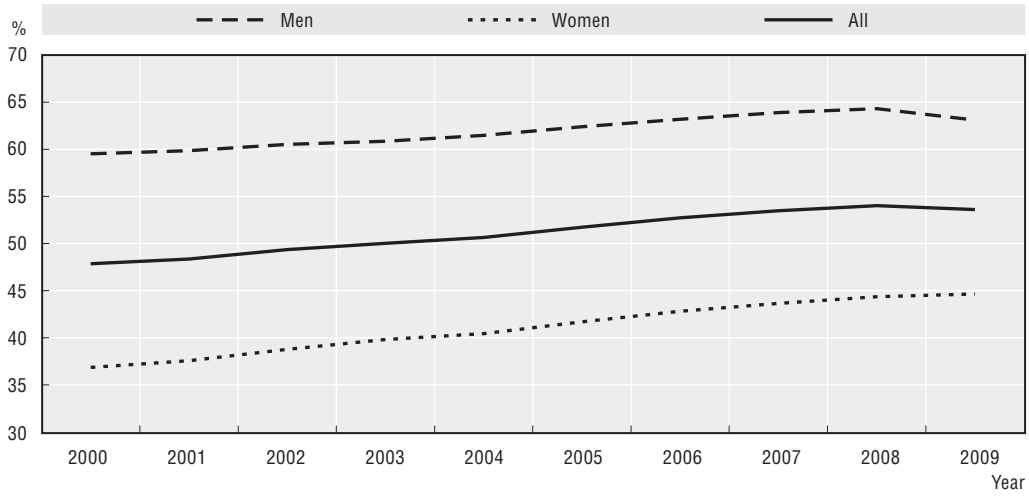
Figure 1.2. **OECD average employment-to-population rates (age 15-64): 2000-09**



Source: OECD *Employment Database.*

StatLink http://dx.doi.org/10.1787/888932482498

Figure 1.3. **OECD average employment-to-population rates (age 55-64): 2000-09**



Source: OECD *Employment Database.*

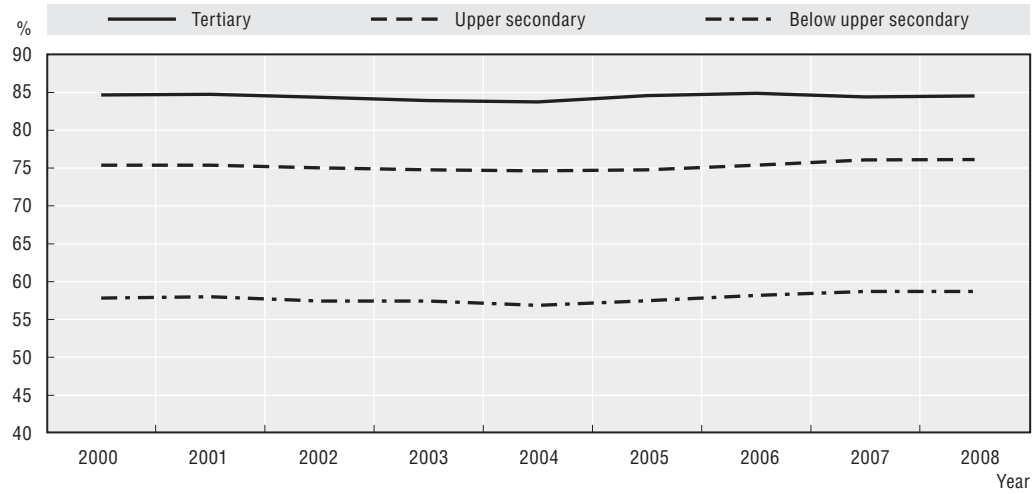
StatLink http://dx.doi.org/10.1787/888932482517

Nevertheless, total employment is still significantly less for older workers than the overall working age population. As shown in Annex A, these differences are predominantly due to lower participation amongst both women and older workers (see Figures A.12 and A.13). Similarly, younger workers also have far lower employment rates than the overall population. We do not present youth employment rates here as these can be misleadingly low due to education choices. However, looking at the youth (15-24 years old) unemployment rate (see Figure A.2 in Annex A) we see this is substantially higher than the overall unemployment rate.

Additionally, there is substantial variation in employment rates across countries. For example, the total employment rate for the working age population ranges from 79 per cent in Switzerland to 44 per cent in Turkey (in 2009). (See Figure A.5 in Annex A).

Turning to education levels, Figure 1.4 breaks down the aggregate employment rate by three education levels: individuals with a tertiary qualification, individuals with upper

Figure 1.4. **OECD average employment-to-population rates (age 25-64) by education level: 2000-08**



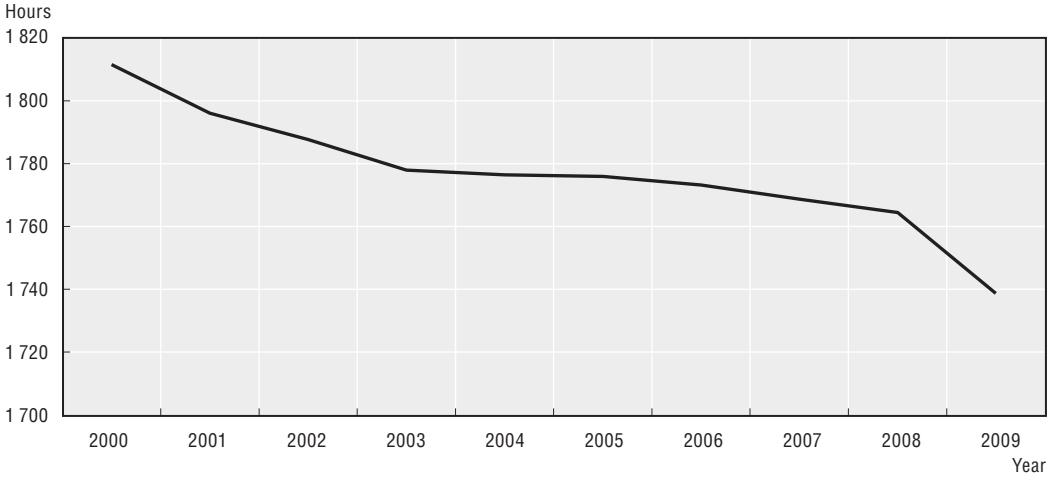
Source: OECD *Employment Database.*

StatLink http://dx.doi.org/10.1787/888932482536

secondary level education (but no tertiary qualification), and individuals with less than upper secondary level education. Employment rates for tertiary educated individuals are very high, but are relatively low for those with less than upper secondary education. This is due to both higher unemployment and lower participation of less educated workers (see Figures A.11 and A.14 in Annex A). There are similar gender gaps for each education level, while there is again substantial variation in rates between countries (Figure A.7).

To obtain a broader view of total labour utilisation, data on the average number of hours worked in OECD countries are also presented. Figure 1.5 shows that, on average, there has been a small reduction in hours worked over the past decade in OECD countries (see Figure A.8 in Annex A for individual country data). Nevertheless the average is still relatively high when compared to a rough "maximum" of 2 080 hours (40 hours per week for 52 weeks) per year. Breakdowns by gender, age, and education level are not available.

Figure 1.5. **OECD average hours worked per worker per year: 2000-09**



Source: OECD *Employment Database.*

StatLink http://dx.doi.org/10.1787/888932482555

To summarise, the overall employment rate over the last 10 years has been roughly constant at around 65 per cent in the OECD area, while there has been a small downward trend in hours worked. Furthermore, low employment is particularly prevalent amongst women, older workers, and low-skilled workers, although there has been a trend increase in employment of both women and older workers (financial and economic crisis aside). Low participation tends to be the predominant factor in these low employment rates, although higher than average unemployment is also particularly prominent for low-skilled workers.

1.2. The taxation of labour income in OECD countries

Before discussing the ways in which tax may affect employment, it is useful to have an understanding of the size of the tax burden currently being imposed on labour. As noted already, taxation distorts the labour market by driving a wedge between the total labour costs faced by employers and the return to employees providing the labour, thus affecting both labour demand and supply decisions, and therefore the level of employment. This section presents various measures of this wedge drawing on the OECD *Taxing Wages* models (see OECD, 2011a).

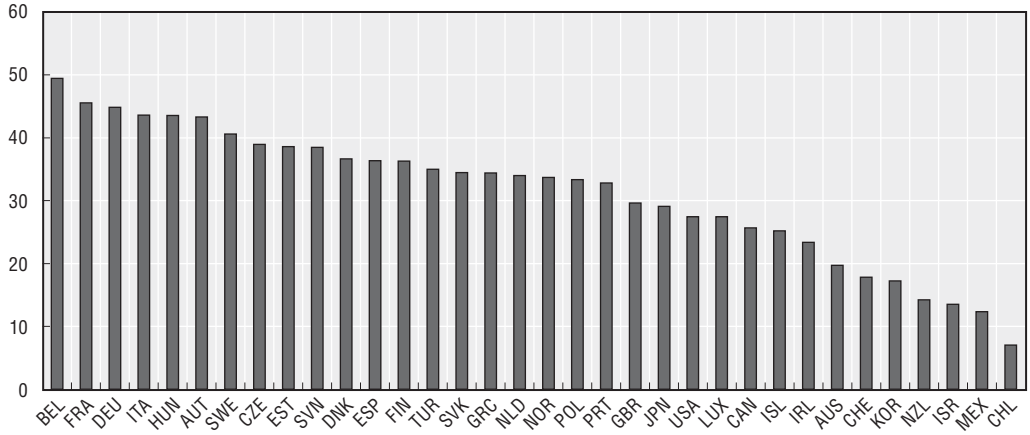
The OECD *Taxing Wages* models use the parameters of tax systems in OECD countries to provide comparative information on tax rates and tax wedges for eight different hypothetical family types. The family types vary by income (based on a percentage of the average wage), number of children and marital status. We use these models to present both average and marginal tax wedges for various family types. The average tax wedge measures the total labour tax burden [defined as income tax plus employee social security contributions (SSC) plus employer SSC (including payroll taxes)][3] less cash transfers related to income level and family characteristics,[4] as a percentage of total labour costs (defined as gross wages plus employer SSC). The marginal tax wedge measures the increase in the total labour tax burden (less cash transfers) that results from a one currency unit increase in total labour costs.[5]

By presenting the wedge inclusive of both taxes legally levied on employees (income taxes and employee SSC) and on employers (employer SSC and payroll taxes), no attempt is made to consider economic incidence. Rather these measures simply attempt to measure the total tax burden affecting the labour market at different margins.

We first consider the tax wedge on a single individual, before turning to other family types. Figure 1.6 presents the average tax wedge across OECD countries for a single individual earning 67 per cent of the average wage in the respective country, while Figures 1.7 and 1.8 show the same for income equal to 100 per cent and 167 per cent of the average wage. These results emphasise the large variation in the tax burden across countries. For a single individual earning the average wage, the tax wedge ranges from 55 per cent in Belgium to just seven per cent in Chile, with an OECD average of 35 per cent. For an individual earning 67 per cent of the average wage, the OECD average falls to 31 per cent, while for an individual earning 167 per cent of the average wage it is 39 per cent.

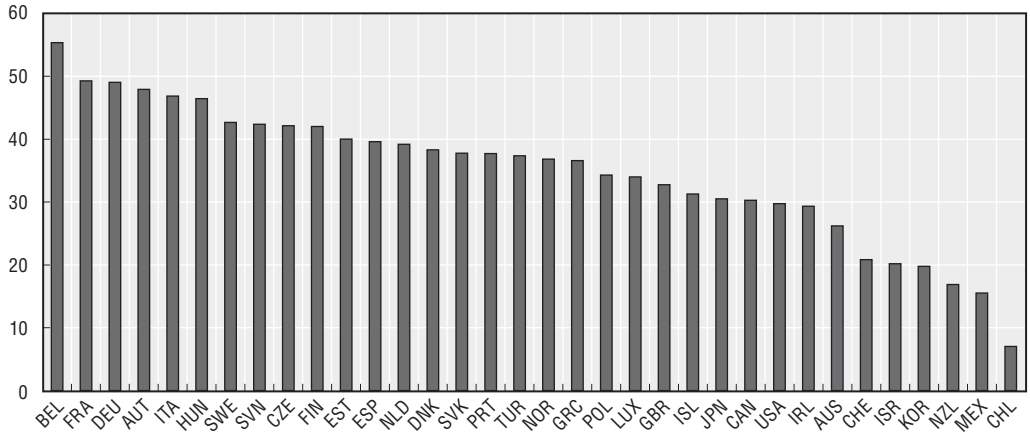
Turning to marginal tax wedges (Figures 1.9 to 1.11), these are considerably higher than average wedges, though again there is considerable variation across countries. The OECD average for a single individual earning 67 per cent of the average wage is 41 per cent, while it rises to 44 and 47 per cent for an individual earning 100 and 167 per cent of the average wage respectively.

Figure 1.6. **Average tax wedge for single individual earning 67% of the average wage: 2010**



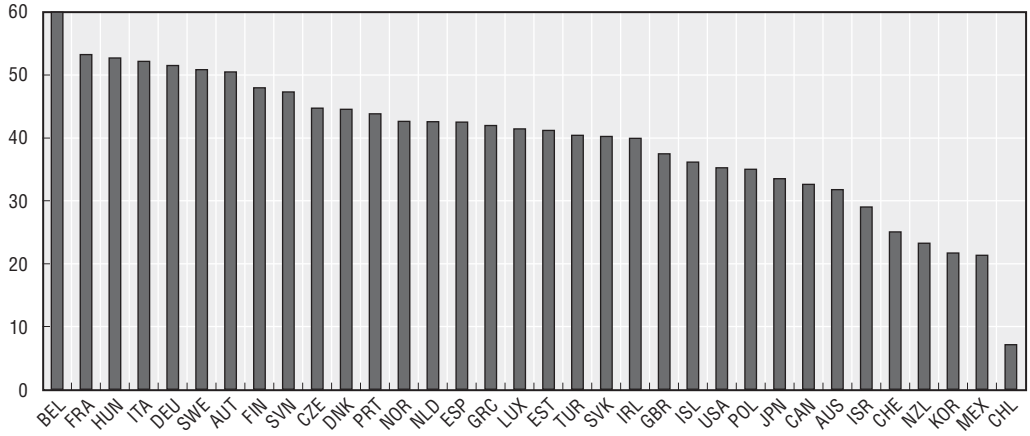
Source: OECD Taxing Wages models. *StatLink* http://dx.doi.org/10.1787/888932482574

Figure 1.7. **Average tax wedge for single individual earning 100% of the average wage: 2010**



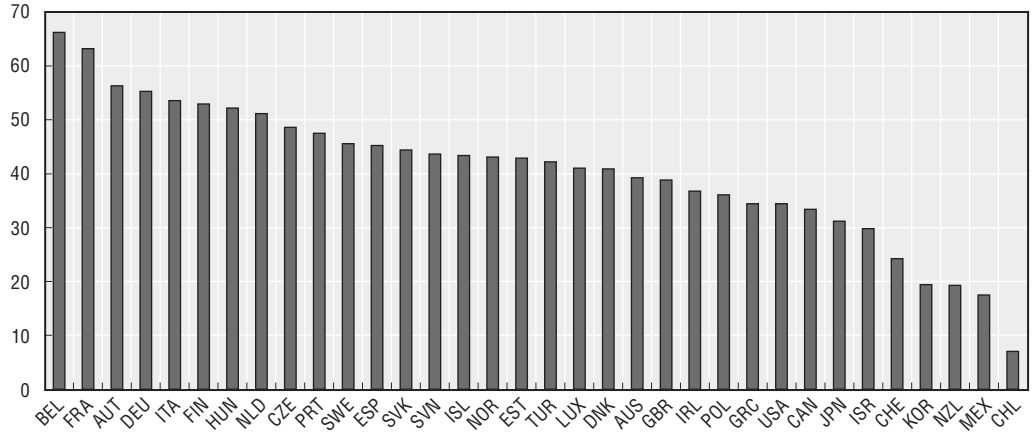
Source: OECD Taxing Wages models. *StatLink* http://dx.doi.org/10.1787/888932482593

Figure 1.8. **Average tax wedge for single individual earning 167% of the average wage: 2010**



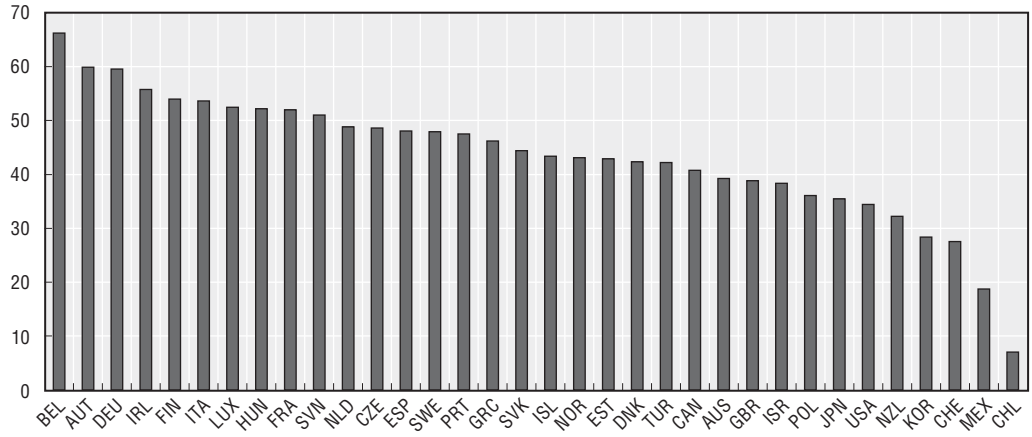
Source: OECD Taxing Wages models. *StatLink* http://dx.doi.org/10.1787/888932482612

Figure 1.9. **Marginal tax wedge for single individual earning 67% of the average wage: 2010**



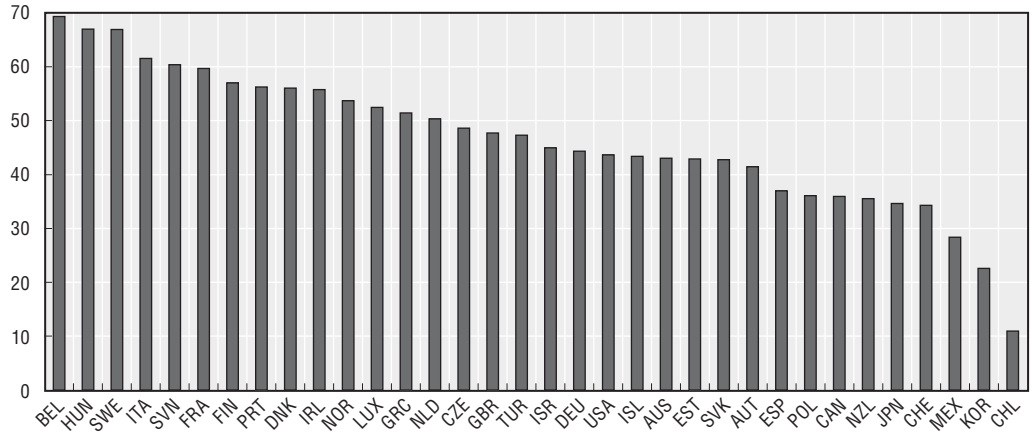
Source: OECD Taxing Wages models. StatLink http://dx.doi.org/10.1787/888932482631

Figure 1.10. **Marginal tax wedge for single individual earning 100% of the average wage: 2010**



Source: OECD Taxing Wages models. StatLink http://dx.doi.org/10.1787/888932482650

Figure 1.11. **Marginal tax wedge for single individual earning 167% of the average wage: 2010**



Source: OECD Taxing Wages models. StatLink http://dx.doi.org/10.1787/888932482669

Though the results vary across countries, tax clearly makes up a major component of total labour costs in most countries. Thus it is not surprising that tax will impact on the functioning of the labour market and in particular the level of employment. The high average tax wedges imply both potentially significant reductions in labour demand, as well as significant disincentives for workers to participate in the labour force. The higher marginal wedges imply strong disincentives for workers already in employment to work longer or harder. (These issues are discussed in more detail in Sections 1.3 and 1.4). The high marginal tax wedges may also imply significant disincentives for entrepreneurship and risk taking which may impact on long-run economic performance and hence demand for labour.

Because tax systems tend to impose different tax burdens on different taxpayers depending not just on their income but also on family characteristics, we also provide tax wedges for additional family types (see Figures A.15 to A.24 in Annex A). Table 1.1 summarises the OECD averages for these different groups. Family types 1-3 correspond to the individual taxpayers illustrated in Figures 1.6 to 1.11. Family type 4 is a single parent with two children earning 67 per cent of the average wage. Family types 5-7 are married couples with two children with varying second earner income levels. Finally, family type 8 is a two-earner married couple without children.[6]

Table 1.1. **Average and marginal tax wedges for eight family types: OECD averages, 2010**

Family type	Marital status	Number of children	Income[1]	Average tax wedge	Marginal tax wedge	
					Primary earner	Second earner
1	Single	0	67	31	41	–
2	Single	0	100	35	44	–
3	Single	0	167	39	47	–
4	Single	2	67	16	44	–
5	Married	2	100-0	25	44	32
6	Married	2	100-33	27	43	36
7	Married	2	100-67	30	44	42
8	Married	0	100-33	32	43	35

1. As a percentage of the average wage. For a two-earner family, the figures refer to primary and second earner income, respectively.

Source: OECD Taxing Wages models.

StatLink http://dx.doi.org/10.1787/888932483581

A clear drop in average tax wedges can be seen for families with children. This reflects the general desire of governments to ensure that families with children maintain a minimum standard of living. This is particularly evident for family type 4 (low-income single parent). Looking at Figure A.15 in Annex A, we actually see that in four countries (Australia, Canada, Ireland and New Zealand) the average tax wedge for family type 4 is negative – largely as a result of child transfers.

On the face of it, such negative wedges would imply a strong financial incentive for low-income single parents to enter the workforce. However, looking solely at (average or marginal) tax wedges for low-income workers is likely to be dangerous because out-of-work income sources (such as unemployment and social assistance benefits) are likely to also impact on work incentives.[7] The same is true for older workers whose work incentives will also be affected by out-of-work income (in the form of pension income). We discuss further the effect of out-of-work income on work incentives in Section 1.6 and in detail in Chapters 2 and 3.

Looking at the marginal wedges in Table 1.1, there is very little difference across different family types for primary earners. This can be slightly misleading though as wedges again vary significantly between countries. For example, the marginal tax wedge for family type 5 (married one-earner couple with two children earning the average wage) is 68 per cent in Canada and 66 per cent in Belgium, whereas it is only 19 per cent in Mexico and seven per cent in Chile (see Figure A.21 in Annex A).

For second earners, the marginal wedges are relatively high given the low levels of income they are earning individually. For example, comparing family type 7 with family types 4 shows the second earner facing, on average, a very similar tax wedge to that faced by a single individual (with two children) earning the same level of individual income. Once again, these averages hide significant variation across countries. Indeed, second earner marginal tax wedges are often significantly higher or lower than those of single individuals earning the same income in a number of countries. These variations can be due to a number of factors including the choice of tax unit and the withdrawal of tax credits or cash transfers on the basis of family income. Section 1.6 discusses second earner work incentives in more detail.

Consumption taxes

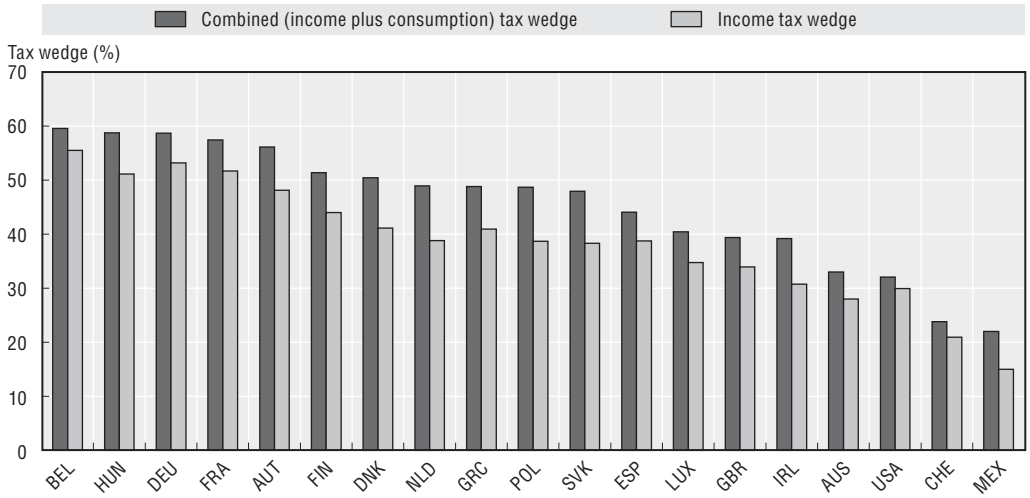
As noted earlier, consumption taxes are also borne to an extent by labour. This is because taxpayers generally work, not for the income they receive, but for the consumption they can obtain (either now or in the future) from that income. As such, a consumption tax acts equivalently to a direct tax on labour earnings in that it creates a wedge between the total labour costs faced by the employer and the return – in the form of the real consumption wage – received by the employee.[8]

This suggests that it is also useful to look at measures of the tax wedge that include consumption taxes. However, constructing a broader (income plus consumption) tax wedge creates a number of methodological difficulties because the "hypothetical taxpayer" structure of the *Taxing Wages* models is not overly compatible with consumption taxes which differ across taxpayers depending on consumption preferences. A number of studies include consumption taxes in an aggregate tax wedge based on national accounts data.[9] However, this also suffers from the aggregation process by effectively treating all individuals as having identical consumption preferences. This is clearly unlikely to be the case. In particular, consumption preferences are likely to differ according to income level and family structure.

We instead rely on recent OECD consumption tax modelling work that uses expenditure microdata from household budget surveys to simulate consumption taxes for families with similar characteristics to the eight *Taxing Wages* family types.[10] These consumption tax results are then combined with the *Taxing Wages* results to produce combined income plus consumption tax wedges. While the use of microdata ensures that the heterogeneity of consumption patterns amongst different family types is accounted for, it also limits the analysis to a subset of OECD countries for which microdata is available and modelling work has been undertaken.

Figure 1.12 presents a comparison of the standard *Taxing Wages* average income tax wedges with the combined average income plus consumption tax wedges for a single individual earning the average wage in selected countries. Annex A provides similar results for other family types. These results show that consumption taxes have a significant effect on the size of the overall average tax wedge, though increases vary

Figure 1.12. **Average combined (income plus consumption) and income tax wedges for single individual earning 100% of the average wage**



Note: Year is as follows: Finland, France (2006); Australia, Belgium, Denmark, Hungary, Luxembourg, Mexico, Poland, Slovak Republic, Switzerland, UK, US (2005); Austria, Greece, Ireland, Netherlands, Spain (2004); and Germany (2003).

Source: Thomas and Picos-Sanchez (2011); and OECD (2009a)

StatLink http://dx.doi.org/10.1787/888932482688

considerably depending on the country. On average, consumption taxes increase the average tax wedge by 7.8 percentage points in the countries considered. The largest absolute increase is for Finland where the wedge increases by 12.5 percentage points, while the smallest increase is of two percentage points for the United States. If we assume that marginal consumption is distributed roughly across the same bundle of goods as total consumption, then it is likely that consumption taxes will increase the marginal tax wedge by a similar amount as the average tax wedge.

In summary, this section shows that the tax burden on labour income can be substantial, with average tax wedges sometimes above 50 per cent for single individuals, although burdens vary significantly across countries and family types. Average tax wedges increase with income emphasising the progressivity inherent in the income tax systems in most OECD countries. They are lower for families with children, particularly for single parents (where they can be negative as a result of cash transfers). Marginal tax wedges tend to be larger than average tax wedges, sometimes above 70 per cent, while secondary earner marginal wedges are often higher than those for single individuals earning similar incomes.

Including consumption taxes can increase the tax wedge by as much as 12.5 percentage points, further emphasising the significant impact that taxation is likely to have on the labour market and employment. In the next two sections we explain the channels through which these substantial tax wedges may affect employment, turning first to unemployment, then to labour supply.

1.3. Taxation and unemployment

Labour taxes will, in general, reduce the level of employment in (the formal sector of) an economy. By increasing total labour costs and decreasing the after-tax real consumption wage, both labour demand and labour supply will fall thereby reducing employment, with the exact extent of the decrease depending on the relative bargaining power of employees

and employers.[11] Whether (and how) labour taxes affect unemployment though is slightly less clear, with empirical evidence to an extent mixed. Nevertheless, the weight of evidence tends to suggest that labour taxes do affect long-run "equilibrium" unemployment, predominantly through interacting with various institutional features of the labour market, such as unionised bargaining or minimum wage regulations. As institutional settings vary significantly across OECD countries, the effect of taxation on unemployment is likely to be highly country specific. This section investigates in detail the link between labour taxation and long-run unemployment, discussing both theoretical and empirical evidence.

Does tax affect unemployment?

In a perfectly competitive labour market, taxation would have no effect on unemployment as the real wage would adjust so that the market would clear. For example, an increase in employer SSC would raise total labour costs thereby reducing the demand for labour. However, the resulting excess supply of labour would lead to a fall in the real wage, reducing the supply of labour until the market cleared. In this case employment falls, but no unemployment is created because all individuals that leave the labour market do so voluntarily (as the return from working is no longer sufficient to induce them to offer their labour).

In practice, no labour market operates in this manner. At the very least, the nature of a labour market will result in some short-run unemployment as it takes time to match workers with vacancies (this is generally referred to as "frictional" or "search" unemployment). Additionally, short-run wage rigidities are also likely to result in some temporary unemployment. For example, it may take time for wages to be renegotiated in response to a reduction in personal income taxes or employee SSC resulting in short-run unemployment until the wage falls.

Rigidities in the labour market are also likely to be present in the long run, and these can lead to unemployment by pushing/maintaining the real wage above the level at which the market would clear. The literature points to various labour market institutions as possible causes of these rigidities. These institutions are generally in place to serve broader social goals or to correct market failures, but at the same time they reduce the flexibility of the labour market, thereby increasing long-run "equilibrium" unemployment. These include: labour market regulations, out-of-work benefits, wage-setting institutions (including unionisation and minimum wage laws), and labour taxes.[12] Additionally, short-run unemployment created by economic shocks may lead to long-run unemployment due to hysteresis effects (see Box 1.2).[13]

The case for most of these institutions affecting unemployment is strong. For example, union bargaining or higher unemployment benefits will create wage pressure by strengthening the bargaining position of employees. Minimum wage laws may forcibly increase the real wage above the productive value of some low-skilled workers. Empirical evidence also tends to support the influence of labour market institutions on unemployment. For example, Nickell, Nunziata and Ochel (2005) conclude that 55% of the rise in European unemployment between the 1960s to the first half of the 1990s can be explained by changes in labour market institutions.

Regarding labour taxes though, theoretical models generally predict that they have no direct effect on unemployment. However, they do predict that labour taxes can affect unemployment indirectly through alleviating or exacerbating non-tax distortions created

by other labour market institutions – specifically out-of-work benefits and wage-setting institutions (see Box 1.1).

Box 1.1. **The effect of taxes on unemployment: Theoretical models**

Most theoretical models of imperfect labour markets predict that labour taxes will only increase unemployment where in-work and out-of-work incomes are taxed differently (see, for example, Bovenberg, 2006; Nickell and Layard, 1999; Pissarides, 1998). The rationale behind this is that if labour taxes increase the (net) replacement rate (the ratio of out-of-work to in-work income) then unemployment becomes less costly which strengthens the bargaining position of workers, pushing up real wages. Additionally, an increase in the net replacement rate will weaken the employer's bargaining position. This is because unemployed individuals become less effective as fillers of vacancies as they can now be more choosy as to what jobs they are willing to take (Nickell, 1997).

Pissarides (1998) finds this to be the case for four different models of wage determination. He considers a competitive model, union bargaining, search, and an efficiency wages model, and finds in all four that the effect on unemployment is minimal where the net replacement rate is fixed. However, the models show significant employment effects where out-of-work income is fixed (and so a tax change alters the net replacement rate).

Some models also predict that greater tax progressivity may reduce equilibrium unemployment. This is because unions may take into account the higher marginal tax rates on additional earnings (and hence the smaller reward from a higher wage), and this will moderate wage demands. Effectively progressivity acts to reduce the distortions created by union market power. Van der Ploeg (2006) shows that this may occur in union bargaining, search and efficiency wage models. Bovenberg (2006) illustrates this in a right-to-manage model. In contrast, while Pissarides (1998) finds this to be the case in bargaining and search models, he does not in an efficiency wage based model or competitive model. Of course, increasing progressivity is not a simple panacea as it carries with it other problems in terms of its effect on work incentives for higher-income individuals and on entrepreneurship (which could, in turn, have long-run effects on economic performance and employment).

Empirical results

Much empirical research has been undertaken to determine whether in practice there is a link between labour taxes and unemployment. These studies generally follow a cross country/time-series econometric approach, with underlying models that allow for the influence of different labour market institutions (including the tax wedge) on long-run unemployment, as well as various other control variables to account for additional factors that may influence unemployment.

At the time of the 1994 *OECD Jobs Study*, the empirical evidence was very mixed.[14] However, more recent evidence tends to suggest that tax does affect unemployment. For example, of the 17 empirical studies surveyed in OECD (2006a), only five of these did not find taxes to have a significant effect on unemployment (and one of the five still found an impact on the long-term unemployed).

Recent OECD research also supports this. Using data for 21 OECD countries[15] over the period 1982-2003, Bassanini and Duval (2006) find that higher labour taxes (whether including consumption taxes or not) raise unemployment, with this result being

Box 1.2. **Labour taxation, demand shocks and unemployment**

The global financial and economic crisis beginning in late 2008 highlighted the effect that demand shocks can have on unemployment. The large fall in economic activity resulted in a substantial fall in labour demand and consequent increase in unemployment. Average unemployment in the OECD increased from 5.7 per cent in 2007 to 8.3 in 2009.

A particular risk of such economic shocks is that the demand driven increase in short-run unemployment may lead to increases in long-run structural unemployment through hysteresis effects. For example, the longer the duration of the shock, the more likely it is that some short-term unemployed individuals will lose employability as their skills start to atrophy so that they remain unemployed even once demand picks up again in the recovery, thus increasing long-run unemployment. This may be particularly the case for low-income workers, especially the low-skilled and young, who are likely to be amongst the first workers to become unemployed in an economic downturn. (Additionally, some individuals may start to become disaffected and lose attachment to the labour force, reducing labour supply and long-run employment).

There is some evidence that labour market institutions may exacerbate the effect of a demand shock on long-term unemployment. Whether tax has any impact is more unclear. For example, while Blanchard and Wolfers (2000) find that shocks (including a demand shock) will interact with taxes to increase unemployment, Nickell (2005) find no significant interaction between institutions and demand shocks.

Recent OECD research suggests that while a number of labour market institutions will exacerbate the effect of a demand shock on long-run unemployment, tax will have no effect. Guichard and Rusticelli (2010) investigate the impact of various labour market institutions, including the tax wedge, on the response of long-run unemployment to increases in aggregate unemployment. They follow a panel regression approach, finding that the level of product market regulation, higher unemployment benefits, and tighter employment protection legislation all interact with increases in aggregate unemployment to increase long-run unemployment. When looking at the tax wedge, they find no significant impact of the tax wedge on long-term unemployment, or of its interaction with aggregate unemployment on long-run unemployment.

Both to avoid the likelihood of increased structural unemployment and to ease the impact of the crisis in the short-run, many countries responded by introducing temporary tax measures to increase labour demand. The most frequently used measure in this regard was reductions in employer social security contributions (SSC). Such reductions occurred in 14 OECD countries. In some cases the reductions applied to all workers (*e.g.* Germany, Japan, and Mexico), while in others they have been more targeted: on low-wage workers (*e.g.* Belgium, France, and the Czech Republic); on newly hired workers who are young or long-term unemployed (*e.g.* Portugal); and on small firms (*e.g.* France). Additional measures introduced included deferred payment of employer SSC (*e.g.* Sweden), and reduced employee social security contributions (*e.g.* Japan). Non-tax measures to increase short-run labour demand included job subsidies, recruitment incentives, public sector job creation and short-term work schemes.

The effectiveness of short-term reductions in employer SSC in generating jobs depends on the responsiveness of labour demand to changes in unit labour costs (*i.e.* the short-run demand elasticity). Recent OECD analysis suggests that this elasticity is sufficiently large for temporary cuts in employer SSC to have a significant impact on employment (over and above the macroeconomic effects of tax cuts on aggregate demand). In the longer term, the effect of a sustained cut in employer SSC is likely (as labour markets and the economy adjust fully) to primarily be to raise real wages rather than to increase employment (OECD, 2009b).

significant across a wide range of different specifications. Their baseline specification implies that a 10 percentage point reduction in the tax wedge in an average OECD country would reduce equilibrium unemployment by 2.8 percentage points and increase the employment rate by 3.7 percentage points (thanks to an increase in labour supply). In addition to the tax wedge, Bassanini and Duval find that high and long lasting unemployment benefits, and stringent anti-competitive product market regulations increase unemployment, while highly centralised and /or coordinated wage bargaining systems reduce unemployment.

The literature also suggests that the extent to which a tax increase leads to higher unemployment may be affected by wage-setting institutions, particularly unionisation and minimum wages (OECD, 2006a). This appears consistent with the theoretical view that it is the interaction of a tax increase with labour market institutions that raises unemployment, rather than the tax increase alone. For example, Bassinini and Duval (2006) find that increases in the tax wedge have a greater impact in raising unemployment the higher the minimum wage is set relative to the average wage (consistent with the argument discussed earlier).

Daveri and Taberlini (2000) find similar effects for unionisation. They group countries according to the size and importance of unions, and find a very strong impact of taxes on unemployment where high union membership is combined with a low or intermediate degree of centralisation/co-ordination of wage bargaining. In countries with weak unions or centralised bargaining they find less impact on unemployment.[16] Elmeskov *et al.* (1998) also find large tax effects on unemployment in countries with intermediate centralisation/co-ordination of wage bargaining. These results suggest that non-centralised (*i.e.* sectoral) unions are likely to successfully push for higher wages in response to a tax increase. Centralised unions on the other hand are likely to factor in the effect of increased unemployment in their bargaining strategy, so not creating the same wage pressure.

Bassanini and Duval (2006) find similar results where there are only intermediate levels of corporatisim in bargaining.[17] However, when looking at the individual countries within this group, they find no consistency (and even opposite signs), casting doubt on the result. They carry out additional sensitivity analysis in Bassanini and Duval (2009), finding a lack of robustness with most interaction results, including between tax and corporatism. However, they note that such a lack of robustness does not necessarily imply that there is no interaction effect, and highlight the small sample size as possibly preventing the emergence of any significant patterns. Nevertheless, caution should be taken in drawing strong conclusions from the results.

While the above studies adopt a regression approach, a recent study by Berger and Everaert (2009) follows a co-integration approach. They group countries according to wage-setting institutions and find evidence that labour taxes only increase unemployment in countries characterised by strong but decentralised unions.

A small number of studies fail to find any empirical link between labour taxes and unemployment. These include Baker *et al.* (2005), Di Tella and MacCulloch (2005), and Fitoussi *et al.* (2000), though Di Tella and MacCulloch (2005) do find a significant negative effect of labour taxes on employment and participation. Unlike most studies, Gruber (1997) uses microdata. He analyses the reduction in payroll taxes in Chile between 1979 and 1986, finding that wages completely adjusted to the tax change and had no employment effect whatsoever.

To summarise, while the evidence is still to an extent mixed, it appears reasonable to conclude that labour taxes do have a significant impact on unemployment, at least in the "average" OECD country. Furthermore, both theoretical and empirical evidence tends to suggest that the predominant impact of taxes on unemployment comes through their interaction with various institutional features of the labour market, such as unionised bargaining and minimum wage regulations.

Given the large variation in labour markets across OECD countries, this implies that the impact of taxes on unemployment will be highly country specific. It is therefore necessary to consider the broader institutional structure of a country's labour market when determining the likely influence of labour taxes on unemployment, and hence the likely effects of any proposed tax reforms. In particular, tax cuts are likely to result in a far more significant reduction in unemployment in countries with strong but decentralised unions as opposed to those with weak or centralised unions, and in countries with high minimum wages.

1.4. Taxation and labour supply

We now turn to the second key determinant of employment: labour supply. Whereas the analysis of unemployment in Section 1.3 took a macroeconomic approach, to understand the impact of labour taxes on the supply of labour requires an analysis at the microeconomic (or "individual worker") level. The main reason for this is to account for the heterogeneity of workers. That is, different types of workers tend to react differently to tax changes – both in terms of the type and magnitude of their response[18] – and an aggregate analysis will not capture these nuances. Microeconomic analysis is therefore particularly crucial for policy makers in order for them to have an understanding of how a proposed reform is likely to affect a target group's behaviour (with the behavioural response potentially determining the success or failure of the policy measure). This section discusses the different ways in which labour taxes affect workers' behaviour, and also summarises the empirical literature on the size of these behavioural responses.

How do taxes affect labour supply?

Labour supply is often assumed in simple models to be homogenous and described in terms of two characteristics – participation[19], and number of hours worked. Labour taxes will influence individuals' decisions to supply labour at both these margins. However, tax will also affect a number of other labour supply decision margins. In particular, tax will affect the amount of effort the individual is willing to put into their work. Hours worked can be seen as a proxy for effort, although not a perfect one – effort not only depends on how many hours an individual works but also on how hard they work in those given hours. Tax will affect the incentive to work harder as it alters the financial return from working harder (for example, in terms of performance related pay, bonuses, or promotions). Longer term labour supply decisions, such as choice of occupation, and whether to undertake further education may also be tax influenced.

Tax will also affect a number of margins that may not generally be considered as affecting employment, per se, but that still carry with them significant efficiency consequences – the decision to engage in tax avoidance or evasion (including working in the "underground" economy[20]) is clearly tax motivated. Tax may also influence the form in which compensation is taken (biasing towards tax-favoured forms such as pensions, or other fringe benefits, including less obvious forms such as improved working conditions),

and create a bias towards tax-favoured forms of consumption (for example, charitable giving and housing).

In this section we focus primarily on the participation, hours worked and effort margins – because these are the most readily quantifiable, and the most strongly linked with employment. We consider these margins in the context of the standard (static, individual) labour supply model.

The standard labour supply model

The standard (but simplified) microeconomic model of labour supply with taxes sees an individual maximise their utility in terms of consumption and leisure, subject to the constraint that if they chose more consumption then they must forgo some leisure (as they must work more to earn the necessary income to pay for their consumption). Labour supply is defined in terms of hours worked – with hours worked specified as a function of the marginal net-of-tax wage rate and non-labour income.[21] This model forms the theoretical basis for most of the empirical literature on labour supply.[22]

To consider the participation decision (*i.e.* the decision to work zero hours *versus* positive hours), the model is normally augmented by allowing for fixed costs of working. The clear prediction of the model is that a tax increase (decrease) will result in the individual leaving (entering) the workforce where it pushes the net-of-tax wage below (above) the individual's "reservation wage" (*i.e.* the minimum wage at which they will be willing to work). The reservation wage will depend on a range of factors including: the fixed costs associated with working (*e.g.* transport or childcare costs[23]); non-labour income; and the alternative uses of the worker's time (*e.g.* leisure, education). Non-labour income includes out-of-work income provided by government (*e.g.* unemployment or social assistance benefits), though in a family it may more likely be in the form of a partner's income.

When considering the effect of a tax change on hours worked, the model does not provide as clear an answer. The worker will determine the number of hours worked by trading off the consumption value derived from working an extra hour against the utility gained by spending that hour in leisure. The imposition of a tax will reduce the relative price of leisure (in terms of forgone consumption), making leisure relatively more attractive and so encouraging more leisure and less hours worked (the substitution effect). However, the imposition of the tax will not just reduce the income earned on the marginal hour(s) of work, but the income earned on all hours worked. This will make them poorer and encourage them to work more hours (the income effect).[24] As these two effects move in opposite directions, the response of hours worked to taxation is unclear. By necessity it becomes an empirical question.

Two practical aspects should be noted about the hours worked decision. First, in some cases a worker may have very little control over the number of hours they work as, for example, the required hours are imposed by the employer or are negotiated collectively by unions. Second, where the employee does have choice over hours worked, it is unlikely to be over a continuous spectrum (though this is how the choice is generally modelled). More likely the decision margin will be a "chunk" of hours, for example the decision to take on another eight-hour shift, or the decision to move from part-time to full-time work.

While beyond the scope of the basic labour supply model discussed above, the decision over how much effort to put in can be seen as relatively equivalent to the hours worked decision. Now though there is an "expected return" from increasing effort by one

unit being traded off against the disutility associated with putting in greater effort. We have an expected return now as the return from putting in more effort is unlikely to be as certain as the net-of-tax wage from working an extra hour. For example, a promotion is likely to be subject to managerial discretion, as may any bonus payments.[25] As with hours worked, there is again both a substitution and an income effect, and hence the effect of taxation on effort is also an empirical question.

Empirical results[26]

This section summarises the empirical labour supply literature. It does not attempt to provide a comprehensive survey as there is ample literature in this regard, rather it summarises the main themes and conclusions that the literature has provided. The predominant focus of the literature has been to estimate wage elasticities for the hours worked and participation margins.[27] Another relatively recent strain of literature considers taxable income rather than hours worked or participation as the dependent variable.[28]

Female labour supply

Female labour supply has received the most attention in the literature. This is unsurprising given the far greater variation in hours worked and participation of women (see Section 1.1). Studies have largely focused on either married women, or lone mothers.

Hours worked elasticities (generally estimated for married women) vary greatly, although most studies find elasticities that are less than one (and positive). The large variation can be illustrated by considering the 102 female elasticity estimates (from 23 studies over eight countries) used in the meta-analysis of Evers *et al.* (2008): these elasticities ranged from –0.08 to 2.79, with a mean of 0.43 and standard deviation of 0.55. Meghir and Phillips (2010) emphasise the difference between results for annual as opposed to weekly hours worked. In summarising the literature, they conclude that the annual elasticity is close to one, with weekly elasticities tending to range between zero and 0.3.[29] This is also unsurprising given that an annual measure enables movement both in terms of hours per week and weeks per year (and possibly even in participation).

Additionally, hours worked of married women with children appear to be more responsive than for those without children. For example, Blundell, Duncan and Meghir (1998) find their highest elasticity for married women with young children (elasticity of 0.37), while finding little responsiveness for married women without children (elasticity of 0.13). Lone parents are also found to be responsive in terms of hours worked. For example, Blundell, Duncan and Meghir (1992) find an elasticity of 0.34.

Turning to the participation decision, the predominant focus here has been on lone mothers. There is a clear consensus from this literature that lone mothers are highly responsive to changes in work incentives. For example, Brewer *et al.* (2006) find an elasticity of 1.02 for the UK; while Eissa and Liebman (1996) and Keane and Moffitt (1998) estimate elasticities of 1.16 and 0.96 respectively for the US. Estimates for married women are also significant (and generally higher than hours worked estimates). For example, Arrufat and Zabalza (1986) find an elasticity of 1.41 for the UK; and Pencavel (1998) finds estimates ranging from 0.77 to 1.83 for the US. Aaberge *et al.* (1999) find an overall elasticity of 0.65 for Italy. They also find a substantially higher elasticity of 2.8 for married women living in poor (10th income percentile) households, and a lower elasticity of 0.031 for married women in wealthy (90th income percentile) households. This evidence suggests that the participation margin is more responsive than hours worked for women.

Male labour supply

There is a general consensus in the literature that male hours of work are almost completely unresponsive to changes in work incentives, with elasticities close to zero (Meghir and Phillips, 2010). This holds across a variety of empirical methods, datasets and countries.[30]

High male employment rates (see Figure 1.2 in Section 1.1) suggest that male participation is also likely to be very unresponsive. While there are few empirical estimates of male participation elasticities, these tend to be close to zero supporting this view (for example, Aaberge *et al*., 1999; Ransom, 1987). Recent work by Meghir and Phillips (2010) confirms this for high-skilled men, but finds that low-skilled men may be somewhat more responsive – estimating a participation elasticity with respect to in-work income of 0.27 for single men and 0.53 for married men.[31]

Taxable income elasticities

As discussed earlier, there are a number of other margins that respond to taxes in addition to hours worked and participation. A more recent literature attempts to capture many of these additional margins in one parameter by estimating the responsiveness of taxable income to tax changes (or more accurately to changes in the "net-of-tax rate"). This literature has been motivated by dissatisfaction with the use of hours worked elasticities in welfare analysis.

Taxable income elasticity estimates have tended to be far larger than male hours worked estimates. For example, early US estimates by Lindsay (1987) and Feldstein (1995) found elasticities often well over 1. More recent literature has tended to find smaller though still substantive estimates. Auten and Carroll (1999) find an estimate of around 0.6 for the US, while Sillamaa and Veall (2001), who follow Auten and Carroll's empirical approach, find an estimate for Canada of 0.25. Hansson (2007) finds estimates between 0.36 and 0.43 for Sweden.[32] Additionally a number of studies have found greater responsiveness amongst higher income individuals (Saez *et al*., 2009).

The higher taxable income estimates are not surprising given that they capture a wider range of behavioural responses than hours worked elasticities (including tax avoidance activity, changes in consumption patterns and remuneration type, as well as effort and hours worked). While not all of these margins may be fully relevant in terms of assessing the impact of taxes on employment, they are distortive and therefore impede the efficient allocation of resources in the economy – and so may have some long-run impact on economic activity and employment. From a more direct employment perspective, they give an indication that, even though hours worked may be unresponsive, effort (and possibly other relevant margins[33]) is likely to be affected by tax changes.

Macroeconomic evidence

A number of recent studies have used cross-country macro-data to investigate the impact of various labour market institutions, including the tax wedge, on average hours worked. These studies tend to find strong negative relationships between average hours worked and average tax rates. For example, in a study of 18 OECD countries from 1960 to 1995, Alesina *et al*. (2005) find an elasticity (of average hours worked with respect to the tax rate) estimate of –0.5 (although this drops to –0.18 when controlling for fixed effects).

While enabling cross-country analysis, a weakness of this aggregate approach is that it cannot account for the heterogeneity of the labour force. To partially address this, recent OECD research adopts a quasi-microeconomic approach – using semi-aggregated data and group-specific tax wedges (Causa, 2008). Causa finds that high tax rates have a significant impact on the hours worked of women, while the hours worked of men are insensitive, thus supporting the broad results of the microeconomic literature.

1.5. Non-labour taxes and employment

While the focus of this chapter has been on direct taxes on labour, it is also important to bear in mind that non-labour taxes can also have an (indirect) impact on the level of employment in an economy. This section briefly discusses the effect that these taxes may have.

Almost all taxes can have some effect on employment, indirectly, through distorting economic decisions, thereby leading to an inefficient allocation of resources and reduced labour demand. For example, differential taxation of capital may distort investment away from pre-tax more profitable investments to pre-tax less profitable (but post-tax more profitable) investments, thereby distorting economic activity and labour demand. Tax systems may also distort the choice of source of investment, often favouring debt over equity financing. This may lead to excessive levels of debt financing and greater risk of collapse with consequent effects on labour demand. Meanwhile, the taxation of savings may alter work patterns and labour supply decisions.

Perhaps the most significant indirect effect on employment is likely to come from the corporate income tax (CIT). The CIT may be borne by capital, labour, consumers, or more likely some combination of the three. At one extreme, in a small open economy with internationally mobile capital, immobile labour, and perfectly competitive product markets, the entire CIT burden may be faced by workers.[34] Under such a scenario the cost of capital will increase by the entire amount of the CIT (as the return to capital is set on the world market), and the output price will not change, so immobile labour bears the burden through lower wages or reduced employment. However, where capital is imperfectly mobile (as is generally the case), or the country is large enough to have some influence on the world interest rate, capital will bear some of the tax burden and the impact of the CIT on labour will be reduced. Likewise, with imperfect product markets, part of the cost of the CIT may be able to be passed on to consumers in the form of higher prices. Nevertheless, as long as the CIT increases the cost of capital, there will be at least some effect on the labour market.

There are three channels through which an increase in the cost of capital can affect the labour market – by reducing output, by inducing factor substitution, and by reducing labour productivity. The higher cost of capital will increase production costs and thereby lead to a reduction in output. This will decrease demand for both capital and labour. However, by altering the relative prices of labour and capital, the CIT will induce substitution away from capital towards (the now relatively cheaper) labour. This increases the demand for labour, countering the effect of the reduction in output. However, as long as labour and capital are not perfectly substitutable for one another then the output effect will outweigh the factor substitution effect resulting in an overall reduction in the demand for labour.[35] Finally, the lower utilisation of capital will reduce the productivity of workers leading to a fall in the wage rate and a reduction in labour supply.

The labour market will also be affected by the relative taxation of corporate and non-corporate capital income. The CIT may result in some production moving from the corporate sector to the non-corporate sector, increasing demand for labour in that sector, and at least partially countering the negative effect on employment in the corporate sector. The overall effect on employment in the economy will depend on the relative labour intensities between the two sectors and the substitutability of labour and capital.[36]

Most empirical work has focussed on direct labour taxes, and there is relatively little empirical work attempting to quantify the impact of the CIT on unemployment or employment, in part because a general equilibrium approach is likely to be needed. A recent example though is Bettendorf *et al.* (2009) who use an applied general equilibrium model with imperfect labour markets to analyse the effects of the CIT on employment, unemployment and efficiency in 17 EU countries. They find that raising CIT revenue by 0.5 per cent of GDP in each country leads to a 0.2 percentage point increase in unemployment, and a 0.2 per cent reduction in labour supply, on average across the 17 countries.

They also compare the effects of equivalent increases in CIT, labour taxes and consumption taxes. Unsurprisingly, they find that labour taxes have a greater impact on unemployment than consumption taxes or CIT, with CIT having the smallest impact.[37] Furthermore, the CIT generates the greatest welfare loss, followed by labour taxes, with consumption taxes the least distortionary. When looking at individual countries they find that increases in CIT are more costly in terms of both unemployment and welfare for countries with initially low effective tax rates on capital income, and substantial FDI. The rationale here is that multinational companies in countries with low effective tax rates will have already exploited most opportunities for profit shifting via transfer pricing, so will reduce investment in response to the tax increase, resulting in a large impact on the labour market. In contrast, multinationals in countries with initially high effective tax rates are able to exploit new transfer pricing opportunities and hence avoid most of the CIT increase.

In another recent study, Cerda and Larrain (2010) use microdata for Chilean manufacturing firms and find that a one per cent increase in CIT revenue reduces labour demand by 0.2 per cent. Interestingly, they find a greater impact for large businesses than for small businesses. They argue that this is because larger firms are more easily able to fire employees than small firms due to the high costs of firing workers (due to high severance payments required by law). Arulampalam *et al.* (2009) use microdata for 55 000 companies located in nine European countries over the period 1996-2003 to investigate, in a bargaining framework, the extent to which CIT is shifted to workers. They find a substantial part of CIT is passed on to workers – with an exogenous one dollar increase in a firm's tax bill resulting in a 75 cent reduction in the median wage.

1.6. Key employment-related tax policy challenges

This section draws on the preceding analysis to highlight a number of key employment-related tax policy issues facing countries both now and in the future. In doing this it is important to consider the impact of government policy on employment as a whole, and not just consider the tax system in isolation. In particular, the interaction of the tax system with other government policies may create or exacerbate existing challenges for the tax system, potentially requiring reform of both tax and non-tax policy settings.

Five issues are highlighted below together with possible policy responses. A selection of these issues is discussed in further detail in the following chapters of this report. Note

that this section is not intended to be exhaustive. For example, high tax rates may also have a negative impact on decisions regarding human capital accumulation and on the incentives to undertake entrepreneurship, which may have long-run impacts on the labour market. However, such long-run issues are beyond the scope of this report.

Low-income workers: unemployment traps and poverty traps

Low-income workers are a group of high concern to tax policy makers. Not only are they highly responsive to work incentives (see Section 1.4), but the tax system often creates significant work disincentives for them (see Section 1.2). On its own this is sufficient to generate concern. However, the interaction of the tax and benefit systems exacerbates the situation considerably as generous out-of-work benefits often combine with substantial taxation of in-work income to create very low incentives to enter the workforce (creating the so called "unemployment" and "inactivity" traps). An additional problem is caused by the targeting of benefits and tax credits to low-income workers. This targeting is generally achieved by withdrawing benefits and tax credits as income increases which, combined with the progressivity of personal income tax systems, often reduces markedly the incentive for low-income workers already in the labour force to work more hours or put in greater effort, thus preventing them from progressing to higher income work and towards full independence (the "poverty trap"). The extent of these problems, and the ways in which countries have endeavoured to address them, are discussed in detail in Chapter 2 of this report.

Chapter 2 shows that the combined disincentive to participate in the workforce created by tax and benefit systems is very high for low-income workers in most OECD countries. In many cases, a worker moving from short or long-term unemployment into work will lose over 80 per cent of the income they earn to taxes and benefit withdrawal. In some cases over 100 per cent of income can be lost from a move into work. The high elasticity estimates for single mothers, for married women with children (who are often second earners on lower incomes), and also the moderate estimates for low-skilled men emphasise the problem, particularly regarding the participation decision.

In many cases, it is the withdrawal of benefits that creates the greatest work disincentives. This emphasises the importance of benefit related measures to reconcile adequate social protection with work incentives. In this regard, active labour market policies (that provide proactive assistance to individuals receiving unemployment benefits to find new jobs) have become increasingly common in OECD countries. For example, benefit receipt is often linked to participation in programs aimed at preventing skill loss and increasing employability. Other alternatives to increase work incentives include reducing benefit levels, or providing benefits on a universal basis. Such measures may however be difficult to reconcile with the redistributional goals of many governments, while the latter would also involve substantial fiscal cost.

Tax measures can also be used to reduce the disincentive problems discussed above. Options include reducing personal income tax (PIT) or social security contributions (SSC) on low-income workers, or introducing work-contingent tax credits ("in-work tax credits").

A number of OECD countries have reduced PIT or SSC burdens on low-income workers in the last 10 years, with PIT burdens now very low or even negative in a number of countries. Nevertheless, further reductions may be possible, particularly regarding SSC where burdens on low-income workers are often still substantial (even when PIT burdens are negligible). A major benefit of SSC reductions over PIT reductions is that they are

generally better targeted at workers. This is because SSC are generally levied only on labour income, whereas PIT is most commonly levied on labour and unearned income (the main exception being countries with (semi-) dual income tax systems). However, SSC reductions may be difficult to achieve in some countries where the underlying structure of the social security system requires a strong link between contributions and benefits. That said, in many countries this link is minimal providing significant scope for reductions in SSC in order to increase work incentives for low-income workers. Alternatively, reforms that increase the link between SSC paid and benefit entitlements may also reduce work disincentives (effectively by converting taxes into compulsory savings or insurance).

In-work tax credits (and equivalent work-contingent benefit payments) are one of the main measures used in OECD countries to increase the participation of low-income workers. At the same time these measures also address in-work poverty (and child poverty) concerns. They achieve these dual goals by targeting low-income workers (often with children), and imposing some form of work-contingent eligibility rule. Empirical evidence shows that in-work tax credits can be successful in achieving both goals. As such, it is unsurprising that they have gained in popularity, particularly over the last 15 years, to the extent that 17 OECD countries have now introduced some form of in-work tax credit scheme.

The need to target low-income workers, to impose eligibility criteria, and to administer the schemes results in complex designs that require a number of trade-offs to be made between competing goals. In addition, scheme design varies significantly across countries (regarding eligibility rules and targeting, credit levels, withdrawal rates and payment methods) reflecting both the different weights placed on the poverty alleviation and work incentive goals of the schemes, as well as various country specific factors (including other tax/benefit parameter settings, income distributions and taxpayer characteristics).

A key trade-off to be made is between the size of the credit provided and the degree of income-based targeting – with a larger credit requiring closer targeting, for a given fiscal cost. While a higher credit is likely to have a greater impact on labour force participation, greater targeting will generally require a faster phase-out of the credit with consequently higher marginal effective tax rates over the phase-out zone which will likely reduce hours worked and effort amongst those already employed. To an extent, the costs of a high phase-out rate can be minimised by phasing out the credit in a region where there are comparatively few workers and/or where workers are less responsive to increased marginal tax rates, though this will not always be possible. Trade-offs must also be made regarding the administration of the schemes. For example, a shorter assessment period and more frequent credit receipt (for example through incorporation into regular employer withholding tax calculations) is likely to increase the effectiveness of a credit scheme at encouraging work and reducing poverty, but will result in higher administrative costs due to the movement away from the regular annual assessment period of most tax systems.

Retirement incentives for older workers

The employment of older workers is another challenging issue for tax policy makers. Older workers have relatively low employment rates in most OECD countries, driven particularly by low participation (see Section 1.1 and Annex A). As such, older workers are a group where substantial increases in employment can be obtained, with consequent benefits in terms of output and growth. Furthermore, in the context of the rapidly aging populations and longer life expectancies in most OECD countries, increasing the labour supply of older workers is likely to be critical to ensuring the sustainability of social security systems.

While the decision to work or retire is likely to be influenced by a number of factors, empirical evidence (see Chapter 3) suggests that the often substantial financial incentives to retire faced by older workers have a significant impact on retirement behaviour. Of particular concern for policymakers is the potential combined effect that tax and pension systems can have to encourage retirement. Tax on earned income will reduce the return to continued work, while pension systems can also have a significant effect on the return to continued work as the design of a pension system can create an implicit tax or subsidy on continued work by altering the discounted present value of future pension entitlements ("pension wealth").[38] Furthermore, tax and pension systems will affect retirement incentives by determining the level of net retirement income. The extent of the overall disincentives to continue working, and the ways in which countries have endeavoured to reduce them, are discussed in detail in Chapter 3 of this report.

Chapter 3 shows that the combined disincentive to continue working created by tax and pension systems is very high for older workers in many OECD countries. In many cases, an older worker that defers retirement will lose more than half of the income they earn to taxes and reductions in pension wealth, with the disincentive to continue working being greater once full pension eligibility age is reached. In some cases over 100 per cent of income can be lost when deferring retirement and continuing to work.

In many cases, it is the pension system that creates the greatest disincentive to continue working. This is particularly so in countries where older workers face extremely high disincentives to continue working. This emphasises the importance of pension reform in many countries to encourage the participation of older workers. In particular, increases to pension eligibility ages, and reductions in the generosity of pension levels, are likely to be necessary in many countries in the coming years. Additionally, reforms moving pension systems towards actuarial neutrality will also ensure greater participation amongst older workers. Potential pension reforms to help ensure the sustainability of social security systems are discussed further in OECD (2011b).

Nevertheless, in many other countries taxation plays as large, or an even larger role than the pension system in discouraging continued work by older workers. Indeed, in some countries the pension system will actually encourage work – so that the tax system is the entire cause of (financial) work disincentives. This is generally due to the high taxation of earned income relative to pension income, and in some cases due to the interaction of pension parameters with the taxation of pension income. In particular, in a number of countries tax concessions are provided specifically for pension income and not earned income. These are generally intended to reduce poverty amongst low-income retired people, but by increasing the level of out-of-work income relative to in-work income they encourage retirement. Similarly, pension income is generally not liable to SSC, whereas earned income generally is.

Various options are available to countries to reduce tax-induced disincentives to continue working. A number of countries provide concessions on the basis of age rather than specifically for pension income. However, where this extends the concession to a greater number of taxpayers, it will either increase the fiscal cost of the concession, or require a smaller concession than that able to be provided to pensioners alone – requiring a trade off between employment and poverty alleviation goals. Meanwhile a number of countries impose reduced SSC obligations on older workers. Several countries provide in-work tax credits targeted at older workers to encourage continued participation. By not

affecting pension income an in-work tax credit will unambiguously increase the incentive to continue working, though where withdrawn at higher income levels they may reduce the number of hours worked by some older workers. Countries that have introduced in-work tax credits for older workers have tended to provide these at more generous levels than in-work credits provided to younger low-income workers. In general, these tax credits involve the same design trade-offs as when targeted at low-income workers.

Taxing mobile high-skilled workers

The taxation of mobile high-skilled workers is increasingly becoming an issue of high importance for tax policy makers. This is because high-skilled workers are becoming increasingly mobile, and with continuing globalisation this trend is only likely to continue. While acknowledging there are many other factors affecting the mobility of individuals,[39] empirical evidence (see Chapter 4) suggests that taxation can have an influence on migration decisions. Furthermore, it may be expected that tax will have a greater than average effect in the case of the high-skilled who are subject to less immigration restrictions than less-skilled workers, and to comparatively high tax burdens (see Section 1.2). This has two main implications for tax policy. First, the potential loss of high-skilled workers due to tax differentials between countries creates an additional cost to income tax progressivity, and thereby places pressure on the ability of governments to redistribute income. Second, it creates a number of potential rationales for introducing tax concessions targeted at mobile high-skilled workers.

While it is difficult to isolate the impact of increased labour mobility on the overall progressivity of income tax systems in OECD countries, the impact of increased labour mobility can clearly be seen in the introduction of tax concessions targeted at mobile high-skilled workers in many OECD countries. The effect of taxation on the migration decisions of mobile high-skilled workers, and the tax concessions introduced in response, are discussed in detail in Chapter 4 of this report.

As of 2010, targeted tax concessions for high-skilled workers have been introduced in 16 OECD countries. In a number of countries, concessions have been introduced to reduce the effect of tax on migration decisions. This has particularly been the case in high-tax countries aiming to become more competitive destinations for high-skilled workers, and in countries concerned about particular tax rules discouraging high-skilled workers from locating in a country. Meanwhile, other countries have used tax concessions to actively attract and/or retain high-skilled workers. Reasons for such active policies may include an expectation of positive knowledge-related spillovers or fiscal gains, and concerns about skill shortages.

Tax concessions will not always be warranted, however. Indeed, design difficulties may limit the effectiveness of tax concessions, while often more direct policy tools may be available for addressing a particular policy concern (for example, a skill shortage may be better addressed through an education-based solution than through the tax system). Furthermore, tax concessions may create equity concerns by treating differently high-skilled and less-skilled workers, and often foreign and domestic workers.

In countries that have introduced concessions, the design has generally been driven by the particular policy goal of the concession, and hence varies significantly across countries. However, one of two broad approaches tends to have been taken – either a specific concession with broad targeting provisions, or a generic concession with narrow targeting provisions. Countries that aim, for example, to reduce tax impediments to

migration associated with the taxation of a particular type of income have tended to adopt the first approach, introducing a very specific concession related to that particular type of income (such as an exemption for foreign sourced income, or a deduction/exemption for employer provided fringe benefits covering costs related to expatriation). As these tax impediments generally affect only high-skilled workers receiving that type of income, detailed targeting criteria are not required. In contrast, countries aiming, for example, to capture positive externalities and/or address skill shortages have tended to follow the second approach, adopting a very generic income tax reduction (such as a reduced tax rate or an exemption for labour income). These concessions then have detailed targeting provisions to restrict eligibility to those workers most likely to generate the desired externalities or address the particular skill shortages. Care though is necessary in the design of targeting provisions to ensure that compliance and administrative costs are not excessive and do not impact on the effectiveness of the concessions.

Irrespective of the broad design approach taken, most concessions are still effectively highly restricted – whether by the specificity of the concession itself, or the narrowness of the targeting provisions. A consequence of this is that the take-up of these "niche" schemes can be very low. A smaller number of schemes are broader in nature, and take-up of these schemes can be expected to be more substantial. While the degree of targeting, and hence take-up, is guided to a large degree by the policy goal of the particular scheme, the overall low take-up does raise some questions as to the effectiveness of the schemes.

Second earners

The effect of taxation on the labour supply decisions of second earners is another significant issue for tax policy makers. The labour supply of second earners is significantly lower than for primary earners – as evidenced in Section 1.1 by the lower participation of women (who are more often second earners) than men. As such, second earners are another group where substantial increases in employment may be possible.

Second earners often face significant tax burdens, particularly in comparison to those faced by other workers. This is illustrated in Box 1.3 which compares average and marginal tax wedges faced by single individuals and second earners earning the same income. In most countries average tax wedges are higher for second earners than single individuals, and generally significantly higher for second earners with children. Meanwhile there is significant variation regarding marginal wedges. These work disincentives, particularly at the participation margin, may be of particular concern given the greater than average responsiveness to work incentives of second earners (at both participation and hours worked margins), particularly those with children (see Section 1.4).

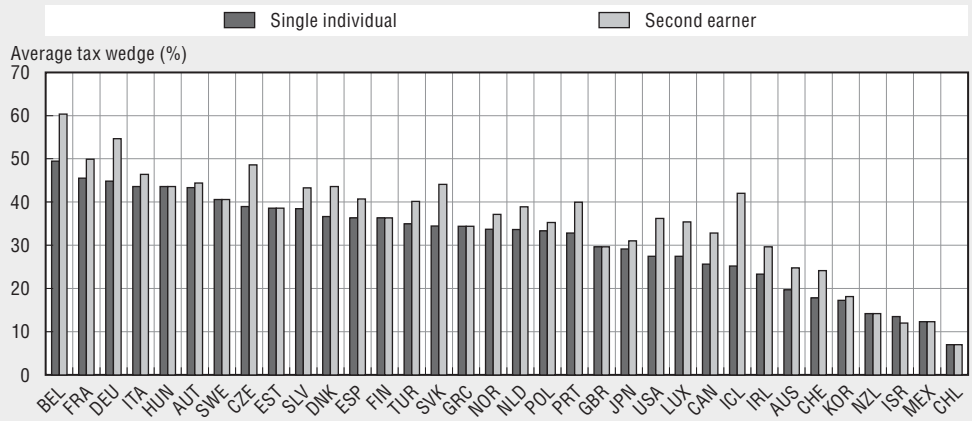
Fixed costs often play a significant role in the participation decisions of second earners, and so non-tax measures such as childcare subsidies can play a major role in encouraging second earner participation, even in the presence of significant tax disincentives. Other measures, such as flexible working-time arrangements and limited parental leave, are also likely to encourage secondary earner participation (Jaumotte, 2003). Nevertheless, there is merit in considering tax reforms to reduce tax disincentives – although this is complicated by the fact that these disincentives often result from policies aimed at achieving social goals.

The high average tax wedges faced by second earners are often caused by three main factors: family based taxation; family based benefit and/or tax credit withdrawal; and

Box 1.3. **Comparing tax wedges for single individuals and second earners in OECD countries**

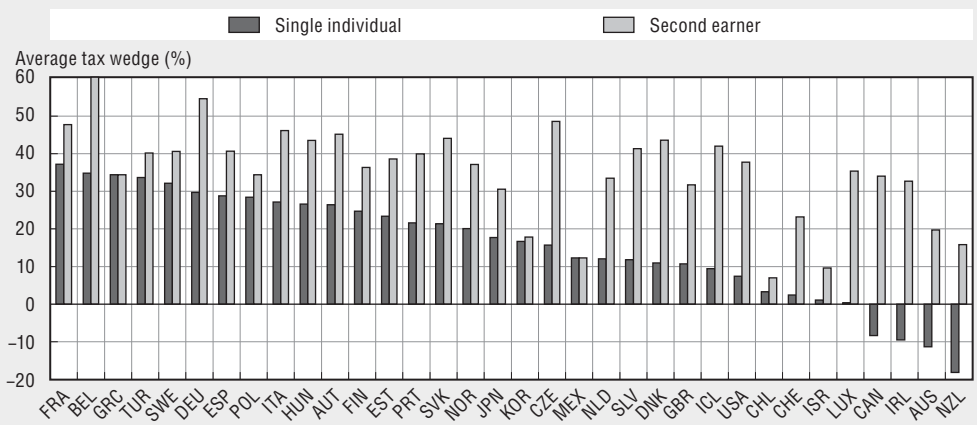
Second earners often face higher average and marginal tax wedges on their individual earnings than single individuals earning the same level of income. This is illustrated below in Figures 1.13 to 1.15. Figure 1.13 compares the average tax wedge faced by a single individual earning 67 per cent of average earnings with the average tax wedge faced by a second earner also earning 67 per cent of average earnings, whose partner earns 100 per cent of average earnings. Figure 1.14 makes the same comparison, but where each worker has two children.

Figure 1.13. **Average tax wedge – Single individual *versus* second earner; income = 67% of AW; (primary earner income = 100% of AW)**



Source: OECD Taxing Wages models. *StatLink* http://dx.doi.org/10.1787/888932482707

Figure 1.14. **Average tax wedge – Single parent *versus* second earner (two children); income = 67% of AW; (primary earner income = 100% of AW)**



Source: OECD Taxing Wages models. *StatLink* http://dx.doi.org/10.1787/888932482726

Note the calculation for the average tax wedge faced by the second earner is not the same as that presented for a two-earner family in Table 1.1 which measured the average tax wedge faced by the whole family. The second earner average tax rate presented in Figures 1.13 and 1.14 instead measures how much extra income tax, employer SSC and employee SSC the family will have to pay as a result of the second earner entering employment, as a proportion of the second earners total income plus the employer SSC due on the second earner's income. As emphasised by Jaumotte (2003), this is the appropriate tax rate to measure the disincentive facing a second earner to participate in employment.

Box 1.3. **Comparing tax wedges for single individuals and second earners in OECD countries** *(cont.)*

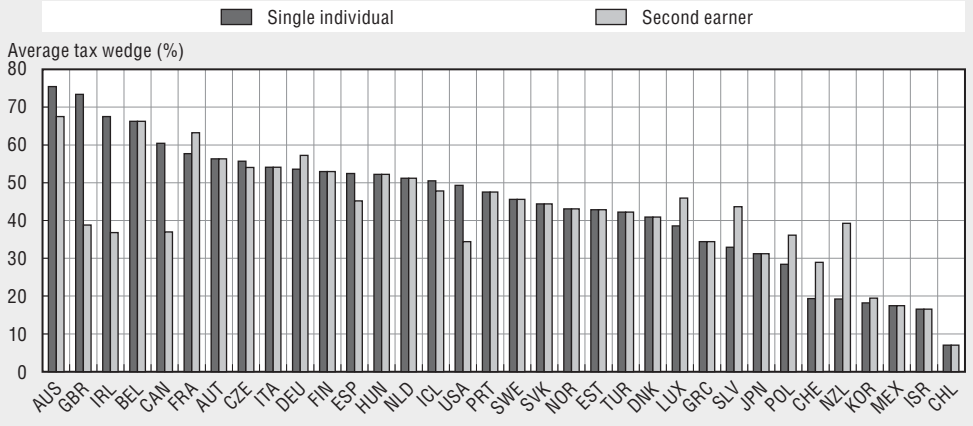
Figure 1.13 shows that, in the majority of countries (24 of 34), a second earner faces a higher average tax wedge than a single individual earning the same income. In most cases the increase is caused by the loss of either family-based benefits/tax credits or a dependent spouse allowance as a result of the second earner entering employment. In a smaller number of countries (*e.g.* France, Germany, Luxembourg, Poland and Switzerland), it is due to family-based taxation more generally. In nine countries there is no difference in the average tax wedges, while in only one country (Israel) does the second earner face a lower average tax wedge. The lower tax wedge in Israel is due to the presence of a tax credit provided specifically to women (Figure 1.13 assumes that a women was the second earner in Israel).

As Figure 1.14 shows, the differences in average tax wedges are even greater in the presence of children. This lowers further the average tax wedge faced by single individuals in most countries as a result of substantial child-dependent benefits and/or tax credits, while tending to increase the average tax rate faced by second earners due to the income-based withdrawal of the same benefits and/or tax credits. Note that for lower income workers, benefit withdrawal may increase further the disincentives for both primary and second earners to participate (see Chapter 2).

While average tax wedges age generally higher for second earners than single individuals, there is far more variability regarding marginal tax wedges. Figure 1.15 compares the marginal tax wedge faced by a single parent with two children earning 67 per cent of average earnings, with the marginal tax wedge faced by a second earner also with two children and earning 67 per cent of average earnings, whose partner earns 100 per cent of average earnings.

Figure 1.15 shows considerable variation. In eight countries the second earner faces a lower marginal tax wedge than the single parent, while in another eight countries second earners face a higher tax wedge. In the remaining 18 countries there is no difference. In countries where the marginal wedge is higher for a second earner, this is generally due to family based taxation resulting in the second earner facing a higher marginal income tax rate than a single individual would. This is the case in France, Germany, Luxembourg, Poland and Switzerland. Note that while the calculations for Poland assume joint taxation, the family could instead opt to be taxed individually, in which case the second earner's marginal wedge would fall to that of the single parent. However, given the uneven split of family income amongst the partners, choosing individual taxation would raise the overall tax burden faced by the family.

Figure 1.15. **Marginal tax wedge – Single parent *versus* second earner (two children) income = 67% of AW; (primary earner income = 100% of AW)**



Source: OECD Taxing Wages models.

StatLink http://dx.doi.org/10.1787/888932482745

Box 1.3. **Comparing tax wedges for single individuals and second earners in OECD countries** *(cont.)*

One exception is New Zealand where the level of total family income (167 per cent of average earnings) pushes the second earner's total family income into the phase-out region of the Working for Families tax credit package. The Working for Families tax credit package phases out at 20 cents in the dollar for (family) income between 77 and 191 per cent of average earnings (for families with two children). As a result, the single parent in Figure 1.15 is below the phase-out zone, but the second earner is still in this zone. As New Zealand has no SSC, the 20 per cent phase-out rate is reflected in Figure 1.15 by a difference in marginal tax wedges of 20 percentage points.

In countries where second earners face a lower marginal tax wedge, the opposite has occurred. For example, in the US, for a family with two children, the earned income tax credit (EITC) phases out at a rate of 21.06 per cent for income between 38 and 94 per cent of average earnings. As such the single parent in Figure 1.15 faces credit withdrawal, whereas the second earner's family has already lost any entitlement to an EITC. Similarly, in Ireland, for a family with two children, the Family Income Supplement is phases out at 60 cents in the euro from the first euro earned until it is exhausted once income reaches 79 per cent of average earnings (although family-based taxation partially counters this effect). Meanwhile, in a number of other countries benefits are already fully withdrawn before income reaches 67 per cent of average earnings, so that the marginal tax wedge is not affected for either single parents or second earners. These examples emphasise how heavily the results in Figure 1.15 are driven by the exact income levels chosen. As such, while the results are not overly useful for cross-country comparison, they do illustrate well the effects that family-based withdrawal can have on marginal tax wedges.

dependent spouse allowances. Each of these has strong justifications on equity grounds, and so a trade-off is required between the social goals they aim to achieve and the efficiency costs in terms of work disincentives.

Family based taxation is usually intended to increase horizontal equity between families with different compositions of income (OECD, 2006b). Although the trend in the OECD over the last 30 years has been a move away from family-based taxation towards individual taxation, several countries still retain mandatory joint taxation (France, Germany, Luxembourg and Portugal). Family based taxation will tend to reduce second earner work incentives relative to those of single individuals, particularly for those with high-income partners. The reason here is that the second earner is immediately taxed at a higher marginal rate than the single individual. Effectively, the primary earner has already "used up" the lower tax brackets (and any allowance) leaving any additional family income facing a higher marginal (and average) tax rate. Because both average and marginal rates are affected, both participation and hours worked decisions are likely to be affected.

Where social goals prevent a move towards individual-based taxation, one option that may reduce the disincentive to work is to provide an independent personal allowance against the earned income of the second earner. By attaching the allowance specifically to the individual rather than the family, participation may be encouraged (the average tax rate falls). However, the marginal tax rate will be unaffected for second earners receiving more than the allowance amount. The combined result may therefore encourage part-time work ahead of full-time work.

While most OECD countries have moved away from joint taxation, many have benefits or tax credits that are withdrawn on the basis of family income. This can also increase both average and marginal tax rates for second earners thereby discouraging participation and hours worked. However, moving towards individual-based withdrawal is likely to be difficult on both equity and cost grounds. In particular, the provision of substantial income-support benefits to a low-income worker who is married to a high income earner will poorly target income support, and possibly be considered unfair.

The presence of dependent spouse benefits may also reduce second earner work incentives. Again, these are generally justified on a horizontal equity basis. The allowance may either be lost entirely once the second earner starts working, or be withdrawn as the second earner's income increases. In the first case this creates a substantial disincentive to participate (particularly to work a small number of hours),[40] whereas the latter potentially creates very high marginal tax rates affecting hours worked. The overall incentives faced by a second earner will, though, depend on the incomes of both primary and second earner, and their interaction with the tax system as a whole.

Pricing low-skilled workers back into employment

As noted earlier, tax systems can also create significant problems regarding the demand for labour. In particular, there is the potential for low-skilled workers to be "priced out" of employment by taxes, minimum wages, or a combination of the two.[41] This may be particularly problematic for older workers and long-term unemployed workers who may suffer from skill atrophy, as well as for younger workers yet to gain significant work experience. The effect of taxation on the demand for low-income workers, and older workers, and the response of countries to these concerns, are discussed in more detail in Chapters 2 and 3, respectively.

At the margin, an employer will be willing to pay a potential worker a wage equal to their marginal revenue product (*i.e.* the additional revenue that the worker can generate for the firm). If the worker's marginal revenue product is less than the minimum wage then they will not be offered a job. However, even if the worker's marginal revenue product is greater than the minimum wage, the imposition of employer SSC (including payroll taxes) may result in them not being offered a job. This is because the minimum wage may prevent the employer from passing on the SSC in the form of lower wages, hence increasing total labour costs above the marginal revenue product of the worker.

Furthermore, collective wage bargaining may result in a market wage that is higher than a worker's marginal revenue product, again resulting in unemployment. The combination of high taxes on low-income workers and generous out-of-work benefits may contribute to this by increasing the bargaining position of unions (as, post-tax, unemployment is relatively less bad), resulting in higher wage demands, particularly in the presence of strong but decentralised unions (see Section 1.3).

To address this concern, a number of countries have introduced reductions in employer SSC for low-skilled workers. Meanwhile, other countries provide tax credits or enhanced deductions targeted at specific low-skilled workers which the employer can benefit from. The precise targeting of these reductions varies. Eligibility may be restricted to one or more of a number of potentially low-skill groups, including: low-income workers, older workers, younger workers, and previously long-term unemployed workers.

1.7. Summary and Conclusions

A number of observations and conclusions can be drawn from this study. First, employment rates in the OECD area have remained stable at around 65 per cent for the working age population over the last 10 years, though average hours worked per worker have been falling over the same period. Employment rates are particularly low for three groups: older workers, women (who are often second earners), and low-skilled (generally low-income) workers. The low employment rates of older workers and women are driven predominantly by substantially lower than average labour force participation, while both higher (involuntary) unemployment and lower participation contribute to the low employment rates of low-skilled workers.

Second, tax burdens on labour income vary significantly depending on income and family characteristics, with substantial variation also across countries. For a single individual earning the average wage in their country, income tax and social security contributions can result in tax wedges ranging from as low as seven per cent to as high as 55 per cent, and marginal tax wedges ranging from seven to 66 per cent. In general, taxpayers with children face lower tax wedges than taxpayers without children, while second earners often face higher average and marginal tax wedges than primary earners. Consumption taxes can add as much as 12 percentage points more to these burdens. Furthermore, the interaction of benefit and pension systems with the tax system can lead to even greater effective tax burdens.

Finally, taxes on labour income drive a wedge between the total labour costs faced by employers and the real consumption wage received by employees. This will generally reduce both the demand for and supply of labour, thereby reducing employment in the formal sector. The effect on labour supply varies across groups depending on their degree of responsiveness to the imposition of the tax in terms of participation, hours worked and effort. Empirical evidence suggests that the labour supply responses to taxes on labour income of low-income workers, single parents, second earners and older workers are likely to be stronger than in the case of single individuals and men of prime working age. In addition, theoretical and empirical evidence also suggests that taxes on labour income are likely to increase long-run "equilibrium" unemployment, predominantly through interacting with various institutional features of the labour market, such as unionised bargaining or minimum wage regulations. As institutional settings vary significantly across OECD countries, the actual effect of taxation on equilibrium unemployment is likely to be highly country specific.

Drawing together these observations, particular concern can be seen to arise for tax policy makers in a number of areas where, in general, high tax burdens are imposed on groups whose labour supply is relatively responsive to economic incentives. Such cases provide significant scope for tax reforms to increase employment. These areas of concern are briefly outlined below, along with potential reform options drawn from the country examples discussed in this report.

- *Low-income workers*. Effective tax burdens on low-income workers are often very high due to the combined impact of taxation and benefit withdrawal on entering employment, or on increasing hours worked once in employment. Furthermore, empirical evidence highlights the high responsiveness of low-income workers to these disincentives, particularly at the participation margin. Possible options to improve work incentives include: reducing PIT and SSC burdens on low-income workers, and introducing in-work tax credits (or equivalent benefit schemes). An alternative way to increase work

incentives would be to reduce benefit entitlements – although this may be difficult to reconcile with broader social objectives.

- *Older workers*. Tax and pension systems often combine to create significant incentives for older workers to retire, while empirical evidence shows that the retirement decision of older workers is highly responsive to such incentives. Possible options to improve work incentives include: providing age-based rather than pension-specific tax concessions; reducing SSC burdens on older workers to match those due on pension income; and providing in-work tax credits targeted at older workers.
- *Mobile high-skilled workers*. Tax systems often impose high tax burdens on high-skilled workers, and estimates of taxable income elasticities suggest that high income recipients are more responsive than most taxpayers to tax rates. Migration does not appear to be a significant driver of these elasticities and the limited empirical evidence does not suggest migration decisions are highly responsive to tax. Nevertheless, international mobility may still be a concern for governments as high-skilled workers can add significant value to an economy. As such, there may be merit, in certain cases, in introducing tax concessions targeted at mobile high-skilled workers. This may particularly be the case in countries with higher than average taxation of labour income, and high and/or complex taxation of foreign sourced capital income.
- *Second earners*. Tax systems often create significant work disincentives for second earners, while empirical evidence highlights the higher responsiveness of second earners to these disincentives. Possible options to improve second earner work incentives include: moving from family-based towards individual based taxation; increasing individual allowances; and removing dependent spouse allowances. Where equity-based objectives do not allow a shift away from family-based taxation, the introduction (or increase in value) of an independent allowance for second earners will increase second earner work incentives.
- *Demand for low-skilled workers*. As well as reducing the supply of low-income workers, the high taxes imposed on low-income workers in many countries may also reduce labour demand. This may cause some low-skilled workers to be "priced out" of employment by high employer SSC, generous minimum wage laws, or a combination of both. Possible options to improve demand for low-skilled workers include: reducing employer SSC and providing employer tax credits targeted at low-skilled workers.

A number of the reforms discussed above would involve a revenue cost and therefore would require either a compensating reduction in public expenditure, or an increase in taxes – either on other tax bases or on different workers. In many cases, reductions in expenditure may conflict with other government goals. Meanwhile, shifting the tax burden towards another base requires a trade-off to be made between the employment gains from reducing the taxation of labour income, and the distributional and efficiency consequences of increasing the tax burden on the other base. While a detailed discussion of the pros and cons of alternative tax bases is beyond the scope of this report, there are a number of possibilities available to countries. In particular, a shift from personal income taxes (and/or SSC) towards consumption, property or environmental taxes may deserve further consideration, particularly in countries with currently high tax burdens on labour. A detailed country-specific analysis of the pros and cons of such a shift would be necessary before implementing any such reform.

However, even where reducing the overall tax burden on labour is not feasible, increases in employment may still be possible through a redistribution of the labour tax burden. Employment gains may be made by reducing marginal and/or average tax burdens faced by more responsive groups, such as those highlighted above, at the expense of less responsive groups. In doing so, the distributional consequences of such reforms must also be considered.

Notes

1. The unemployment rate is defined as the number of people unemployed as a percentage of the labour force. The unemployed are defined as those people that make themselves available for work, but cannot find work. The labour force is defined as the total number of people that make themselves available for work, irrespective of whether they find work.
2. Note that someone is considered to be employed if they usually work at least one hour per week in paid employment, including self-employment.
3. The inclusion of SSC in a measure of the tax wedge is not without debate. Where there is no connection between the SSC paid and the expected future return to the worker then SSC are equivalent to a "pure" tax. However, if there is a fully actuarial link between SSC paid and the expected future return then they are more in the nature of compulsory savings or insurance. As such, they may create very different behavioural responses than a "pure" tax. In practise, most SSC are likely to be somewhere between the two polar cases. SSC tend to have some link between payment and return, but will also likely have a substantive redistributive element to them as well – making them closer in nature to a "pure" tax. The OECD defines taxes as compulsory unrequited payments to general government. As such, only SSC that are unrequited are included in the *Taxing Wages* models. In practise this means that only SSC that have some redistributive element are included in the models. Consequently, SSC included in the tax wedges presented here are likely to incite similar behavioural responses as the income and payroll taxes they are combined with. An alternative approach to this would be to undertake the daunting task of attempting to separate out the tax and compulsory savings components. Disney (2004), for example, attempts to do this for pension contributions. It is also arguable that certain non-tax compulsory payments (NTCPs) – for example, compulsory payments to private sector pension schemes – should be included in a measure of the tax wedge as these may also generate similar behavioural responses as taxes. OECD (2010) discusses NTCPs in more detail and presents compulsory payment indicators that include both taxes and NTCPs. Compulsory payments indicators are also published annually at: *www.oecd.org/ctp/taxdatabase*.
4. This does not include social benefit payments such as unemployment, housing or social assistance benefits. However, the impact of such benefits on low-income workers is considered in Section 1.6 and in Chapter 2.
5. With the exception of a non-working second earner. In this case the marginal increase is assumed to be a move to part-time work earning 33 per cent of the average wage.
6. These correspond to the eight standard family types presented in the annual *Taxing Wages* publication. See OECD (2011a).
7. Furthermore, in many countries the child cash transfers included in the wedge calculations will not depend, or only part of them will depend, on working.
8. Nickell (1997) emphasises the need to include consumption taxes when analysing the effect of labour taxes on unemployment.
9. See, for example, Bassanini and Duval (2006); Carey and Rabesona (2002); Nickell (1997).
10. See Thomas and Picos-Sanchez (2011); and OECD (2009a).
11. The exception is where either demand or supply is totally inelastic. In this case one party bears the entire burden of the tax, and employment will remain constant.
12. These are not the only "suspects". For example, Nickell and Layard (1999) also point to education policies and barriers to regional labour mobility.
13. Economic shocks and their interaction with market rigidities are generally considered to be the predominant causes of the initial large increases in unemployment experienced in most OECD countries in the 1970s. The persistence of high unemployment, however, turned attention in the literature towards labour market institutions as causes of long-run unemployment. A vast

literature exists discussing the causes of long-run "equilibrium" unemployment. Blanchard (2006) provides a summary of the evolution of this literature over the last thirty years.

14. OECD (1994) provides a survey of this literature. As such, we focus on more recent research.

15. Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Ireland, Italy, Japan, Netherlands, Norway, New Zealand, Portugal, Spain, Sweden, Switzerland, United Kingdom, United States.

16. Daveri and Tabellini note that when grouping all countries together they find smaller results that are similar to those of Nickell and Layard (1999) who follow a similar empirical approach, but do not allow for differing wage-setting institutions across countries.

17. "Corporatism" implies that while wages may technically be negotiated at a decentralised level, the degree of coordination within the industry means wages are effectively determined collectively at the industry level.

18. Additionally, as was shown in Section 1.2, tax systems tend to impose different tax burdens on different taxpayers depending on their income and family characteristics. To fully understand how a particular tax system will affect labour supply, one needs to match the responsiveness to taxation of different groups with the actual tax burden they face. We do this in Section 1.6 when identifying key policy challenges.

19. This is generally simplified in terms of entering employment or not, abstracting away from the possibility of unemployment.

20. While not being represented in employment statistics, individuals operating in the "underground" economy are still employed in a broader sense. However, in addition to the abuse of tax laws, and potential abuse of welfare programs and consequent fiscal cost, these workers may be adversely affected in terms of their productivity and output due to a lack of access to facilities only applicable to businesses and employees in the "official" economy.

21. And possibly a number of additional explanatory variables depending on the complexity of the model.

22. Extensions to the standard labour supply model include family-based and inter-temporal models of labour supply. Given their complexity, and the developmental status of the related empirical literature, we focus on the standard model. For a discussion of these extensions see Meghir and Phillips (2010).

23. The cost of childcare creates a fixed cost to entering employment which drives up the reservation wage. That said, carrying out childcare provides an implicit income (as otherwise you would have to pay for childcare), and if the implicit income derived from childcare is greater than that in "market" work then it will be in the individuals best interests not to participate in market work and instead to "work" by caring for their children. The tax system will create a bias towards childcare and against market work as implicit childcare income will not be taxed whereas the alternative market income would be.

24. This assumes a proportional income tax. In a progressive tax system, if just the taxpayer's marginal rate changes there will be a far smaller income effect as only income subject to that marginal rate is affected by the rate increase. If the marginal rate applies only to the marginal hour of work then there will be no income effect at all. Note also that when faced with a non-convex budget constraint, as may result from an in-work tax credit, behavioural responses may differ. Such issues are considered in more detail in Chapter 2.

25. Because of the risk involved, the expected return from putting in an extra "unit" of effort will be lower than if the return was received with certainty, thereby lowering the incentive to put in the extra effort. A progressive tax system would further discourage such risk taking as the gross expected return would be taxed at higher rates.

26. This section draws heavily on the excellent recent survey by Meghir and Phillips (2010).

27. The wage elasticity of labour supply at the extensive (intensive) margin can be defined as the percentage change in participation (hours worked) in response to a one per cent increase in the net-of-tax wage.

28. The elasticity of taxable income can be defined as the percentage change in taxable income in response to a one per cent increase in the "net-of-tax rate" (one *minus* the marginal tax rate).

29. Meghir and Phillips (2010) note a caution regarding studies where fixed costs of work are not taken account. These studies are likely to overestimate elasticities because the large jumps in hours

worked that relate to the participation decision will be interpreted as responses at the intensive margin. This was particularly a problem of earlier literature in this area (OECD, 1994).

30. See, for example, MaCurdy, Green and Paarsch (1990) for the US; Blomquist and Newey (2002) and Flood and MaCurdy (1992) for Sweden; Kaiser *et al.* (1992) for Germany; and Bourgiugnon; and Magnac (1990) for France. Meghir and Phillips (2010) and Pencavel (1986) provide surveys.

31. This assumes a participation rate of 60 per cent. They also find slightly higher participation elasticities with respect to a change in out-of-work income. Estimates for highly educated men were very low (and statistically insignificant).

32. See Saez *et al.* (2009) for a detailed survey covering studies across 12 countries. They emphasise that there is no reason to expect similar estimates across countries as the taxable income elasticity depends on many aspects of a particular country's tax system, including the tax base definition, avoidance opportunities and the enforcement regime.

33. Longer term labour supply margins such as career choice and education decisions may be affected, but are unlikely to be captured by taxable income elasticity estimates. This is because estimates are often based on data around two years after a reform that has changed the net-of-tax rate (following the "natural experiment" approach).

34. Consequently, Gordon (1986) argues that small open economies should not impose corporate income taxes. He notes that labour will bear the entire burden of either a labour tax or a CIT, so both will distort labour supply. However, CIT will also distort the production mix and so is inferior to labour taxation alone.

35. This result was first illustrated by Harberger (1962).

36. For example, if capital is easily substituted for labour in the non-corporate sector then capital flowing into the unincorporated sector in response to the CIT may simply replace labour.

37. However, they emphasise that the parameterisation of the model is important in driving the size of the difference. In particular, the lower is real wage resistance, the smaller is the effect of labour taxes on unemployment, and the more significant an impact is felt on unemployment, relatively, by the CIT.

38. The analysis of pension wealth requires taking account of both the potentially positive effect on pension entitlements of working another year (by increasing the number of years of service credits on which entitlements are determined), and also the cost associated with a year's pension income foregone.

39. For example, children and other family commitments, language and cultural differences, etc.

40. This may create a disincentive to work part-time with incentives to work full-time less affected. This is because after the initial jump in the average tax rate due to the full withdrawal of the dependent spouse benefit, the marginal rate will remain unchanged, and the average tax rate will reduce with every extra hour worked (until the secondary earner hits a higher PIT or SSC threshold).

41. Low-skilled workers will tend also to have low incomes and may therefore face the labour supply disincentives associated with unemployment and poverty traps discussed earlier. Not all low-income workers though will be low-skilled. For example, low-income workers may also include high-skilled part-time workers. Such workers are unlikely to be priced out of employment.

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Chapter 2

The Taxation of Low-Income Workers

Chapter 1 emphasised the low employment rates amongst low-income workers compared to higher-income workers in many OECD countries.[1] This difference is driven by both lower participation and greater (involuntary) unemployment than in higher-income groups. This chapter considers both factors, though the predominant focus is on the participation side, examining both the causes of the low supply of labour by low-income workers, and the ways in which OECD countries attempt to address this concern.

While a number of factors will influence the labour supply decisions of workers, the low labour supply of low-income workers can be largely explained by two facts: low-income workers often face substantial work disincentives; and, as shown in Chapter 1, low-income workers are more responsive to financial incentives than many other groups. However, the work disincentives faced by low-income workers are not attributable solely to the tax system. It is the combined effect of both tax and benefit systems that determines the overall work disincentives faced by low-income workers. In particular, the provision of generous unemployment, social assistance and other out-of-work benefits will reduce the incentive to enter low-income employment, just as higher taxes on employment income will.[2] Additionally, the income-based withdrawal of support targeted at individuals and families on low-incomes will reduce incentives to work longer, or harder, once in employment. While affecting work incentives, the provision of such benefits serves redistributional goals, and so the overall design of tax and benefit systems requires a trade-off to be made between income redistribution and employment goals.

The chapter presents various effective tax rate indicators to quantify the combined disincentive created by both tax and benefit systems to enter low-income employment, and to work longer, or harder, once in employment. While results vary significantly across countries and family types, in many cases these work disincentives are very high. The indicators presented are also broken down into their tax and benefit components to identify the relative importance of each factor in determining work incentives. The analysis confirms that both tax and benefit systems do significantly affect work incentives, with the impact of benefit withdrawal generally being the predominant factor. Nevertheless, the analysis does show significant scope for tax reform to improve work incentives.

The chapter then focuses on the tax measures that countries have adopted to improve work incentives for low-income workers – with a particular focus on reforms in the last 10 to 15 years. In particular, many OECD countries have reduced personal income tax burdens or social security contribution burdens on low-income workers over this period (by adjusting rates, thresholds or allowances). Additionally, in-work tax credit (or benefit) schemes have become increasingly popular in the last 15 years. These schemes attempt to both reduce in-work poverty and increase work incentives for low-income workers by making the credits conditional on employment. However, the need to target low-income workers, to impose eligibility criteria, and to administer the schemes results in complex designs that require a number of trade-offs to be made between competing goals. In addition, design varies significantly across countries reflecting both the different weights

placed on the poverty alleviation and work incentive goals of the schemes, as well as various country specific factors including other tax/benefit parameter settings, income distributions and taxpayer characteristics.

While the low employment of low-income workers is often driven by low participation, employment also depends on the availability of jobs. Some groups of low-income workers (particularly the low-skilled, young, or long-term unemployed) can be effectively priced-out of employment by high taxes, high minimum-wage laws, or a combination of both. As such, the chapter also considers policy measures introduced to increase demand for low-income workers. In general, these are (temporary or permanent) reductions in employer social security contributions.

The chapter draws heavily on responses to a questionnaire issued in early 2010 to Country Delegates to Working Party No. 2 of the OECD Committee on Fiscal Affairs (the "*tax and employment study* questionnaire"). The questionnaire sought information as of 1 January 2010 and information on tax rules relates to that date unless otherwise specified.

The chapter proceeds as follows: Section 2.1 first discusses the trade-offs faced in tax-benefit system design, before Section 2.2 presents various effective tax rate indicators to quantify the work disincentives created by the tax-benefit systems in OECD countries. Section 2.3 then considers recent tax reforms in OECD countries to increase work incentives for low-skilled workers, including changes to personal income tax and social security contribution rates and thresholds. The use of in-work tax credits is left for Section 2.4, which examines in detail the key design features of these measures, outlining the trade-offs that are made and their likely impact on the labour supply of low-income workers. Finally, Section 2.5 considers measures to increase the demand for low-income workers.

2.1. Trade-offs in designing tax-benefit systems: Consequences for employment

While the focus of this report is on tax policy, it is impossible to consider the effect of taxation on the employment of low-income workers without also considering the benefit system. This is because the tax and benefit systems together lay out the incentive structure that low-income workers will face when they consider whether to enter the labour force, the number of hours they will work if they do enter the labour force, and the effort they will expend during those hours of work. Additionally, the benefit system will have implications for the taxation of higher income earners too, as they will likely face a higher or lower tax burden depending on the tax paid and benefits received by low-income earners.

At the heart of tax-benefit design is the classic equity-efficiency trade-off. Governments want to redistribute income from higher to lower income individuals and families (and to raise a certain amount of revenue for public good provision). However, in doing so they reduce work incentives – thereby reducing the total amount of income available to be redistributed. In particular, governments generally provide significant support to those that are unemployed (or unable to work), and to the working poor – with greater support in both cases generally provided where young children are present. The incentive problems created by such low-income support programmes are often categorised as one of three so called "traps":

- *The unemployment trap.* This trap occurs where generous benefit levels paid to the unemployed and/or high tax rates imposed on low-income workers result in there being very little difference between the levels of income received when in-work and out-of-work. This creates very little incentive for an individual to move into work, thereby "trapping" them in unemployment.

- *The inactivity trap.* This trap is similar to the unemployment trap, but occurs where generous social assistance and/or other benefits are paid to an inactive individual (as opposed to an unemployment benefit for which they will be ineligible). Alternatively, it may occur in a family where an inactive partner would be taxed at relatively high levels due to their partner's income. Again, by creating little difference between in-work and out-of-work income, the individual has little incentive to move from inactivity into employment.
- *The poverty trap.* A third "trap" may occur as a result of the targeting of support to the poor. Targeting restricts the fiscal cost of low-income support and ensures that for any given fiscal cost the greatest level of support can be provided to those deemed to be in need of that support. However, almost inevitably, targeting requires support to be phased-out as income increases. This often reduces markedly the incentive for those already in work to increase the number of hours they work, put in greater effort, or invest in training. As such this can prevent low-income workers from moving out of poverty and benefit dependence towards higher income work and full independence.

As long as a government has some taste for redistribution, then these traps will occur to some extent. Empirical evidence suggests that low-income workers facing these traps are likely to be relatively responsive to the work disincentives they create. In particular, recall from Chapter 1 the high elasticity estimates particularly at the extensive (participation) margin for single mothers, and for married women with children – who are often second earners on lower incomes; and also the moderate elasticity estimates for low-skilled men. Additionally, as is discussed in Section 2.4 (see Box 2.4), empirical studies on the effectiveness of in-work credits targeted at low-income workers find strong evidence that workers respond to the incentives they create, particularly at the extensive margin. As such, the impact of these traps on the level of employment is likely to be of some significance.

The trade-off can be softened, to an extent, by using more information than just income to determine the merit of providing support to a particular group of taxpayers (Mirrlees *et al.*, 2011). For example, countries will often target support to individuals or families with children, to individuals with disabilities, and to older taxpayers. These characteristics (presence of children, disability, and age) are relatively easily determined and allow closer targeting of groups considered in need of support without creating the negative work incentives associated with income-based targeting.

Optimal income tax theory provides some insights on the setting of tax (and benefit) rates in order to balance both efficiency and redistributional objectives. The models developed in this literature effectively formalise the efficiency-equity trade-off. They set out to determine the optimal set of marginal tax rates that raise a fixed amount of revenue, for a specified redistributive preference held by the government. As emphasised by Brewer *et al.* (2010), the key insight from the literature is that marginal tax rates should be higher where:

- Taxpayers are relatively less responsive to high tax rates.
- The government cares more about redistribution.
- There are few people subject to that marginal rate.
- There are a larger number of people earning higher incomes.

The reasons are relatively intuitive. Where taxpayers are less responsive to high tax rates (at either extensive or intensive margins), the cost in terms of reduced labour supply will be lower. Where the government cares more about redistribution it will give less weight to the loss in welfare (due to a higher marginal tax rate) suffered by the taxpayers subject to

that rate. Where there are few people subject to the marginal tax rate, the cost in terms of reduced labour supply will be lower. Meanwhile, where the number of people earning higher incomes is larger, a greater revenue gain will be made without having a significant impact on labour supply (as the marginal rate of the higher earners does not change).

The substantial participation elasticities found for low-income workers imply that low-income workers should not face high effective tax burdens when moving into work, unless the preference for redistributing income to individuals out-of-work is extremely strong (Saez, 2002). Indeed, Saez finds that in some cases it may be optimal for marginal tax rates on low-income workers to be negative. Instead, marginal tax rates should be higher further up the income distribution at points where taxpayers are less responsive, less populous, and whose welfare is of less importance to the government. Box 2.1 discusses the implications of the optimal income tax literature for low-income workers in more detail.

This result is not always borne out in practice, however. As we will now see, tax rates on low-income workers are often very high.

Box 2.1. **Taxing low-income workers: Lessons from optimal income tax theory**

The standard model of optimal income taxation was developed by Mirrlees (1971). Essentially, the model formalises the equity-efficiency trade-off inherent in tax-benefit design. The government seeks the tax schedule that will maximise social welfare,[1] subject to the need to raise a specific amount of revenue.[2]

In the basic model, workers only respond to the imposition of taxes at the intensive (hours-worked) margin and not the extensive (participation) margin. In this setting, Mirrlees (1971) shows that marginal tax rates will always be positive, with the exception that the rate on the highest earner will always be zero. Subject to a number of further assumptions, Mirrlees also derives an optimal tax schedule that is very close to a negative income tax – with an almost linear income tax and a transfer to incomes below an exemption level. Numerical simulations based on this model have suggested imposing high tax rates on low-income workers (see, for example, Tuomala, 1990; Diamond, 1998; Saez, 2001; and Brewer *et al.*, 2010). Diamond (1998) derives optimal tax rates for the US with a U shape over the whole distribution, imposing high rates on both low and high incomes. Brewer *et al.* (2010) find a similar shaped schedule for the UK.

In contrast, adjusting the model to allow for workers to respond at the extensive margin can result in far lower tax rates on low-income workers (Diamond, 1980; Saez, 2002; Brewer *et al.*, 2010). Indeed, Saez (2002) shows that in a model with both extensive and intensive responses, it can be optimal for marginal tax rates on low-income workers to be negative (as currently occurs in a number countries via in-work tax credit schemes that phase-in the credit at low income levels).

To examine the implications of both (intensive-only and intensive plus extensive response) models, we use the discrete model adopted by Saez (2002).[3] In this model there are $I + 1$ types of "occupations" (I different jobs, plus the unemployed), with salaries w_i increasing from $i = 1$ to I. The net taxes paid by each individual in each occupation, i, is T_i, with after tax income in occupation i equal to $c_i = w_i - T_i$. The total population is normalised to one, with h_i representing the proportion of individuals in occupation i. The government's problem is to set a tax schedule (including a benefit to the unemployed) that maximises welfare, subject to the requirement that it raise a fixed amount of income, $H(=\sum_{i=0}^{I} h_i T_i)$. Welfare is measured by the weighted sum of individual utilities, with individuals in each occupation given a welfare weight by the government equal to g_i, which decreases as income rises. When allowing only for responses at the intensive margin, the optimal marginal tax rates are given by:

$$\frac{T_i - T_{i-1}}{c_i - c_{i-1}} = \frac{1}{\zeta_i} \sum_{j=i}^{I} \frac{h_j}{h_i} (1 - g_j) \qquad [1]$$

Box 2.1. **Taxing low-income workers: Lessons from optimal income tax theory** *(cont.)*

Equation [1] shows that the optimal marginal tax rate depends on four factors. It decreases with: the elasticity of labour supply (ζ_i); the number of workers subject to the tax rate (h_i); and the welfare weight the government gives to those earning that and higher incomes (g_j). And it increases with the number of taxpayers earning that and higher incomes ($\sum_{j=i}^{I} h_j$).[4] The intuition for this is discussed in the main text. See Heady (1993) or Brewer *et al.* (2010) for a fuller discussion.

When extending the model to include behavioural responses at the extensive as well as intensive margin, equation [1] becomes:

$$\frac{T_i - T_{i-1}}{c_i - c_{i-1}} = \frac{1}{\zeta_i} \sum_{j=i}^{I} \frac{h_j}{h_i} \left(1 - g_j - \eta_j \frac{T_j - T_0}{c_j - c_0}\right) \qquad [2]$$

This is identical to equation [1] except that the welfare weight is now augmented by $-\eta_j(T_j - T_0)/(c_j - c_0)$, where η_j is the participation elasticity. Note also, that where η_j is 0, equation [2] reverts back to equation [1]. Saez (2002) summaries that "… adding the participation margin amounts to attributing a higher welfare weight … to income groups that are prone to leave the labour force and that receive a lower transfer than the unemployed ($T_j > T_0$)." (p1055). This added welfare weight has the result of lowering the marginal rate on low-income workers who (as emphasised in Chapter 1) are highly responsive at the extensive margin.

Saez (2002) undertakes numerical simulations with a number of elasticity estimates, and finds that tax rates will generally be low at low-income levels. For these simulations, Saez assumes a social welfare function where individual welfare weights are a decreasing function of disposable income. For feasible elasticities (based on empirical estimates), Saez finds the optimal income tax schedule for the US provides a moderate guaranteed income, and imposes a zero, or even slightly negative, marginal rate at the bottom of the earnings distribution, with higher rates slightly further up the income distribution. Saez notes that this is relatively similar to the Earned Income Tax Credit (EITC) with phase-in and phase-out regions currently in place in the US.

The simulations also emphasise that the optimal structure is very responsive to the participation elasticity. When it is zero, the optimal structure looks more like a classical negative income tax – with a large guaranteed income that is quickly phased out – while as the elasticity increases the EITC-type result becomes more and more pronounced. Saez' upper participation elasticity estimate of 1 results in a far lower guaranteed income, and negative marginal rates at low income levels that is then phased out quickly. The exception is when the government has an extremely strong preference for redistribution, in which case a very high guaranteed income accompanied by high tax rates results – irrespective of the size of the participation elasticity. In contrast, when redistribution is unimportant, the guaranteed income and tax rates are quite low. Meanwhile, a higher intensive elasticity tends to push down the guaranteed income, increase tax rates at low-incomes, and lower the phase-out rate at slightly higher incomes.

Overall, though, the broad implication from the paper is that behavioural responses at both the intensive and extensive margin matter for optimal tax-benefit design. Where the behavioural response of workers is mainly on the extensive margin then an EITC-type structure is appropriate. But if the behavioural response of workers is predominantly on the intensive margin, a negative income tax structure should be preferred.

The model does have some limitations. Most notably, it only focuses on individual labour supply responses, thereby ignoring second earners effects (who are likely to be affected by phase-out based on family income). Also, the model ignores income effects – although this does not have major implications on the results (see Saez, 2000).

1. Social welfare is represented by a specific welfare function that gives different weights to the welfare of rich and poor according to the redistributive preference of the government.
2. Theoretically, the government would like to tax on the basis of ability, but it does not know the true abilities of workers so has to tax on the basis of income instead. This poses the problem that a high ability worker may choose to imitate a worker of less ability (and hence earn less and pay less tax). Consequently an "incentive compatibility constraint" is also imposed on the government's welfare maximisation problem to ensure that a worker will not be better off by imitating a lesser ability worker.
3. See Saez (2000) for an illustration of the model in a continuous setting.
4. Note that together, $\sum_{j=i}^{I} h_j / h_i$ provides a measure of the thinness of the income distribution.

2.2. Quantifying the financial disincentives to work

This section investigates the financial disincentives to work faced by low-income workers (both to move into work and to increase hours worked once in the workforce) that are created by the interaction of tax and benefit systems. The analysis is based on participation tax rates and marginal effective tax rates calculated for 31 OECD countries using the OECD Tax-Benefit models.[3]

Participation tax rates (PTRs) are used to investigate the financial disincentive to move into work. These show how much of the gross income earned from moving into work from either unemployment or inactivity is "taxed" away in the form of lost out-of-work benefits, reduced income-tested benefits, and taxation of in-work income (personal income tax plus employee social security contributions).[4] As such, they provide an indication of the extent of unemployment and inactivity traps in OECD countries. Marginal effective tax rates (METRs) are used to consider the financial disincentive for an individual already in part-time work to increase the number of hours they work. METRs show how much of the additional gross income earned from increasing the number of hours worked is "taxed" away in the form of reduced income-tested benefits and income taxation. They provide an indication of the extent of poverty traps in OECD countries. Box 2.2 discusses their calculation in more detail.

Box 2.2. **Calculating PTRs and METRs**

The OECD Tax-Benefit models are used to calculate both participation tax rates (PTRs) and marginal effective tax rates (METRs) for a number of specific scenarios and family types. The participation tax rate shows how much of the gross income earned from moving into work from either unemployment or inactivity is "taxed" away in the form of reduced out-of-work and income-tested benefits, and taxation of in-work income (personal income tax plus employee social security contributions). The PTR is defined as:

$$PTR = 1 - \frac{y_{netIW} - y_{netOW}}{y_{grossIW} - y_{grossOW}} = 1 - \frac{y_{netIW} - y_{netOW}}{y_{grossIW}}$$

where y_{netIW} and y_{netOW} are net family income in work, and out of work, respectively; and $y_{grossIW}$ and $y_{grossOW}$ are gross income in and out of work. As $y_{grossOW}$ is zero, the denominator is simply $y_{grossIW}$. The second term calculates the additional income from moving into work as a proportion of total income in work. As such, one minus this amount is the proportion of gross income lost through taxation and benefit withdrawal.

The marginal effective tax rate shows how much of the additional gross income earned from increasing the number of hours worked is "taxed" away in the form of reduced income-tested benefits and income taxation. It is defined as:

$$METR = 1 - \frac{y_{netB} - y_{netA}}{y_{grossB} - y_{grossA}}$$

This is effectively the same calculation as for the PTR, except that it now considers the move from one level of in-work income to a slightly higher level of in-work income (from state "A" to state "B"), rather than considering the move from unemployment/inactivity into work.

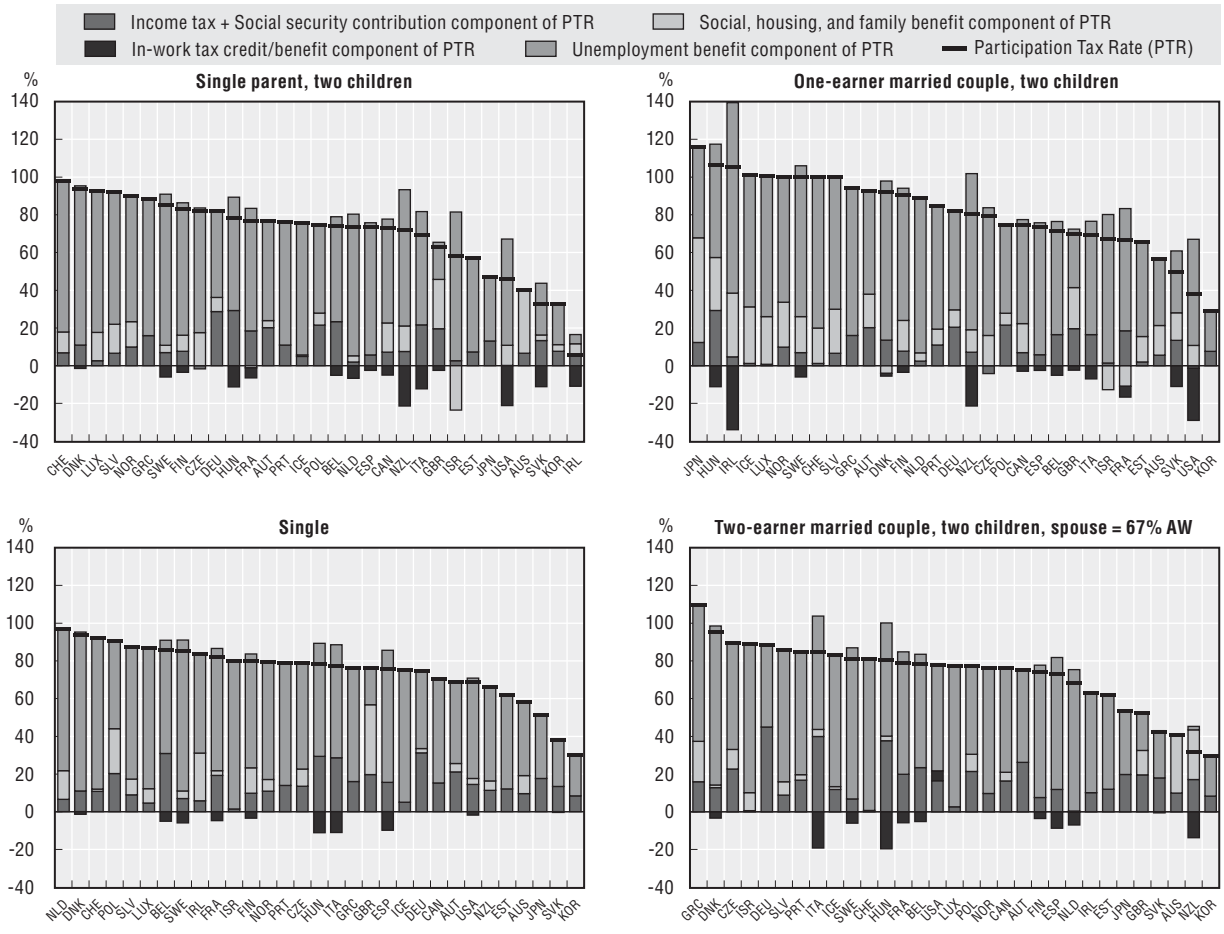
The calculated PTRs and METRs are decomposed into their various tax and benefit components in order to determine the scope for tax reforms to increase work incentives for low-income workers.

Note that there are some limitations to the use of PTRs and METRs in examining work incentives. Most obviously, given their static nature they cannot capture dynamic effects. For example, a low-pay job may be seen as a stepping stone to a better career and greater long-term earnings prospects (OECD, 2006a). Additionally, the influence of benefit payments on work decisions may vary over time (for time-limited benefits). For example, the withdrawal of an unemployment benefit on entering work is likely to have a far smaller impact on the decision to take a job the longer the beneficiary has received the benefit and hence the closer they are to losing eligibility (in the case of a time-limited benefit).

Moving from short-term unemployment into full-time work

Figure 2.1 calculates PTRs for the move from short-term unemployment into full-time work. This takes account of the taxation of in-work income, plus the loss of unemployment benefits and any other available benefits such as housing, family and social assistance benefits. As such, it provides an indication of the extent of unemployment traps in OECD countries.

Figure 2.1. **Decomposition of Participation Tax Rate: Moving from short-term unemployment to full-time work at 50% of AW (wage before unemployment = 50% of AW), 2009**



Note: Countries are ranked by decreasing order of the total PTR.
Source: OECD Tax-Benefit models. See OECD (2007b) for more detail.

StatLink http://dx.doi.org/10.1787/888932482764

The calculations assume the worker previously earned income equal to 50 per cent of the average wage and is moving back into work earning 50 per cent of the average wage. As benefit entitlements are often dependent on prior work history, the taxpayer is assumed to be 40 years old with a long and uninterrupted employment history. Any post-employment "stand-down" period before becoming eligible for an unemployment benefit is assumed to have been met. Calculations are made for four different family types: a single individual, a single parent with two children, the sole earner in a one-earner family with two children, and the second earner in a two-earner family with two children.

The clear implication from Figure 2.1 is that the effective disincentive to enter the workforce is very high. The highest PTRs tend to be faced by one-earner families with children, where PTRs are over 60 per cent in almost all countries, and over 80 per cent in more than half. At the extreme, a one-earner family with two children in Japan faces a PTR of 116 per cent, meaning that a move into work will actually result in the family being worse off than when unemployed. This is because the gross income earned from entering work is outweighed by the income taxation due on that gross income and the loss of the various benefits previously received. Another four countries also have PTRs greater than 100 per cent (Hungary, Ireland, Iceland and Luxembourg), and a further four countries have PTRs equal to 100 per cent, meaning that the combination of tax and benefit withdrawal exactly subsumes all gross income from moving into work.

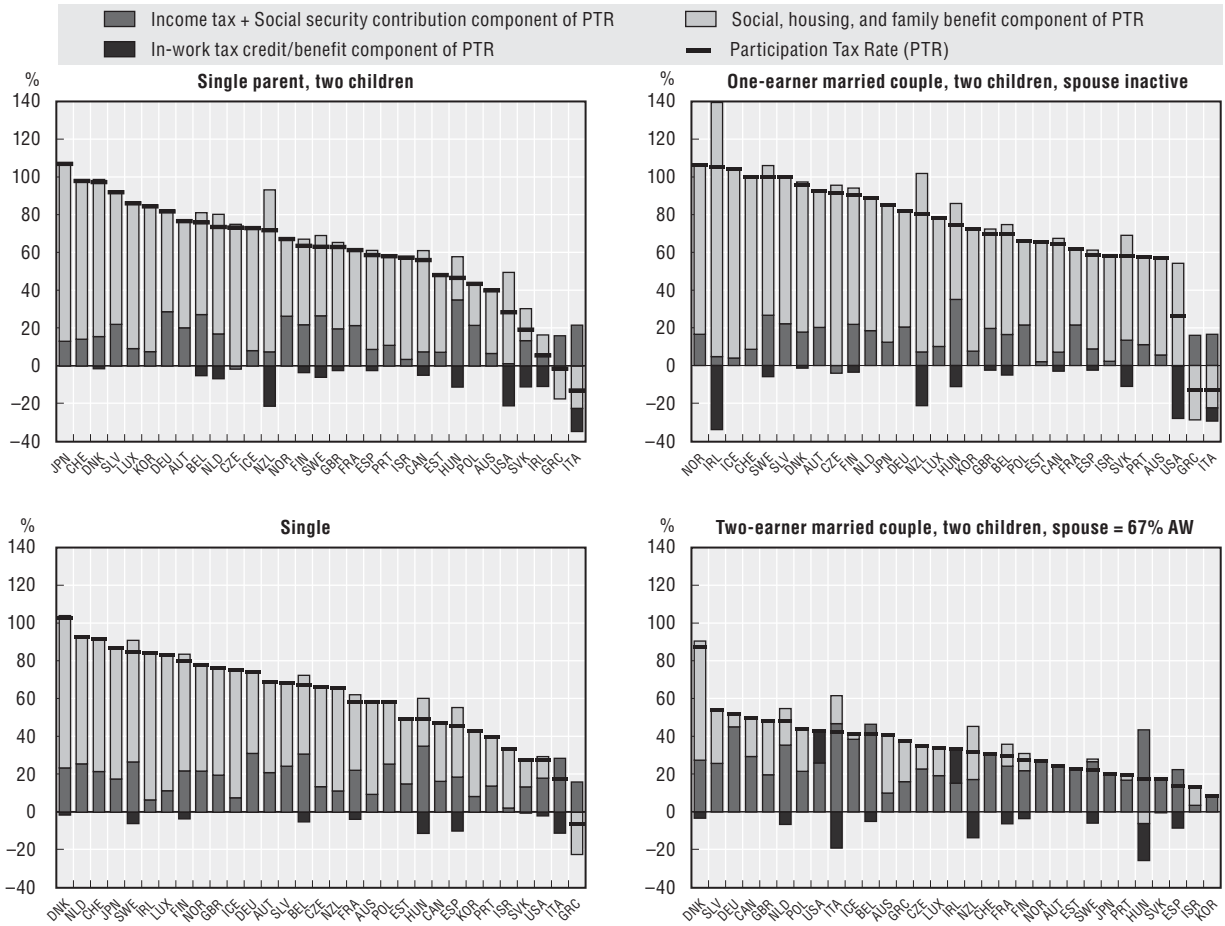
PTRs are slightly lower, though still generally very high, for single parents as they will tend to receive slightly lower family benefits than one-earner families so face less benefit withdrawal when entering employment. PTRs for single individuals and second earners are also at similar levels to those for single parents. While these family types will generally receive lower out-of-work benefits than single parents, they tend to face slightly higher tax burdens. For second earners this is largely due to their partner's income, while single individuals do not receive child-dependent tax reductions that are provided in many countries.

When considering the decomposition between taxes and benefits it is clear that, while taxes do contribute to the high PTRs, the majority of the disincentive is created on the benefit side, particularly from the withdrawal of unemployment benefits.[5] The influence of in-work tax credits can be clearly seen lowering PTRs substantially in a number of countries, particularly in Ireland, New Zealand and the US for single parents and one-earner couples with two children. In contrast, note that in the US for a second earner in a two-earner family with two children, the in-work tax credit actually slightly increases in the PTR. This is because the credit is withdrawn at higher levels of family income, and by entering employment the second earner increases overall family income to such an extent that it reduces the size of the credit to which the family is entitled. This highlights the often complex effects that in-work tax credits can have on work incentives. (These effects are discussed in more detail in Section 2.4). In general though, Figure 2.1 shows in-work tax credits to have a negative impact on PTRs, particularty for single parents and one-earner couples with two children.

Moving from inactivity to full-time work

Figure 2.2 calculates PTRs for the move from inactivity (or long-term unemployment) into full-time work. In this case the worker is assumed not to be eligible for unemployment benefits (either due to length of unemployment, or through not meeting job-search requirements), but to still be eligible for social assistance and other available benefits. This measure provides an indication of the extent of inactivity traps.

Figure 2.2. **Decomposition of Participation Tax Rate: Moving from long-term unemployment or inactivity to full-time work at 50% of AW, 2009**



Note: Countries are ranked by decreasing order of the total PTR.
Source: OECD Tax-Benefit models. See OECD (2007b) for more detail.

StatLink http://dx.doi.org/10.1787/888932482783

Once again, the calculations assume the worker previously earned income equal to 50 per cent of the average wage and is moving into work earning 50 per cent of the average wage, and that the taxpayer is 40 years old with a long and uninterrupted employment history. Calculations are made for the same four family types.

Due to the absence of any unemployment benefit withdrawal, PTRs in Figure 2.2 are generally lower than in Figure 2.1. However, in most countries social assistance payments are larger for inactive individuals/families than for unemployed ones, and the withdrawal of these payments results in PTRs still being substantial, implying significant disincentives to enter the workforce from inactivity. This is particularly the case for one-earner families with two children where PTRs are over 60 per cent in most countries (and over 80 per cent in just under half).

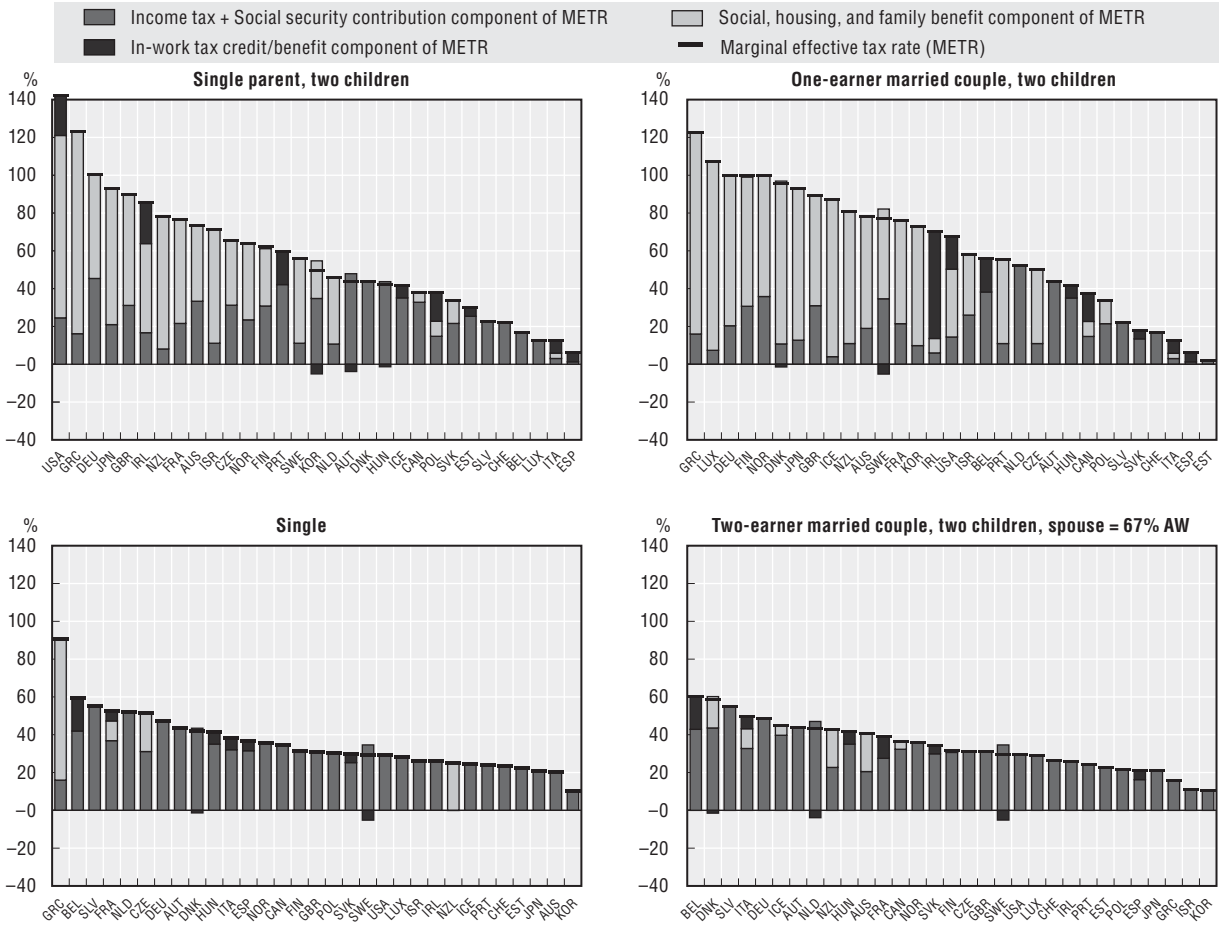
Single parents and single taxpayers again face slightly lower PTRs than one-earner families. However, the biggest change is for second earners who face substantially lower PTRs than any other family type. This is because second earners are unlikely to have been eligible for significant social assistance payments due to the income of their partner. Consequently they face very little benefit withdrawal, if any at all.

When considering the decomposition between taxes and benefits, benefits once again make up the majority of PTRs for single parents and one-earner couples with two children. For single individuals taxes contribute to around half of the PTRs, while for second earners with two children the PTRs are made up almost entirely of taxes in most countries. In-work tax credits are still seen to have a significant negative impact in a number of countries on PTRs for single parents, but to have less of an impact for other family types. Note again that, for a second earner, the US in-work tax credit increases the PTR. This in now also the case regarding Ireland's in-work benefit. Once again the reason is that the increase in overall family income arising from the second earner's entry into employment leads to a reduction in the size of the tax credit/benefit to which the family is entitled.

Increasing hours worked

Figure 2.3 calculates METRs for an individual working part-time earning 50 per cent of the average wage who increases their earnings by 10 per cent (to 55 per cent of the average wage). This takes account of the taxation of additional in-work income, plus the withdrawal of income-tested benefits and tax credits including social assistance, family and housing

Figure 2.3. **Decomposition of Marginal Effective Tax Rate: Increasing hours worked, moving from earning 50 to 55 per cent of the AW, 2009**



Note: Countries are ranked by decreasing order of the total METR.

Source: OECD Tax-Benefit models. See OECD (2007b) for more detail.

StatLink http://dx.doi.org/10.1787/888932482802

benefits, and in-work tax credits. This measure provides an indication of the extent of poverty traps in OECD countries. Calculations are made for the same four family types as above.[6]

The results in Figure 2.3 show that METRs vary more than the PTRs presented above. METRs are often high for both single parents and one-earner families with two children – with METRs over 60 per cent in close to half of countries for single parents, and in just over half for one-earner families – implying significant disincentives to increase hours worked (or to work harder). In a number of cases METRs are above 100 per cent. Meanwhile, METRs are also below 20 per cent in several countries, emphasising the variability across countries.

METRs are far lower, and less variable, for single taxpayers and second earners (with the exception of single individuals in Greece who face a METR of 90 per cent). This is because they are generally not eligible for social assistance payments when earning 50 per cent of the average wage, so face no withdrawal as income rises.

When considering the decomposition between taxes and benefits, benefits make up the majority of METRs for one-earner couples with two children, but the contribution of taxes and benefits is far more mixed for single parents. For single individuals and second earners with two children, taxes make up the majority, if not all, of METRs. The effect of in-work credit/benefit withdrawal can be seen in several countries pushing up METRs substantially. This is particularly the case for single parents and one-earner families in Canada, Ireland, and the US and for all family types in Belgium. Meanwhile, in a small number of countries, in-work credits have a small negative effect on METRs. This occurs where the in-work credits are still being phased-in with income (*e.g.* Sweden).

The scope for tax reform

When considering together all the PTR and METR results it is evident that the majority of the work disincentive is created on the benefit side, particularly from the withdrawal of unemployment benefits. This emphasises the importance of benefit related measures to reconcile adequate social protection with work incentives. In this regard, many OECD countries have introduced active labour market policies that provide proactive assistance to individuals receiving unemployment benefits to find new jobs. For example, benefit receipt is often linked to participation in programs aimed at preventing skill loss and increasing employability.

Nevertheless, taxes do contribute to all the PTRs and METRs, and for particular groups such as second earners and single individuals taxes play a dominant role in determining work disincentives. As such, there is still significant scope for tax measures to address concerns regarding unemployment, inactivity and poverty traps.

Furthermore, the PTRs and METRs presented above do not include employer social security contributions (SSC), and so they may underestimate the impact of tax on work disincentives. Employer SSC are often substantial, particularly in many European countries, and may be (partially or fully) borne by workers in terms of lower wages, reducing work incentives. Finally, Figures 2.1 to 2.3 also show that in-work tax credits are a commonly used measure to address concerns regarding unemployment and inactivity traps. While they can be successful in reducing disincentives to enter the workforce (and in alleviating poverty), they have the potential to exacerbate poverty traps as targeting generally requires the tax credits to be withdrawn at higher income levels. They can also reduce second-earner work incentives where they are withdrawn on the basis of family income rather than individual income. Design is therefore a delicate balance.

The next two sections consider in detail the tax measures adopted in OECD countries to reduce work disincentives for low-income workers.

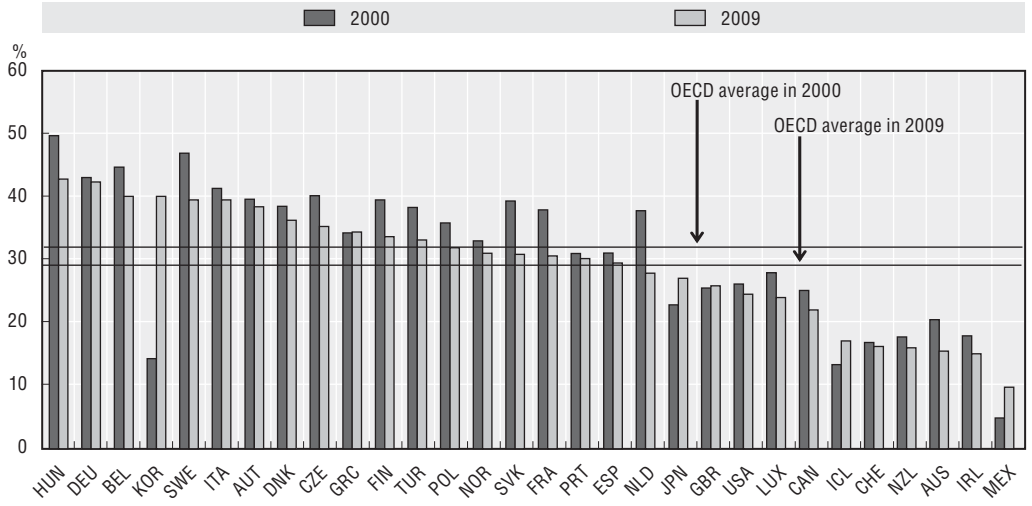
2.3. Reducing the tax burden on labour

Recognising the concerns highlighted in Sections 2.1 and 2.2, many OECD countries have introduced reforms to their tax and/or benefit systems to increase work incentives for low-income workers. This section and the next discuss recent tax measures introduced to reduce the tax burden on low-income workers. The focus of this section is on reductions in personal income tax (PIT) and social security contributions (SSC), while the following section considers the introduction of in-work tax credits.

To illustrate the extent of recent tax reductions, Figures 2.4 to 2.6 compare average tax wedges in 2000 and 2009 for three different low-income family types. While excluding the impact of benefit payments covered in the previous PTR calculations, the tax wedges do include employer SSC (whereas the PTR and METR calculations did not). Figures 2.4 to 2.6 show that the vast majority of countries have reduced the tax wedge on low-income workers over this period, particularly for low-income single parents and one-earner families.[7] Particularly large reductions have occurred in Australia, Canada, Ireland, the Netherlands, and the Slovak Republic. In contrast, minor increases have occurred in a small number of countries, such as Iceland, Mexico and Korea.

While there has been a clear trend to reduce the tax burden on low-income workers, it must be emphasised that not all of these tax changes have been motivated by employment goals. Tax design involves a number of competing goals regarding efficiency, equity, simplicity, and revenue generation. In particular, equity goals play a significant role in determining the appropriate tax burden faced by low-income workers relative to higher-income workers. Furthermore, as views of equity are highly country specific, so the appropriate degree of redistribution and progressivity in the tax system varies across countries (as can be seen by the variation in tax wedges across countries). Within these constraints, though, many countries have still introduced reforms specifically to increase

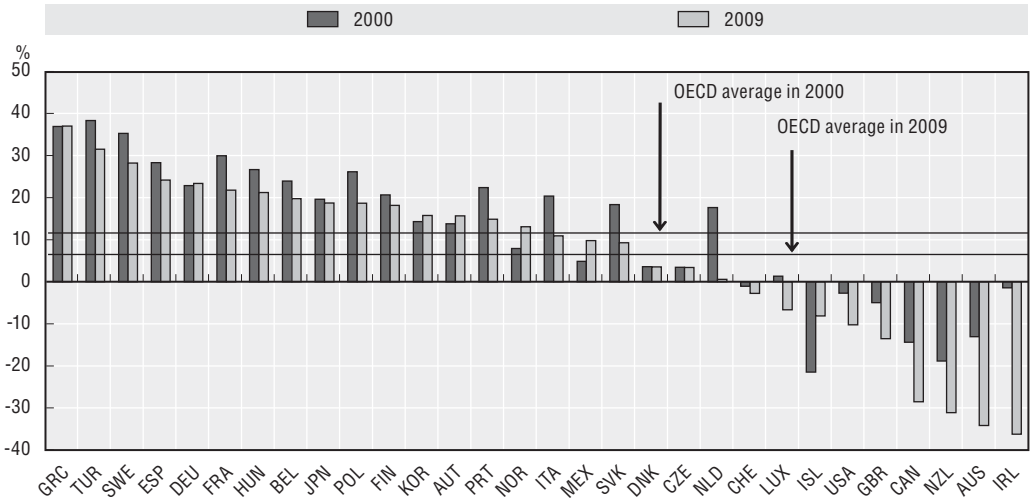
Figure 2.4. **Average tax wedge for a single individual earning 50% of the AW, 2000-09**



Source: OECD Taxing Wages models.

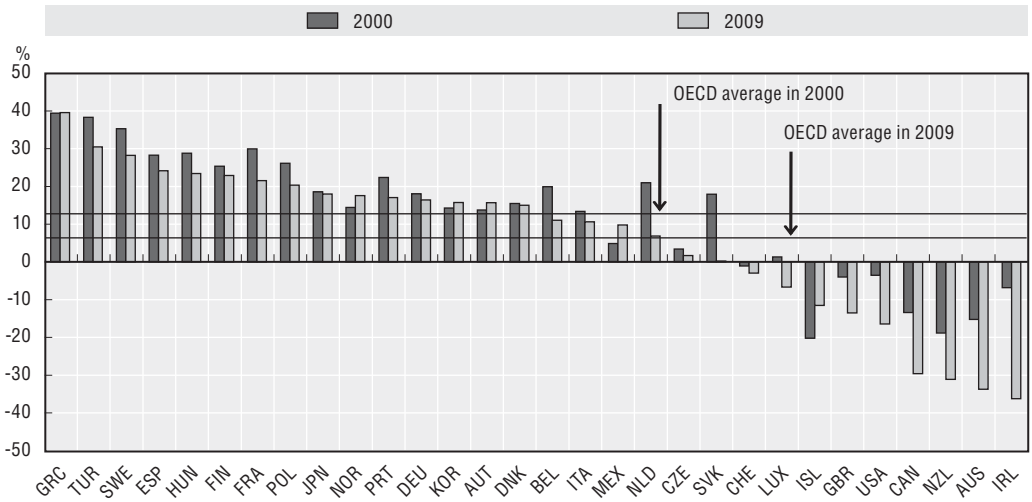
StatLink http://dx.doi.org/10.1787/888932482821

Figure 2.5. **Average tax wedge for a single parent with two children earning 50% of the AW, 2000-09**



Source: OECD Taxing Wages models. StatLink http://dx.doi.org/10.1787/888932482840

Figure 2.6. **Average tax wedge for one-earner family with two children earning 50% of the AW, 2000-09**



Source: OECD Taxing Wages models. StatLink http://dx.doi.org/10.1787/888932482859

work incentives for low-income workers, or as part of larger reform packages addressing both work incentives as well as wider policy goals.

Countries that have not reduced the tax wedge tend to have had less significant problems with low-income worker participation, such as Iceland which had very strong participation and employment between 2000 and 2008. Additionally, the tax wedge itself is far lower in countries such as Iceland, Mexico and Korea that have increased the tax wedge, than in many countries that have reduced the tax wedge. Large reductions have, however, occurred in both countries with initially high tax wedges (*e.g.* Sweden and the Netherlands) and in countries with already low tax wedges (*e.g.* Australia and Ireland).

An additional constraint to reducing the tax wedge for low-income workers is the need to fund the reductions. This can be done by either reducing public expenditure or by

increasing the tax burden elsewhere, but both options cause difficulties. Reducing expenditure may be politically difficult and/or socially undesirable, while shifting the tax burden will create inefficiencies in other areas. In some countries reforms have been funded by increases in taxes on higher income earners, or environmental taxes, while there has been a particular trend towards increasing consumption taxes. The shift towards consumption taxes is motivated largely by efficiency (see, for example, Johansson *et al.*, 2008), though it may have weaker effects on labour supply than other revenue shifts because (as emphasised in Chapter 1) consumption taxes are also likely to be borne partly by labour. In some cases increased economic activity and consequent revenue increases may allow tax reductions. Equally though, in an economic downturn, pressure is exerted to increase taxes – as is now being experienced following the recent economic crisis.[8]

The remainder of this section considers country examples of tax reductions intended to increase work incentives for low-income workers. PIT reforms are considered first, then SSC reductions.

PIT reductions

Reductions in the PIT burden for low-income workers can be achieved by altering PIT rates and thresholds or by introducing/increasing tax credits and allowances. Targeting reductions to low-income workers is difficult as higher income workers also benefit from rate reductions, credits and allowances. In this regard, the use of tax credits rather than allowances has become more and more popular, both for equity and work incentive reasons, as they provide the same tax benefit to all, whereas allowances provide a greater benefit to taxpayers facing higher marginal tax rates. Additionally, some tax credits and allowances are withdrawn as income rises enabling better targeting of low-income workers. However, such an approach increases METRs potentially leading to the poverty trap concerns discussed in Section 2.1. As such, most basic family allowances and other non work-contingent allowances and tax credits tend not to be withdrawn. Most work-contingent tax credits ("in-work tax credits") are withdrawn as income increases, and the negative effects on METRs are consequently a significant design issue. This is discussed further in Section 2.4. Despite these targeting concerns many countries have introduced recent PIT reductions to increase work incentives for low-income workers. Country examples are discussed below, drawing on country responses to the *tax and employment study* questionnaire.

Country examples

A steady process of reform has occurred in Germany since the late 1990s lowering the PIT burden on low-income workers. The bottom PIT rate has been reduced from 26.9 per cent in 1998 to 14 per cent in 2010. Over the same period, the basic allowance was raised from EUR 6 322 to EUR 8 004. While these tax cuts reduce the tax burden for all income taxpayers, the greatest relief is afforded to households with low and medium incomes. These reforms have been partly funded by base broadening through, for example, restricting the use of loss relief, changes in depreciation rates, and a reduction in the proportion of interest income that is exempted from tax.

In Ireland, economic growth and the resultant increases in tax revenue from 2000 until 2008 allowed for reductions in PIT. Government policy was to remove the minimum wage from the tax net altogether and ensure that the average industrial wage was not liable at the higher rate of income tax. This policy was pursued through the increase of basic tax credits and the standard PIT rate threshold between 2003 and 2009. Over this

period the standard rate threshold increased from EUR 28 000 to EUR 36 400, while the basic tax credits increased from EUR 2 320 to EUR 3 660.

In Sweden, taxes on labour income were reduced by increasing the basic allowance. This was funded through a shift from personal income (not only labour income) to environmental bases such as greenhouse gases. In Finland, steady reductions in the taxation of labour income since the mid 1990s have also been largely funded through increases in environmental taxes, as well as consumption taxes.

In Australia, PIT rates were reduced across the board when GST was introduced in 2000. In particular, the upper threshold for the zero tax rate increased from AUD 5 400 to AUD 6 000, while the lowest (non-zero) tax rate fell from 20 to 17 per cent. Since then, the lowest tax rate has fallen further to 15 per cent (in 2009), while the lower threshold for this rate has increased from AUD 20 000 (in 2000) to AUD 35 000 (in 2009). VAT increases also enabled direct taxes to be reduced in the Netherlands in 2001 through adding an additional tax bracket for low incomes. Along with a 1.5 percentage point increase in the standard VAT rate, the reductions were also funded by environmental taxes.

The 2010 Danish tax reform reduced the labour tax burden across the board with rate cuts at low and middle income levels, and threshold increases at higher income levels. The bottom tax rate was reduced from 5.26 per cent to 3.76 per cent, while the middle tax rate was abolished. The threshold for the top tax rate increased from DKK 362 800 to DKK 389 900 (in 2010) and to DKK 409 100 in 2011. These reforms have been part of a steady shift in Denmark from taxes on labour and capital income towards environmental, energy, and consumption taxes. The reductions were also partially financed by base broadening measures.

The majority of the reduction in the tax wedge in New Zealand and Belgium has come from the extension of in-work tax credits (see Section 2.3). Additionally though, in New Zealand the lowest PIT rate was reduced in 2008 from 15 per cent to 12.5 per cent, while the upper threshold for this rate was increased from NZD 9 500 to NZD 14 000. The original introduction of the Belgian in-work tax credit was part of broader PIT reforms over the 2002-04 period. Other changes included the widening of the brackets of the income tax schedule for middle-income earners, and reducing the tax burden on second earners by increasing the zero-rate band for spouses (to make it equal to the zero-band of single individuals), the individualisation of the computation of tax rebates and separate taxation of non-earned income. Additional measures, such as the removal of the top two tax brackets, were targeted at higher-income earners.

In Canada, a number of recent tax measures have improved work incentives for low-income workers. The amount that low-income workers can earn before paying federal personal income tax has increased significantly as a result of the introduction of the Canada Employment Credit and the Child Tax Credit and increases in the basic tax credit and related credit for spouses and eligible dependants. Additionally, the lowest personal income tax rate was reduced to 15 per cent in 2007. The Refundable Medical Expense Supplement (RMES) also increases work incentives for low-income workers. It is a refundable tax credit that helps to offset the loss of coverage for medical and disability-related expenses when individuals move from social assistance to the paid labour force. It is equal to twenty-five per cent of the total of the allowable portion of expenses that can be claimed under the medical expense tax credit and the expenses claimed under the disability support deduction. In order to target the credit to low-income families, it is withdrawn as income increases above CAD 23 633 (in 2009) at a rate of five per cent.

The Slovak Republic introduced a higher basic allowance for taxpayers and a child tax credit at the same time as the introduction of the flat tax reform in 2004. Additionally, in 2007 a tax allowance that is gradually withdrawn as income rises was introduced. In 2005, Portugal lowered from 12% to 10.5% the income tax rate applicable to the first bracket. Meanwhile, in 2005, Norway split the basic allowance into two: one basic allowance for wage income and one basic allowance for pension income, but with the basic allowance for wage income higher than the basic allowance for pension income, partly in order to improve low-income work incentives.

SSC reforms

The other significant reduction in the tax burden on low-income workers has been through reductions in social security contributions (SSC). A major benefit of SSC reductions over PIT reductions is that they are generally better targeted at workers. This is because SSC are generally levied only on labour income, whereas PIT is most commonly levied on labour income and unearned income (the main exception being the (semi-) dual income tax countries). As such, an individual only receiving unearned income will often benefit from a PIT reduction, but will not from a SSC reduction.

An added complexity regarding SSC reductions is that they may be targeted at employers or employees. While reductions in employee SSC will clearly impact on labour supply decisions, the link with employer SSC is less clear. Reductions in employer contributions are discussed in Section 2.5 as a measure to increase the demand for low-income workers. This is certainly the case in the short run when wages are unable to adjust. In the longer run, reductions in employer SSC may also have some impact on labour supply decisions as (depending on the relative bargaining power of employers and employees) some of the reduction may be passed on to workers in the form of higher net wages. As such, employer SSC reductions may be particularly useful measures to introduce in an economic downturn as they will increase labour demand in the short-run to aid exit from the downturn, but in the longer run will encourage labour supply, which is likely to be the greater constraint on long-run output.

In a number of countries, SSC make up the majority of the tax wedge faced by low-income workers, so there is often significant scope for reductions in SSC to increase work incentives. As with PIT, there are a number of competing goals associated with the funding of social security systems and therefore SSC design. In particular, SSC reductions may be difficult to achieve in countries where the underlying structure of the social security system requires a strong link between contributions and benefits. In many countries, though, this link is minimal enabling significant reductions in SSC in order to increase work incentives, with some funding of social expenditure being shifted to other sources such as PIT, or in an increasing number of countries, consumption taxes. Such shifts from SSC to consumption taxes have a complicated impact on work incentives given that, as discussed in Chapter 1, consumption taxes are borne to an extent by workers. Nevertheless, a number of countries have introduced such reforms. Country examples of reforms are provided below, again drawing on country responses to the *tax and employment study* questionnaire.

Country examples

A number of countries have reduced employer SSC to increase demand for low-income workers. We leave discussion of these measures to Section 2.5. Employee SSC

reductions have also been introduced in a number of countries. In 2008, Austria introduced reductions in unemployment insurance contributions for low-income workers. The contribution rate has been reduced from three per cent to two per cent for workers with monthly income below EUR 1 417, and to one per cent for workers with monthly income below EUR 1 260, while employees with monthly income below EUR 1 155 are exempt from unemployment insurance contributions. In Sweden, employee SSC has effectively been reduced by the introduction of a tax credit for the public pension fee. This was gradually introduced from 2000 and as of 2006 fully covers the public pension fee.

In Germany, the unemployment contribution rate was reduced from 3.3 per cent to 3 per cent in 2009 (with a further temporary reduction to 2.8 per cent until the end of 2010). Half of these contributions are levied on employees and the other half on employers. At the same time, the health insurance contribution rate was reduced from 7.3 per cent to 7 per cent for employers and from 8.2 per cent to 7.9 per cent for employees.

In addition to these reductions, Germany also reduced the unemployment insurance rate from 6.5 per cent to 4.2 per cent in 2007 (again, this was levied equally on employers and employees). This reform was fully funded by an increase in the standard VAT rate from 16 to 19 per cent (only one third of the resulting VAT increase was required to fully fund the reduction in SSC). The SSC reduction was intended to both decrease the burden on labour in order to increase labour supply and to increase labour demand, as well as to increase efficiency. The reductions were targeted at low-income workers via the ceiling for unemployment insurance contributions which results in low-income workers benefiting more from the decrease than high-income workers.

Similarly, Hungary reduced employer SSC by five percentage points in 2009 (initially for income up to twice the minimum wage, but to all income as of 1 January 2010), and abolished the lump-sum health contribution as of 1 January 2010. These were funded by a five percentage point increase in the standard VAT rate. Excises on petrol, diesel, alcohol and cigarettes were also increased at the same time. The reform was largely motivated by the desire to reduce the high tax burden on labour income, and was not targeted specifically at low-income workers.

Several countries have also increased consumption taxes so as to avoid raising SSC. Switzerland has financed recent increases in social security expenditure for disability insurance and old age insurance by increasing VAT instead of increasing SSC. Ireland has in recent years increased excises to minimise the extent to which employment-related taxes would need to be increased. This has included increases in excises on cigarettes, petrol and diesel, and the introduction of an air travel tax and a carbon tax. Similarly in Portugal revenues derived from the one per cent increase in the standard VAT rate in 2009 will be used to fund social security expenditure (this is intended to be a one-off exception though).

Significant political debate has also occurred in a number of countries regarding the merits of such shifts from SSC to consumption taxes. For example, in Switzerland there have been several parliamentary initiatives for shifting the tax burden from PIT to VAT. These have all been rejected due to equity concerns and fiscal federalism issues (as indirect tax revenue goes mainly to the federal government, while direct tax revenues go mainly to the cantons). Additionally, a popular initiative for shifting the tax burden from labour income/SSC towards green taxes was rejected by popular vote in 2000.

In France a similar reform was considered after the 2007 presidential election campaign, but was not included in the budget law for 2008. The aim of the proposed reform was to decrease labour costs and to enhance competitiveness in both foreign and domestic markets through a decrease in unit labour costs (both imported and domestic goods would be subject to the VAT increase but only the latter would benefit from the decrease in labour costs). While there was no precise proposal, the reforms considered involved either a uniform decrease in social contributions or a decrease aimed at lower wages or around the minimum wage. For comparison purposes, the various scenarios considered were based around a one percentage point increase in VAT (less than EUR 10 billion at that time). One of the major concerns regarding the proposal was the likely adverse short term inflationary effects of the VAT increase.

2.4. In-work tax credits or benefits

As noted earlier, work-contingent tax credits or benefits ("in-work credits" – see Box 2.3) are one of the main measures used in many OECD countries to address concerns regarding unemployment traps and inactivity traps. These measures have the dual motivation of poverty alleviation, and increasing incentives to work. They achieve this by targeting low-income workers (often with children), and imposing some form of work-contingent eligibility rule.

Box 2.3. **Defining an "in-work credit"**

In this report, we use the term "in-work credit" to refer to permanent work-contingent tax credits, tax allowances or equivalent work-contingent benefit schemes designed with the dual purposes of alleviating in-work poverty and increasing work incentives for low-income workers. While the report focuses on tax measures, work-contingent benefits are considered along with tax credits and allowances where they have the same goals and the same impact on work incentives and on in-work poverty. In this situation it is largely an administrative decision as to whether the policy is implemented via the tax or benefit system.

Note that a number of countries also provide temporary or one-off lump-sum work-contingent benefit payments targeted at encouraging the long-term unemployed into the workforce. Such payments are not considered as "in-work credits" in this report. Belgium also provides a one-off tax credit to long-term unemployed workers re-entering the workforce. For consistency, this credit is not considered as an "in-work credit" either. (For a discussion of temporary work-contingent payments, see Immervoll and Pearson, 2009).

The need to somehow target low-income workers, to impose eligibility criteria, and to administer the schemes results in complex designs that require a number of trade-offs to be made between competing goals. In addition, scheme design varies significantly across countries reflecting both the different weights placed on the poverty alleviation and work incentive goals of the schemes, as well as various country specific factors including other tax/benefit parameter settings, income distributions and taxpayer characteristics. This section examines how different countries have designed their in-work credits, highlighting the key design issues and trade-offs, the choices made by countries and the reasons behind

these choices. In doing so this section draws heavily on country responses to the *tax and employment study* questionnaire.

In-work credits in OECD countries

In-work credit schemes are a long established component of the tax-benefit systems in the UK, US, and Ireland (where they were first introduced in 1971, 1975 and 1984 respectively). Theoretically, in-work credits can have conflicting effects on employment, increasing the incentive to enter employment, but reducing work incentives for those already in employment. However, empirical evidence (based particularly on the US and UK schemes) shows that the overall impact of these schemes on employment is positive. (Box 2.4 discusses in more detail the effects of in-work credits on employment). In addition, evidence suggests that in-work credit schemes can also substantially reduce in-work poverty, and moreover can achieve this redistribution at very small efficiency cost.[9]

Given the ability of in-work credits to address both equity and efficiency goals, it is unsurprising that they have gained in popularity, particularly over the last 15 years, to the extent that 17 OECD countries have now introduced some form of in-work credit scheme. Table 2.1 summarises the key features of these schemes.

Table 2.1 emphasises the large variation in design across countries, particularly regarding eligibility rules and targeting, credit levels, withdrawal rates and payment methods. Regarding eligibility criteria, countries either require a certain number of hours to be worked each week, or a minimum amount of income to be earned from employment. Additionally, seven countries require the presence of children for eligibility (while the number of children in a family increases the value of credits in six countries). Most countries also target the credit by income level. This is generally achieved by withdrawing the credit as income increases above a certain level. Rates of withdrawal, however, vary significantly as shown in column [7]. The size of the credit, which is to an extent linked to the withdrawal rate (in the sense that large credits tend to be phased out more quickly so as to limit the fiscal cost), also varies greatly – as shown in column [9].

From an administrative perspective credits also vary significantly. Payments are predominantly structured as tax credits, although Belgium provides a reduction in employee SSC, Denmark provides a tax allowance (which is called a credit), while Finland provides both a tax credit and a tax allowance. Ireland pays a comparable work-contingent benefit. Finally, payment frequency also varies from annually to fortnightly or monthly.

The next sections consider each of these key design features in detail. The work contingent test is considered first, before the decision to target on an individual or family basis is examined. The trade-offs surrounding income targeting, credit size, and fiscal cost are then discussed. Following this, the trade-offs regarding the method of payment, assessment period and the frequency of payment are discussed. We finish by considering measures to prevent fraud.

Box 2.4. **Employment effects of in-work credits: Theory and evidence**

In-work credits have a complicated effect on employment as they create different and sometimes conflicting work incentives for different groups of potential and existing workers. Below, we outline the different types of work incentives typically created by in-work credit schemes, before summarising some of the empirical literature on resulting effects on employment.

The exact incentive structure created by an in-work credit scheme depends on its specific design. However, the broad effects are roughly the same across schemes, with the main differences depending on whether credits are phased-in (as sometimes happens) and/or phased-out (as usually happens) with income. The clearest effect is that, for non-working individuals, an in-work credit will clearly encourage participation in employment by increasing the level of in-work relative to out-of-work income. However, for individuals already in work, and for second earners, in-work credits have a more complicated effect on work incentives.

For individuals already working, in-work credits may have several, potentially conflicting, effects on work incentives. First, all working individuals that receive the credit will face a negative income effect encouraging them to reduce the number of hours they work (as they could reduce the number of hours worked and still earn the same income as before). Second, where the credit changes the METR faced by the worker, they will face an additional substitution effect either encouraging or discouraging work. In schemes that phase-out the credit, individuals initially in the phase-out region will face a negative substitution effect further enforcing the income effect and encouraging a reduction in hours worked. In contrast, in schemes that phase-in their credits, individuals in this phase-in zone will have a positive substitution effect counteracting the negative income effect (resulting in an ambiguous effect on hours worked). Finally, due to the non-convexity of the budget constraint an in-work credit may also result in some workers that initially are not initially eligible for the credit may also prefer to reduce to reduce the number of hours they work and receive the credit.

Work incentives faced by second earners are also relatively complex where credit eligibility is phased-out on the basis of family, rather than individual, income. In such cases, where family income is in the phase-out zone, a non-working spouse will be discouraged from entering employment due to the loss of some or all of the tax credit the family would otherwise receive. Meanwhile, a working second earner will face negative income and substitution effects encouraging a reduction in hours worked (as above). Finally, in countries that phase-in their credits to relatively high levels, and family income is initially in the phase-in zone, then a non-working second earner will be encouraged to enter employment. Meanwhile, a working second earner will face a negative income effect but positive substitution effect, resulting in an ambiguous effect on hours worked.

The overall effect of an in-work credit on employment will depend on both the number of workers affected by these different incentives, and their behavioral responses to them. A substantial empirical literature has investigated this. The majority of the evidence is from studies of the US Earned Income Tax Credit (EITC) and the UK Family Credit and its replacement, the Working Families' Tax Credit (WFTC). This is not surprising given the length of time these credits have been in operation and the number of reforms they have been through, providing data for natural experiment type studies. Nevertheless an emerging literature has considered credits in other countries.

Box 2.4. **Employment effects of in-work credits: Theory and evidence** *(cont.)*

Studies have tended to find that the overall impact of in-work credits is to increase employment. In particular, the effect on single parents, who are the largest group of recipients of the EITC, has been found to be large in the US. For example, Hotz *et al.* (2006) find that expansion of the EITC accounted for 11.8 per cent of the increase in participation of single parents with two or more children in California between 1991 and 2000. Meyer and Rosenbaum (2001) find that more than 60 per cent of the nine percentage point increase in the participation of single mothers between 1984 and 1996 was due to expansions of the EITC. Eissa and Liebman (1996) find that the 1986 expansion of the EITC increased participation of single parents by 2.8 percentage points (and by six percentage points for single parents with the lowest level of education).

Primary earners are also found to increase participation, though, as theory predicts, evidence is also found that married women work less – both in terms of participation and reduced work hours. For example, Eissa and Hoynes (2004) consider several reforms between 1984 and 1996 finding that the EITC increased married men's labor force participation slightly, but reduced married women's labor force participation by over one percentage point. Additionally, already working women in the phase-out region were found to reduce their hours worked by as much as 20 per cent. Ellwood (2000) also finds reductions in work among married women with children between 1986 and 1999 (a period spanning three major expansions of the EITC). In contrast, Heim (2005), using a joint labor supply model, does not find any impact of the EITC on the labor force participation of married women. The broad consensus though has been that the positive effects (particularly on single parents) outweigh the negative effects, resulting in an overall positive impact of the EITC on employment, albeit small.

Similar results arise regarding the UK WFTC. For example, Brewer *et al.* (2006) find that the replacement of the Family Credit with the more generous WFTC increased employment by five percentage points, with employment gains the strongest for sole mothers with young children. Simulation work by Blundell and Hoynes (2001) regarding the introduction of the WFTC imply a 2.2 percentage point increase in participation of single parents, but a 0.57 percentage point reduction in the participation of married women with a working partner. Additionally, empirical evidence looking at the Family Credit has suggested it led to a reduction in hours worked by single parents already in employment (Blundell *et al.*, 2000; Blundell and Hoynes, 2001). However, this effect was small with the overall effect of the Family Credit on employment still positive.

Evidence from the Canadian Self Sufficiency Program (a controlled experiment providing a substantial work subsidy to single parents) also finds strong evidence of the positive response of single parents to work incentives (see, for example, Card and Robins, 1998). Meanwhile, evidence on the French *Prime pour l'emploi* has suggested positive but very small effects on employment (see, for example, Sterdyniak, 2007).

Table 2.1. **Permanent in-work tax credits (and equivalent benefit schemes) in OECD countries, 2010**

	Name of programme	Beneficiaries	Work criterion	Children required for eligibility	Credit size increases with number of children	Phase-in rate	Phase-out rate	Phase-out starts at	Maximum credit
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]
Belgium	Reduced social security contributions		Income from work	No	No	–	18%	40% of AW	Max. value of SSC allowance is EUR 1 716 (4% of AW)
Canada	Working Income Tax Benefit	Working individuals with low income	Income from work at least CAD 3 000 (6.9% of AW)	No	No	25%	15%	24% of AW; 33% of AW in case of couples or lone parent	CAD 925 for single individuals (2.1% of AW); CAD 1 680 for families (3.8% of AW)
Denmark	Earned Income Tax Credit (operates as allowance)	Working individuals	Income from work	No	No	–	No phase-out	–	Max. value of tax allowance is DKK 13 600 (3.6% of AW)
Finland	Earned Income Tax Allowance (municipal income taxation)	Working individuals	Income from work at least EUR 2 500 (6.5% of AW)	No	No	51%, then 28%	4.5%	36% of AW	Max. value of tax allowance is EUR 3 570 (9% of AW)
	Labour Income Tax Credit (central income taxation)					5.2%	1.2%	86% of AW	Max. value of tax credit is EUR 600 (1.5% of AW)
France	Prime pour l'emploi	Working individuals	Income from work at least EUR 3 695 (10.9% of AW)	No	Yes	4-5%	9%	66% of AW	EUR 948 (3% of AW)
Hungary	Employee Tax Credit	Working individuals	Income from work	No	No	17%	12%	130% of AW	HUF 181 200 (8.5% of AW)
Ireland	Family Income Supplement (FIS)	Working families with children and low earnings	19 hours per week	Yes	Yes (through earnings limit)	–	60%	–	60% of difference between net family earnings and earnings limit
Italy	Labour Income Tax Credit	Working individuals	Income from work	No	No	–	7%/3%[1]	6.7% of AW	EUR 1 840 (6.6% of AW)
Korea	Earned Income Tax Credit	Low-income working families	Income from work	No	No	15%	24%	34.6% of AW	KRW 1 200 000 (3.4% of AW)
Luxembourg	Employee Tax Credit	Working individuals	Income from work	No	No	–	–	–	EUR 300 (0.6% of AW)
Netherlands	Labour Credit	Working families with children aged under 12	Income from work	Yes	No	1.7%/12.4%	No phase-out	–	EUR 1 489 (3.3% of AW)
	Income Dependent Combination Credit	Same as above and must be a single parent or the lower-earning partner	Minimum income from work of EUR 4 706 (10.5% of AW)			3.8%			EUR 1 859 (4.1% of AW)

Table 2.1. **Permanent in-work tax credits (and equivalent benefit schemes) in OECD countries, 2010** *(cont.)*

	Name of programme	Beneficiaries	Work criterion	Children required for eligibility	Credit size increases with number of children	Phase-in rate	Phase-out rate	Phase-out starts at	Maximum credit
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]
New Zealand	In-work Tax Credit	Working families with children and not receiving a main out-of-work benefit	20/30 hours per week (combined) for one/two-parent families	Yes	Yes	–	20%	Once family tax credit is fully withdrawn	NZD 3 120 (7% of AW) plus NZD 780 for fourth and subsequent children
Slovak Republic	Child Tax Credit	Working families	Income from work equal to at least 6 times the monthly minimum wage	Yes	Yes	–	–	–	EUR 240 *per child* (2.7% of AW)
	Employee Tax Credit	Working individuals		No	No		19%	40% of AW	EUR 181.03 (2% of AW)
Spain	Earned income deduction	Working individuals	Income from work	No	No	–	35%	37.6% of AW	Max deduction of EUR 4 080 (16.7% of AW)
	Earned income credit						10%	32.8% of AW	Max credit of EUR 400 (1.6% of AW)
Sweden	Earned Income Tax Credit	Working individuals	Income from work	No	No	Value initially increases up to the point where the credit fully offsets (local) tax liability	No phase-out	–	SEK 11 000 (5% of AW)
United Kingdom	Working Tax Credit	Working individuals	16 hours per week; 30 hours per week if aged 25+ and no children	No (but lone parents get more)	No (unless under 25)	–	39%	19% of AW	Maximum GBP 4 630 (13.9% of AW)
United States	Earned Income Tax Credit	Working families with children and individuals with low income	Income from work	No	Yes	8-40% depending on family type	8-21% depending on family type	17-42% of AW depending on family type	USD 457 without children, USD 3 050 with one child, USD 5 036 with 2 children (12.8% of AW)

1. The effective withdrawal rate is 7.17% from EUR 8 000 to EUR 15 000. Above this amount the effective withdrawal rate varies between 3.345% and 3.445%.

Source: Adapted from OECD (2005a); and Immervoll and Pearson (2009); and updated based on responses to a questionnaire issued to Country Delegates to Working Party No. 2 of the OECD Committee on Fiscal Affairs.

Work contingent test (income vs hours worked tests)

The key design feature in ensuring that an in-work credit scheme creates incentives to work is making the payment contingent on working. The two basic approaches that have been taken in OECD countries have been to base the credit on receipt of income from employment, or to require a specific number of hours to be worked per week.

Hours worked tests

An hours-worked test will ensure that minimal or occasional work (particularly high-wage workers working very few hours) is not subsidised. This is a substantial concern as not only are these individuals not the main target group for the credits, the income effect from receipt of the credit could create a disincentive for these individuals to increase the number of hours they currently work. In principle, an hours worked test could be used to target only full-time workers which would minimise deadweight costs associated with subsidising recipients that would have worked any way. In practise, though, hours worked tests have been set to enable part-time workers to be eligible – emphasising both the redistributive goals of the credit, and the fact that many low-income workers may only be able to take up part time work (*e.g.* single parents).

Ireland, New Zealand, and the UK use hours work tests. The Irish Family Income Supplement (FIS) requires 19 hours to be worked per week, or 38 hours per fortnight.[10] The credit is paid on a family basis and the hours worked by a couple can be combined to meet the overall hours worked test. The New Zealand In-Work Tax Credit (IWTC) is also paid on a family basis and allows the hours worked by a couple to be combined to meet the overall hours worked requirement. However, a higher 30 hour per week requirement must be met (or 20 hours per week for a single parent). Meanwhile, the UK Working Tax Credit (WTC) is paid out on a family basis, but requires one partner to work at least 16 hours per week.

The hours worked tests in both Ireland and the UK were reduced in the 1990s in order allow more part-time and casual workers to access the schemes. The Irish test was reduced to 19 hours in 1996,[11] while the UK Family Credit (replaced first by the Working Family Tax Credit in 1999 and then by the WTC in 2003) test was reduced from 24 to 16 hours per week in 1992.

In the UK, an additional top-up payment to the Family Credit was introduced in 1995 available at 30 hours of work per week by one family member. This was intended to reduce the negative effect on hours worked that in-work credits may create (see Box 2.4). With the introduction of the WTC, couples with children are now able to combine their number of hours worked in order to meet the 30 hour requirement for the top-up payment, as long as one partner still works at least 16 hours. Neither Ireland nor New Zealand has considered it necessary to introduce such additional payments.

A particular consequence of an hours worked test is that it may result in some bunching around the minimum hour requirement. This is due to both the clear incentive to work at least the minimum number of hours when moving into work, and the negative income effect on those already working more than the minimum requirement. For example, Blundell and Hoynes (2001) point out significant bunching around the 16 hour mark for low-skilled single mothers in the UK. Meanwhile, Blundell (2000) shows bunching of single parents at 24 hours in the UK prior to 1992, with this being replaced by bunching at 16 hours after the 1992 reform.

Earned income phase-in

Another drawback of an hours worked test is that it increases information requirements and so both compliance and administrative costs. In contrast, the comparative simplicity of an earned income test can therefore be attractive. Such simplicity has played a major role in the use of earned income rather than hours worked as the eligibility test in a number of countries. For example, in both Finland and Korea the difficulty involved in monitoring hours worked was a major reason to use an earned income test instead. Simplicity was also a major rationale in Belgium, Sweden and Denmark choosing earned income tests.

Using earned income as the eligibility criteria, once again creates a risk of subsidising occasional workers, particularly those on high wages that work few hours. To address this concern, a number of countries phase in their credits, either from zero, or from a specified minimum income level. This is the case in Belgium, Canada, Denmark, Finland, France, Hungary, the Slovak Republic, Sweden and the US.

In Sweden and Denmark, the phase-in zones reach far greater income levels than in other countries (up to an income of SEK 300 000 and DKK 320 000 respectively). This is because these credits are also intended to increase work incentives at the intensive margin. The Swedish credit combines two elements: the first is phased in very steeply and is mainly intended to increase the attractiveness of being in work as opposed to receiving income-replacing benefits (*i.e.* the extensive margin); the second element is phased in gradually and thereby lowers the METR (*i.e.* the intensive margin). These decreasing phase-in rates and the credit maximum ensure greater targeting of lower income individuals (as neither it nor the Danish credit is withdrawn at higher incomes).

The income-based phase-in of the Earned Income Tax Credit (EITC) in the US was chosen both for its administrative ease and in order to increase work incentives at the intensive margin. Additionally, the EITC is at least partially intended to off-set income tax and SSC (although the combined credits are far larger than tax liability) – and these are based on income.

Fixed earned income test

An alternative approach to the hours worked or income phase-in approaches is taken by the Slovak Republic. The Slovak Employee Tax Credit (ETC) and Child Tax Credit (CTC) require a minimum income level for receipt of the credits (set equal to half of the minimum wage). Another variation is adopted in France. The *Prime pour l'emploi* (PPE) makes an adjustment for part-time work converting income to a full time equivalent figure, with the calculated credit amount then adjusted down again by a set percentage. For example, the PPE of an individual whose work ratio is 50 per cent (*i.e.* the person works half-time all year or full-time for six months) amounts to 92.5 per cent of the PPE of a full-time worker. This adjustment reduces the extent to which part-time high-skilled workers benefit from the credit. The adjustment ratio was increased in 2007, providing greater assistance to low-income part-time workers.

Family or individual targeting

The two main criteria used for targeting are family status and income level. Countries that wish to focus on child poverty and low-income families, often target credits on the presence of children, and on family income (by withdrawing credits as family income rather than individual income rises above a certain level). In contrast, countries with a

greater focus on work incentives tend not to require children for eligibility and to target credits simply on the basis of individual income. This section considers the use of family status for targeting, while the following section focuses on income-based targeting.

Family targeting

In Ireland, Korea, New Zealand, and the Slovak Republic (CTC), receipt of the credit is dependent on the presence of children, illustrating the emphasis of these credits on addressing in-work family poverty (and particularly child poverty).

Furthermore, in Ireland, New Zealand and the Slovak Republic, credit payments increase with the number of children. While the Irish FIS increases by a smaller amount per child as the number of children increases, the Slovak Republic CTC provides a fixed credit for each additional child in a working family. This reflects the fact that the CTC is intended to encourage working families to have more children (in addition to the basic goal of reducing child poverty by recognising the additional costs of raising children). New Zealand pays the same credit for families with between one and three children, before providing a higher credit for families with four or more children. Recent changes to the Irish FIS have increased the family focus by increasing income thresholds to include additional gains for larger families.

While the US and France do not require children for eligibility, payments do increase with the presence of children. For example, the maximum US EITC for a one child family is more than six times the maximum credit for a no child family (USD 3 050 compared to USD 457, in 2010). The rationale for the US EITC is to provide similar assistance to economically equivalent households. Thus, it adjusts for family size by varying the credit based upon the presence and number of qualifying children in the worker's household.[12]

Individual targeting

The remaining countries do not make eligibility contingent on the presence of children. In these countries there is a clear disassociation between child related benefits and in-work tax credits. In particular, the emphasis of the Belgian Work Bonus is to make work pay and so it is unrelated to the number of children. Instead, tax credits for children and child's benefits (which are provided on a universal basis) address child poverty goals. This is also the case in Hungary where separate child tax credits focus on the family poverty goals.

The UK's Working Tax Credit is (largely) independent of family status (although an additional payment is made to single parents). Instead, the separate Child Tax Credit addresses child poverty concerns more directly. Prior to 2003, these two credits were effectively combined together as the Working Family Tax Credit. Current proposals in the UK to move to a "Universal Tax Credit", if implemented, would effectively combine the Working Tax Credit and Child Tax Credit (along with other government transfers) once again. See DWP (2010) for more details.

Simplicity was an important factor in Finland, Denmark and Sweden's decision not to target children. This is particularly the case as these credits are administered through individual-based tax systems. Once again, specific child related benefits are seen as better instruments for targeting child poverty goals. Furthermore, in these countries child care is to a large extent covered by direct public funding leaving parents with fewer costs and

hence less of a need for tax incentives for working families than in other countries. In Finland it was also considered more transparent (as well as cost effective) for family related measures to be dealt with via the benefit system rather than the tax system.

Sweden notes that their EITC is designed to increase labour supply along the entire adult population, and so no special requirements regarding family situation are specified. Nevertheless, people older than 65 receive a larger EITC in order to help increase labour supply amongst older workers so as to better meet challenges related to population aging. (Chapter 3 deals with tax measures for older workers in more detail). France notes that the PPE was created to help all low-income workers irrespective of family situation.

Individual or family income credit withdrawal

As discussed in the next section, most countries target their in-work credit schemes by withdrawing the credit as income rises above a certain level. However this withdrawal can be based on family or individual income. Countries particularly concerned about child and family poverty tend to base their withdrawal regimes on family rather than individual income. This ensures a closer targeting on low-income families. In particular, it prevents low-income workers in wealthy households from receiving the credit.

In contrast, countries more concerned about employment incentives tend to withdraw credits on the basis of individual income. This will result in some low-income individuals in high-income families receiving a credit, but will avoid creating negative effects on second earner work incentives. Empirical evidence suggests that family-based credit withdrawal does result in some second earners exiting the workforce (see Box 2.4). As such, whether a country chooses individual or family income credit withdrawal is largely based on the relative emphasis placed on the work incentive and poverty alleviation goals of the scheme.

Unsurprisingly, the countries that make their credits contingent on children all use family income as the basis of credit withdrawal. In contrast, countries with no link to the presence of children tend to withdraw credits according to individual income. The UK and Canada are perhaps the exceptions where children are not required for eligibility for the credit, and no adjustment for children is made, but the credit is withdrawn on a family income basis (note though that lone parents get a higher credit in the UK, while lone parents and couples get a higher credit than single individuals in Canada).

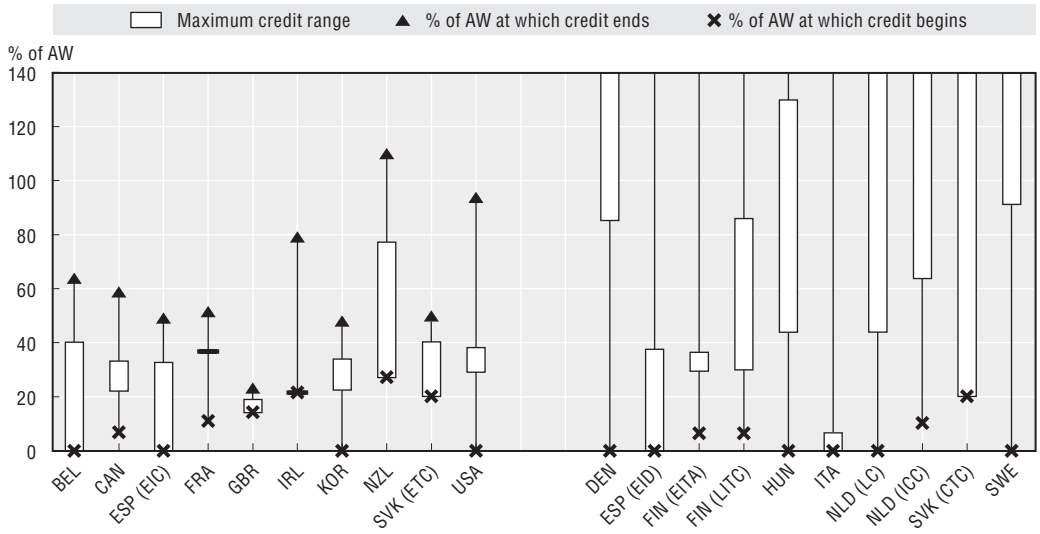
Income targeting

A key design feature of most in-work credits is that they are withdrawn as income increases above a certain level. This ensures that the credits are targeted at low-income workers. However, the group targeted, and design of withdrawal regime varies substantially across countries. Additionally, several countries do not withdraw credits based on income at all. This section focuses specifically on the income group that countries have chosen to target. It must be borne in mind, though, that this targeting, and choice of withdrawal regime, impacts on other aspects of credit design, requiring trade-offs to be made between competing objectives. The following section considers these trade-offs in more detail.

Figure 2.7 illustrates the varying approaches taken to the income targeting of in-work tax credits in OECD countries. To enable comparability between countries that target on a family vs individual basis, we focus on the rules in place for a single parent with two

children. The income level (as a percentage of the average wage) at which the credit is first paid, the zone over which the maximum credit is paid, and the income level at which the credit is finally completely phased-out are shown for each country.

Figure 2.7. **Targeting of in-work credits in OECD countries (for single parent with two children), 2010**[1]



1. EIC: Earned Income Credit; ETC: Employee Tax Credit; EID: Earned Income Deduction; EITA: Earned Income Tax Allowance; LITC: Labour Income Tax Credit; LC: Labour Credit; ICC: Income Dependent Combination Credit; CTC: Child Tax Credit.

Source: OECD calculations based on responses to *tax and employment study* questionnaire.

StatLink http://dx.doi.org/10.1787/888932482897

As discussed earlier, the method of introduction of in-work credits varies from a phase-in with income, to full provision of the maximum credit once an hours worked requirement is met, to immediate full provision of the maximum credit as soon as the worker enters the workforce. In countries where an hours worked test is employed, the earnings level at which a worker earning the minimum wage would meet the hours test is used to illustrate the lowest income level for eligibility. The design of withdrawal regimes is broadly consistent across OECD countries, with the credit generally being withdrawn at a fixed rate above a specified income threshold.[13]

There are two broad groups represented in Figure 2.7. The majority of countries strongly target their credits at low-income single parents by phasing out their credits at relatively low income levels (shown on the left hand side of Figure 2.7). Meanwhile, a smaller number of countries either do not phase out their credits at all, or do so at such a low rate that high income individuals will still receive a substantial credit (right hand side of Figure 2.7). Two countries, Spain and the Slovak Republic, provide one credit in each group.

Considering the first group of countries on the left of Figure 2.7, all countries except New Zealand begin to phase out their credits at around 40 per cent of the average wage or less, thereby targeting very low-income workers. Furthermore, in each of these cases the credit is fully phased out at less than 100 per cent of average earnings. Korea and the UK target particularly low-income workers with credits fully phased out at income levels below 50 per cent of the average wage, while France, the Slovak Republic and Spain fully

phase out their credits at only slightly above 50 per cent of the average wage.[14] Belgium and Spain provide the maximum credit for the very lowest earners while most other countries phase in their credits up to a maximum at a higher income level (as discussed above, this is generally intended to encourage low-income workers to work a greater number of hours per week). Meanwhile, countries with an hours worked test (Ireland, New Zealand and the UK) only provide the credit once that number of hours has been reached.

Several of these credits are linked to the minimum wage. For example, the maximum credit in France is provided at the level of the minimum wage, with it then withdrawn and fully extinguished at 1.3 times the minimum wage. The Slovak credit is also withdrawn from the level of income earned by a full time worker earning the minimum wage. (The Hungarian tax credit is also designed to ensure that a worker earning the minimum wage has no income tax liability.[15] However the Hungarian credit also provides substantial benefit to higher income earners).

New Zealand targets both low and middle income earners with its in-work tax credit. Once the minimum hours worked requirement is met, the maximum credit is then provided to single parents earning as high as 77 per cent of the average wage, and is not fully phased out until earnings reach at least 109 per cent of the average wage.[16]

Turning to the second group on the right of Figure 2.7, Denmark, the Netherlands and Sweden never phase out their credits. These credits are initially phased in with income before reaching a constant maximum. Meanwhile, in Finland the phase out rates for both the earned income tax allowance (EITA) and labour income tax credit (LITC) are so low that substantial credit is still received at very high income levels (both do not fully phase out until income is well over 200 per cent of the average wage). Hungary provides an increasing credit (calculated as a fixed percentage of earnings) that reaches its maximum at earnings of 44 per cent of the average wage. However, it does not begin to phase out until earnings equal 130 per cent of the average wage, and is not fully exhausted until 184 per cent of the average wage. Similarly, the Italian credit does not fully phase out until 196 per cent of the average wage, resulting in many middle- and higher-income earners receiving a significant credit.

Despite providing substantial credit to high income workers, these credits do still provide some degree of low-income targeting in the sense that they provide a larger proportionate benefit to low-income workers than to high-income workers. Indeed, the EITA in Finland was originally targeted for low-income workers with regular labour income (excluding occasional employment). However, since late nineties the allowance has been increased as part of general tax cuts on labour income, so that it is no longer granted only to low-income earners. Also, despite its slow phase-out, the maximum credit in Italy is reached at just seven per cent of the average wage ensuring that very low-income workers receive substantial benefit from the scheme.

Finally, Spain and the Slovak Republic both provide one credit strictly targeting low-income workers and one credit provided to all workers. As with the Spanish earned income credit (EIC), the Spanish earned income deduction (EID) provides a maximum credit to workers earning less than 40 per cent of the average wage. However, while the EIC is then fully phased out, the EID is provided at a lower constant rate for all higher income earners. Furthermore, as it is a deduction rather than a credit, it will provide a greater tax benefit to taxpayers earning more than 209 per cent of the average wage who are subject to the top personal income tax rate. The Slovak Republic introduces both its employee tax credit (ETC) and child tax credit (CTC) once earning reach one half of the minimum annual wage.

However, while the ETC phases out quickly once earnings are above 40 per cent of the average wage, the CTC is paid out to all higher income workers.

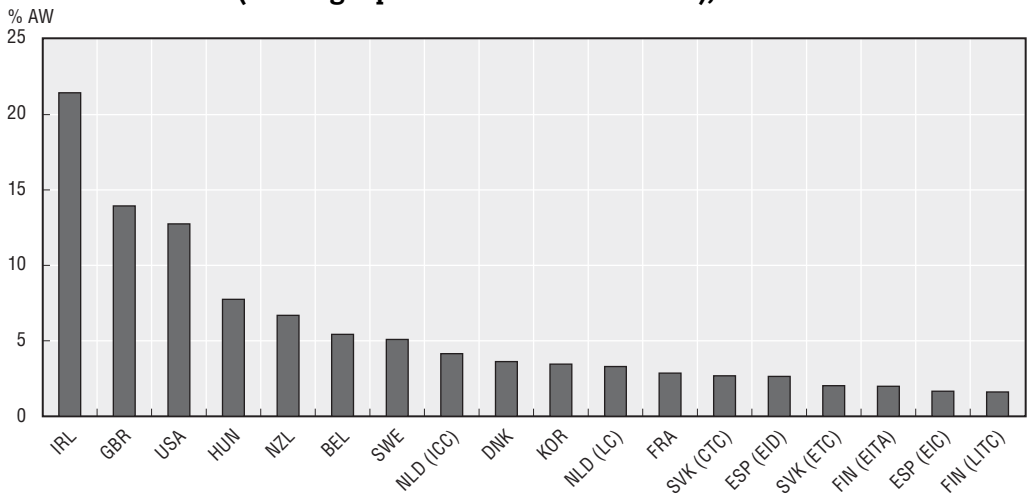
Withdrawal regime, credit size, and fiscal cost

Withdrawing an in-work credit as income increases both targets low-income workers and restricts fiscal costs. However, it will also have a negative impact on work incentives by increasing METRs for those in the phase-out zone. To an extent the costs of a high withdrawal rate can be minimised by withdrawing the credit in a region where there are comparatively few workers and/or where workers are less responsive to increased marginal tax rates, though this will not always be possible. For a given fiscal cost, a higher withdrawal rate will enable a larger credit to be paid and therefore increase the likely effectiveness of the credit at moving people into work. As such, choosing the appropriate withdrawal rate and credit size requires a trade-off between increasing the incentive to enter work and reducing disincentives to work more hours for those already in work.[17]

Countries have approached this trade-off differently depending on the relative weights placed on these two concerns, as well as additional country specific factors. Figures 2.8 to 2.10 illustrate the choices countries have made. The maximum sizes of credits (as a percentage of the average wage) are presented in Figure 2.8, while Figure 2.9 shows credit phase-out rates. For consistency with Figure 2.7 these again focus on the single parent with two children case. Finally, Figure 2.10 presents the overall fiscal cost of in-work credit schemes introduced in OECD countries.

Countries have tended to adopt one of three broad approaches: high withdrawal rates and generous credits; low withdrawal rates and smaller credits; or low-to-moderate withdrawal rates and still generous credits – but at higher fiscal cost.

Figure 2.8. **Maximum credit size of in-work tax credit schemes (for single parent with two children), 2010**[1]

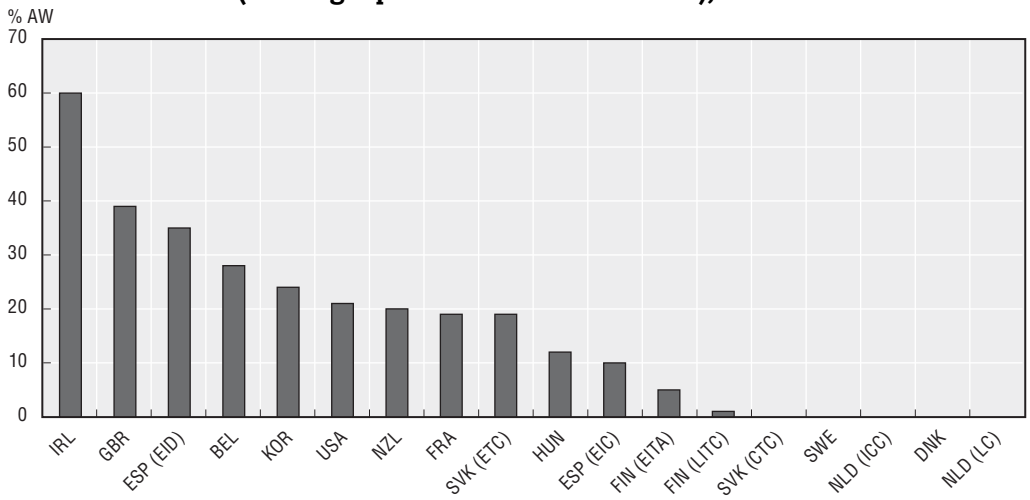


1. EIC: Earned Income Credit; ETC: Employee Tax Credit; EID: Earned Income Deduction; EITA: Earned Income Tax Allowance; LITC: Labour Income Tax Credit; LC: Labour Credit; ICC: Income Dependent Combination Credit; CTC: Child Tax Credit.

Source: Country responses to *tax and employment study* questionnaire.

StatLink http://dx.doi.org/10.1787/888932482916

Figure 2.9. **Primary phase-out rates of in-work tax credit schemes (for single parent with two children), 2010**[1]

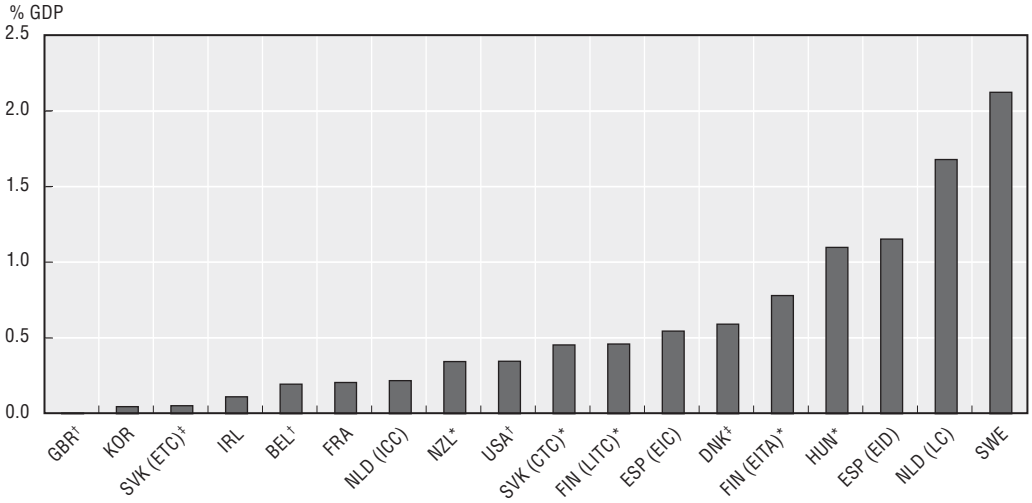


1. EIC: Earned Income Credit; ETC: Employee Tax Credit; EID: Earned Income Deduction; EITA: Earned Income Tax Allowance; LITC: Labour Income Tax Credit; LC: Labour Credit; ICC: Income Dependent Combination Credit; CTC: Child Tax Credit.

Source: Country responses to *tax and employment study* questionnaire.

StatLink http://dx.doi.org/10.1787/888932482935

Figure 2.10. **Fiscal cost of in-work tax credit schemes, 2009 (or most recent year available)**[1]



* 2008; † 2007; ‡ 2010 estimate.

1. EIC: Earned Income Credit; ETC: Employee Tax Credit; EID: Earned Income Deduction; EITA: Earned Income Tax Allowance; LITC: Labour Income Tax Credit; LC: Labour Credit; ICC: Income Dependent Combination Credit; CTC: Child Tax Credit.

Source: Country responses to *tax and employment study* questionnaire.

StatLink http://dx.doi.org/10.1787/888932482954

High withdrawal rates and generous credits

To maximise the effectiveness of credits at increasing employment (as well as at reducing in-work poverty) a number of countries provide credits at relatively high rates. As shown in Figure 2.8, this is particularly the case in Ireland, the UK, the US, New Zealand, and Belgium where maximum credit payments are all greater than five per cent of the

average wage. Ireland in particular is very generous with a maximum credit greater than 20 per cent of the average wage.

To reduce fiscal costs, these countries all withdraw these credits at relatively high rates (20 per cent or greater), thereby accepting relatively high METRs as a consequence (see Figure 2.9). Again Ireland is the extreme case with an effective phase-out rate of 60 per cent, emphasising the predominant focus of the Irish FIS on poverty reduction rather than employment goals. Furthermore, with the exception of Belgium, these countries all withdraw their credits on the basis of family income which provides tighter targeting, thereby enabling potentially larger credits than would otherwise be possible. As already noted though, this may affect second earner work incentives. As can be seen in Figure 2.10, this high degree of targeting keeps the fiscal cost of these credits relatively low despite the generous credit levels.

Low withdrawal rates and smaller credits

Some countries that are more concerned about the negative consequences of high METRs choose to phase out credits over a wider income range, thereby reducing the size of METR increases (but extending the income range facing the increases). However, when limited funding is available this necessarily results in lower credits, which may pose concerns for the effectiveness of the credits at increasing employment and reducing in-work poverty. That said, the lower phase-out rate means they are available to a wider range of workers, potentially providing incentives for some middle-income earners also to move into work or to increase hours worked in order to meet eligibility requirements for the credit. Conversely, this also means that higher METRs are faced by a greater income range, potentially resulting in some workers reducing the number of hours they work. Countries in this category include Canada, France, and Spain (earned income credit).

Low-to-moderate withdrawal rates and generous credits

Another group of countries also have lower withdrawal rates due to concerns regarding high METRs, but still desire substantial credit amounts in order to achieve a significant work incentive. These countries accept higher fiscal costs in order to achieve this.

Denmark, Sweden and the Netherlands are particularly strong examples of this. Concerns in these countries about high withdrawal rates are particularly great for two reasons: first, labour is already taxed at high rates so METRs are already high; and second, the income distributions are particularly narrow, especially those of Denmark and Sweden. As a result, high withdrawal rates over even a small income range would affect a very large number of workers. As previous OECD work has emphasised,[18] narrow distributions pose significant difficulties for in-work credit design – as well as exacerbating work disincentive effects, and increasing costs, they also make redistribution largely ineffective. This is because many of the middle and higher income earners paying for the credit through higher progressive taxes are likely to also be gaining some benefit from the credit (Immervoll and Pearson, 2009).

The response of these countries is to design a credit focused around increasing work incentives rather than redistribution, and not to withdraw the credit. The consequence of this is clearly seen in Figure 2.10 with all three countries, particularly Sweden and the Netherlands (labour credit), facing very large fiscal costs for their in-work credit schemes as a percentage of GDP. The Swedish EITC is the most expensive in-work credit scheme in the OECD, costing 2.1 per cent of GDP, while the Dutch labour credit is not far behind at

1.7 per cent of GDP. Estimates by the Swedish Fiscal Policy Council (2008) support this design approach, finding that the positive employment effects of the first two steps of the Swedish EITC would have been sharply reduced by a phase-out of the credit.

Finland, though not having as condensed an income distribution as Sweden or Denmark, also has high METRs due to the underlying high taxation of labour income, and so withdraws the EITA and LITC at just one and 0.9 per cent respectively (and from high income levels, particularly for the LITC). Together these two credits also create a substantial fiscal cost of 1.2 per cent of GDP.

The Spanish earned income deduction is also relatively expensive. Low-income workers are targeted with the maximum credit, before fiscal costs are reduced by partially phasing out the credit between 38 and 54 per cent of the average wage. However, a fixed deduction is then maintained at higher incomes. This avoids creating high METRs but results in a substantial fiscal cost of over one per cent of GDP. In comparison, the Spanish earned income credit which is fully phased out, costs half as much (although comparatively it also provides a slightly smaller benefit to workers).

Another credit with a high fiscal cost is the Hungarian employee tax credit, where fiscal costs exceed one per cent of GDP. However, this enables a relatively large credit, a mid-range withdrawal rate, and targeting of both low and middle income earners. The credit is also withdrawn on an individual basis thus ensuring second earner work incentives are not adversely affected, but pushing up fiscal costs further.

Method and frequency of payment

Administrative features of in-work credit schemes play a major role in determining the effectiveness of the schemes. Perhaps the most obvious decision to be made is whether to make payments through the tax system or the benefit system. This decision is closely linked to the decision regarding the frequency with which payments are made. Paying the credit through the tax system will reduce administrative costs as it can closely align with the standard tax assessment process. However, it may be less effective at creating incentives to work and alleviating poverty as payment may not be received until after the end of the tax year. In contrast, paying through the benefit system will enable more regular payments but at greater administrative cost. In addition negative stigma attached to benefit receipt may impact on take-up rates when administered through benefit systems.

There are three main options that countries have chosen in dealing with these trade-offs: to assess and pay throughout the year via the benefit system; assess and pay annually via the normal tax system; and to assess annually through the tax system, but to pay throughout the year via interim payments.

Assess and pay throughout the year via benefit system

Benefit systems in most OECD countries are generally set up so as to both assess eligibility and make payments of benefits on either a weekly or fortnightly basis. By paying out in-work credits (or more accurately "in-work benefits") this regularly makes the payments more visible and therefore more likely to affect the decision to enter employment. In addition, it will ensure that low-income families receive financial support when it is needed, better meeting the poverty alleviation goals of the schemes.

While a number of countries have temporary work-contingent payments that are administered through the benefit system, only Ireland has a permanent in-work payment

administered through the benefit system.[19] This enables the Irish FIS to be assessed and paid on a weekly basis consistent with the frequency of other social welfare payments in Ireland.

Prior OECD analysis (OECD, 2004) has emphasised that paying in-work credits via the benefit system may result in low take-up. In particular, ignorance, stigma and burdensome application procedures may discourage workers from applying for the benefit. Indeed, low take-up appears to be a problem in Ireland, with research by the Irish Economic and Social Research Institute (ESRI) suggesting the take-up rate of the FIS may be as low as 25 per cent (OECD, 2004). Research commissioned by the Department for Social and Family Affairs in 2008 emphasised that, while the overall awareness of the FIS scheme was high, awareness and understanding of the eligibility requirements was low. The review recommended the need to raise awareness of the scheme and ensure qualification criteria are communicated as clearly as possible in order to improve take-up (Millward Brown IMS, 2008).

Low take-up was also a concern regarding the UK Family Credit (FC), which was replaced by the Working Families Tax Credit (WFTC) in 1999. While the FC was administered through the benefit system, the WFTC (and its 2003 successor, the Working Tax Credit) was administered through the tax system. Brewer *et al.* (2006) note that the WFTC led to greater take-up than the FC, with this contributing significantly to the success of the WFTC in increasing employment for low-income workers.

Assess and pay annually via the normal tax system

To reduce both administrative costs and problems surrounding low take-up rates, most countries implement their in-work credit schemes via the tax system. When paid via the tax system it is likely to be far more cost effective to assess and pay the credits on an annual basis. This way no significant adjustment is required by tax administrations as the credit can simply fit into the standard annual tax assessment cycle. As such, a number of countries choose to assess and pay credits on this basis.

The Slovak Republic ETC is paid on an annual basis through the tax system in order to avoid imposing excessive administrative costs on employers (that would be incurred if adjusting monthly tax withholding requirements), and to avoid complexities associated with under/over payments. Korea also pay on an annual basis, noting that the administrative costs of paying more regularly are likely to outweigh the benefits to recipients. Similarly, Finland and France also attempt to minimise administrative costs by paying credits annually through the tax system.

Assess annually but pay regularly via tax system

A greater number of countries opt to adjust their tax systems to accommodate regular payment of in-work credits. As noted above, this may aid the in-work credit schemes in achieving both work incentive and poverty alleviation goals. Under this approach, the assessment period remains the tax year, with estimated payments made throughout the year and a square-up process at year end to account for any under or overpayments.

In some cases, this is implemented by requiring estimated credit payments to be incorporated within the regular (generally monthly) income tax withholding obligations of employers. This is the case in Sweden, Denmark, Hungary and the Slovak Republic (CTC), and is optional to the taxpayer in the US. The emphasis in Sweden is on improving work incentives by ensuring the credit is received as soon as possible after the work took place.

The Belgian Work Bonus provides a reduction in employee SSC rather than income tax. However, it is also paid regularly through incorporation into SSC payments withheld by employers throughout the year (generally monthly). The Work Bonus has replaced the Low Income Tax Credit (LITC), which was paid yearly as part of the standard tax return process, for all employees outside the public sector.[20] The more immediate effect on take-home pay, combined with concerns about the lack of visibility of the LITC, were the reasons for replacing the LITC with the Work Bonus. As with Sweden the greater focus here was on increasing work incentives than on poverty aspects.

A negative consequence of this approach, however, is the increased administrative costs faced by employers. These are exacerbated where credit payments depend on family structure and other information not readily available to employers. The extent of such administrative costs on employers was the reason for the UK in 2005 moving from requiring payment through employer tax deductions, towards HMRC making direct cash payments to recipients. New Zealand also chooses to make direct cash payments of tax credits rather than impose further administrative requirements on employers. Furthermore, where recipients also receive benefit income the payment of the in-work tax credit is made by the Benefit Administration (who then provide this information to the Revenue Administration to be used in the end-of-year tax square-up process). In Canada, eligible workers have the opinion to receive advance payments of the in-work credit. The advance payments are made directly by the Revenue Administration on a quarterly basis.

The approach taken in the UK, New Zealand and Canada reduces administrative costs to employers at the expense of increased administrative costs for the Revenue Administrations. As noted in OECD (2004), such an approach can be seen as a hybrid of the lower cost tax administration approach and higher cost benefit administration approach.

As noted above, an additional complexity created by all these approaches is the potential for under and overpayments of in-work credits. This requires a square-up at end of year and possibly requires taxpayers to repay overpaid credits. In the US, to reduce both the possibility of overpayments, and the amount of reconciliation on annual income tax returns for workers with multiple jobs, the advanced payment of the EITC is limited to 60 per cent of the maximum credit to which a worker with one child would be entitled (Similarly, Canada limits advance payments to 50% of the maximum credit). The US is slightly different to most countries in that eligible individuals can generally[21] either request advanced EITC payments from their employers throughout the year, or can receive the credit annually on filing their tax returns. However, the vast majority of recipients choose to receive payment at the end of the year. Concerns over both overpayment (and hence future repayment) and the administrative burden placed on employers by choosing regular payment likely play a part in this decision (OECD, 2004).

The UK's proposed "Real Time Information" reform to the PAYE system (see HMRC, 2010), if implemented, would reduce the likelihood of tax credit overpayments, as well as potentially reducing error and fraud. This proposal would require employers to provide income and tax deduction details electronically to HMRC at the same time as salary and wage payments are made to employees. The continuous provision of income data to the tax administration would enable adjustment to regular tax credit payments in response to income and employment changes, thereby reducing the number of overpayments.

Reducing avoidance and fraud risk

An additional administrative issue faced in introducing an in-work credit scheme is how to minimise avoidance or fraud. The potential for fraud is increased by the decision to implement credits through the tax rather than benefit system. This is because benefit systems, while more expensive to administer, are set up to verify that each recipient meets the required criteria to a far greater degree than tax systems generally do. Instead, tax systems reply largely on voluntary compliance and the threat of audit. Particular risks may arise where information requirements are greater than that available generally to the tax administration. For example, policing an hours worked test may be difficult.

This can be seen in the US, where evidence suggests a substantial level of non-compliance regarding the EITC. For example, the IRS found that between 27 and 32 per cent of EITC claims were erroneous in 1999 (Government Accountability Office, 2004). Errors were primarily associated with the targeting criteria that are difficult for the IRS to verify. The largest source of EITC errors in 1999 was claiming a child who did not meet the qualifications for the credit. Misreporting of filing status was the second largest source of errors. For example, many taxpayers claimed to be single or head-of-household filers when they were, in fact, still legally married and required to file either jointly with their spouse or to file as "married filing separately." To investigate whether errors are intentional or not, research has considered the correlation between the size of credit and the probability or level of non-compliance (on the basis that if errors were random there should be no correlation between the size of the credit and noncompliance). Liebman (1995) finds that at least 32 per cent of the erroneous EITC claims in 1988 that were associated with a dependent error were intentional, while McCubbin (2000) finds that at least 28 per cent of qualifying child errors in 1994 were intentional.

In contrast, the UK invests significantly more resources in administering the WTC. With implementation through the benefit system, Ireland also expends significant resources on verification of FIS claims. In particular, all claims are reviewed annually as payment expires. In addition, more in-depth reviews are conducted of selected cases. Additionally, hours worked are matched against weekly earnings, bearing in mind the minimum wage, to identify discrepancies. Forms requesting clarification of hours worked over a longer period are also issued in cases where there is doubt over hours worked.

New Zealand acknowledges the risk of abuse with regards to the hours worked test. However, this risk is limited by other qualifying criteria, including income testing, and the requirement that the recipient is not receiving certain other government assistance.

Hungary has adjusted the design of its credit in response to concerns regarding recipients near the income ceiling. Prior to 2000, the ETC was applicable up to an income ceiling, but if income exceeded that ceiling by just one currency unit, the employee lost the entire credit. This regime resulted in an extremely high marginal tax rate at the level of the income ceiling. This problem has been removed by withdrawing the credit at a constant rate above the ceiling.

2.5. The effect of taxation on the demand for low-income workers

As well as reducing the supply of labour, taxes will generally also reduce the demand for labour which, in the presence of market rigidities, will increase unemployment. In an economic downturn, this can become a very serious problem, leading to significant increases in short-term unemployment, with the risk of increased structural

unemployment – particularly amongst low-income workers. As was illustrated in section one, these concerns resulted in the introduction of a number of temporary measures, including targeted tax reductions, to increase labour demand in response to the recent financial and economic crisis (see Box 1.2).

A lack of demand can also be a significant issue for low-income workers in the longer term, and may justify permanent measures to reduce unemployment amongst certain groups of low-income workers. In particular, there is the potential for low-skilled workers to be "priced out" of employment by taxes, minimum wages, or a combination of the two.[22] This may be particularly problematic for younger workers yet to gain significant work experience, as well as for long-term unemployed workers and older workers who may suffer from skill atrophy. This section focuses on tax measures to increase demand for low-skilled workers, with the exception of older workers who are considered separately in Chapter 3.

The effect of taxes on job availability

At the margin, an employer will be willing to pay a potential worker a wage equal to their marginal revenue product (*i.e.* the additional revenue that the worker can generate for the firm). If the worker's marginal revenue product is less than the minimum wage then they will not be offered a job. However, even if the worker's marginal revenue product is greater than the minimum wage, the imposition of employer SSC (including payroll taxes) may result in them not being offered a job. This is because the minimum wage may prevent the employer from passing on the SSC in the form of lower wages, hence increasing total labour costs above the marginal revenue product of the worker.

Furthermore, collective wage bargaining may result in a market wage that is higher than a worker's marginal revenue product, again resulting in unemployment. The combination of high taxes on low-income workers and generous out-of-work benefits may contribute to this by increasing the bargaining position of unions (as, post-tax, unemployment is relatively less bad), resulting in higher wage demands, particularly in the presence of strong but decentralised unions (see Section 1.3 in Chapter 1).

Tax measures to increase demand for low-income workers

14 OECD countries currently provide tax measures to increase demand for low-income workers, with several countries providing more than one. These measures are summarised in Table 2.2. In most cases (11 of 14 countries) they take the form of a reduction in employer SSC, whether via a reduced rate, an exemption, a fixed amount reduction, or a reimbursement of SSC after initial payment. In both Portugal and Slovenia, an enhanced income tax deduction is provided, along with an SSC reduction. Similarly, Luxembourg provides a tax credit in addition to a full reimbursement of employer SSC.

Low-income workers are targeted in a number of ways, with countries often providing multiple schemes targeted at different low-income groups. Belgium, for example, provides four separate schemes with each one targeted in a different manor. In three schemes (in Finland,[23] France, and one of the Belgian schemes), concessions are targeted at all low-income workers, with the concession being withdrawn at higher income levels.[24] One potential concern with such schemes is that they can become very expensive as they cover a broad group of workers and may result in significant deadweight costs by being provided to new employees that would have been employed even in the absence of the concession. An

Table 2.2. **Tax measures to increase demand for low-income workers, 2010**

Country	Concession type	Size of concession (per year)	Eligibility criteria	Duration
Belgium (1)	Employer SSC	EUR 1 600 + EUR 0.162 for every EUR 1 under 24 100	None	Unlimited
Belgium (2)	Employer SSC	Max. of EUR 8 200 over 5 years; reduced amount for second and third employee	First employment	5 years
Belgium (3)	Employer SSC	Max. of EUR 20 000 over 5 years (size of reduction varies depending on age)	Long-term unemployed (length of unemployment varies depending on age)	Varies – max. of 5 years
Belgium (4)	Employer SSC	EUR 1 000 quarterly for the first seven quarters, EUR 400 per quarter afterwards	Low qualified (secondary education not completed) worker aged 18-26[1]	Until age 26 – max. 8 years
Finland	Employer SSC	44% of wage between EUR 900 and EUR 1 600; withdrawn at 55% above EUR 1 600	Worker aged 54+	3 years
France	Employer SSC	Max. reduction of 26% at min. wage (28% for company with less than 20 employees); fully phased out at 160% of monthly min. wage	None	Unlimited
Germany	Employer SSC	50% reimbursement	Long-term unemployed	1 year
Greece	Employer SSC	Exemption	Unemployed youth employed by small business in specified areas	4 years
Hungary	Employer SSC	Year 1: 10%; year 2: 20% (instead of 27%)	First employment	2 years
Ireland	Income tax/Employer SSC	200% deduction of wages and pension contributions	Long-term unemployed (at least one year); must work at least 30 hours per week	3 years
Luxembourg (1)	Tax credit	Tax credit of 15% of gross wage	Previously unemployed	3 years
Luxembourg (2)	Employer SSC	Full reimbursement	Long-term unemployed (12 months for age 30+; 3 months for 40+; 1 month for 45+)	2 years/3 years/ Unlimited
Portugal (1)	Income tax	150% deduction of wages and employer SSC	Young or long-term unemployed	5 years
Portugal (2)	Employer SSC	Exemption	Young or long-term unemployed	3 years
Slovak Republic	Employer SSC	29.2% (instead of 35.2%)	Disabled	Unlimited
Slovenia (1)	Income tax	Up to 170% of wages are deductable depending on level of disability	Disabled	Unlimited
Slovenia (2)	Employer SSC	Full reimbursement	Younger than 26, never employed, and occupation in "excess supply"; or younger than 28 and unemployed for 2 years	1 year
Spain (1)	Employer SSC	EUR 800 allowance	Young unemployed (16-30)	4 years
Spain (2)	Employer SSC	EUR 600 allowance	Unemployed for 6 months	4 years
Spain (3)	Employer SSC	EUR 4 500	Disabled	Unlimited
Sweden	Employer SSC	15.49% (instead of 31.42%)	Young workers (under 26)	Unlimited
Turkey	Employer SSC	Exemption	Disabled workers in firm with 50 or more workers where 3%+ are disabled	Unlimited

1. Preferential schemes also exist in Belgium for those under 18 and for very low qualified workers.
Source: Responses to questionnaire issued to Country Delegates to Working Party No. 2 of the OECD Committee on Fiscal Affairs

additional concern with income-targeted reductions is that they may make it more expensive for employers to provide pay increases in the future (as they may lose the concessions) resulting in a "low-pay trap" (OECD, 2003).

In contrast, other concessions target new hires from particular low-income groups: six schemes specifically target the hiring of long-term unemployed workers; another three specifically target the hiring of younger workers; and two target employees being hired for their first job. Additionally, both of Portugal's concessions target the hiring of either young or long-term unemployed workers. Luxembourg's employer SSC reimbursement is provided to businesses hiring long-term unemployed workers but the length of unemployment required varies depending on the age of the new hire. Meanwhile, Slovenia's employer SSC reimbursement is targeted using a combination of all three criteria. One of Belgium's four concessions is targeted at workers that are both young and low-educated. Four countries also provide concessions for the hiring of disabled workers.

The length and generosity of measures also varies substantially, with most measures provided for between one and five years. In general, measures that are longer running tend to provide a lower level of support each year than shorter term measures. Belgium is an exception to this though, providing relatively generous reductions for up to five or even eight years depending on the particular concession. Additionally, measures targeted at disabled workers also tend to be more generous and available for a longer period.

Box 2.5. **Assessing the effectiveness of tax measures to increase demand for low-income workers**

A number of studies have been undertaken to assess the effectiveness of measures to increase demand for low-income workers, particularly employer SSC reductions in Belgium and France, generally finding a positive effect on employment.

For example, Goos and Konings (2007) follow a natural experiment approach using firm level data to analyse the effect of changes in employer SSC reductions targeted at manual workers in Belgium in the late 1990s. They find that employment subsidies increased employment of manual workers and also had a small positive impact on pre-tax wages. Batyra and Sneessens (2010) construct a general equilibrium model, calibrated on Belgian data, to simulate the employment effects of a reduction in employer SSC. They distinguish three groups of workers by skill level, with the lowest skilled group being paid the minimum wage. They find that the largest employment effects are gained when targeting employer SSC reductions to minimum-wage workers – with a targeted reduction in employer SSC equal to one per cent of GDP resulting in an increase in employment of low-skilled workers of around 14 per cent, and an increase in total employment of around two per cent. Also for Belgium, Pierrard (2005) constructs a similar general equilibrium model with both high and low-skilled labour. He finds that employer SSC reductions targeted at the minimum wage create ten times more employment (mainly low-skilled) than reductions targeted at high wages.

Kramarz and Philippon (2001) use French labour force survey data to look at the effect of changes in minimum labour costs, as a result of changes in both employer SSC and minimum wages, between 1990 and 1998. They find that increases in minimum labour costs resulted in increased unemployment, with a one per cent increase in minimum labour costs implying a 1.5 per cent increase in the probability of moving from employment to unemployment. However, they do not find a significant positive impact on employment of reductions in minimum labour costs. Also for France, Crepon and Desplatz (2002) use firm-level data to analyse the change in employment resulting from employer SSC reductions between 1995 and 1996. They find that firms that initially benefited more from the SSC reductions had larger increases in employment than firms who had employed fewer low-income workers prior to the reform and hence benefited less from the SSC reduction. However, they could not distinguish whether the increase in employment was of the targeted low-income workers or higher-income workers.

In the Netherlands, Bovenberg *et al.* (2000) develop a general equilibrium model and simulate the effects of the "SPAK" reduction in employer SSC on low-wage workers. Their simulations predicted a positive effect on employment of almost one per cent at a cost of 0.5 per cent of GDP funded by reduced public expenditure. In contrast, some studies for Finland provide evidence that the Finnish wage subsidies targeted at low-income older workers are ineffective at increasing employment of older workers. This evidence is discussed in more detail in Chapter 3.

Notes

1. Where low-income is proxied by low-skill level.
2. Taxes may also reduce out-of-work income if benefits are included as part of taxable income. However, with gross in-work income higher than gross out-of-work income, taxes will still reduce the difference between in-work and out-of-work income, reducing work incentives.
3. For more information on the OECD Tax-benefit models and their underlying assumptions, see OECD (2007b). Additionally, the Tax-Benefit models are available on-line at: *www.oecd.org/els/social/workincentives*, along with summary tables of the main features of unemployment, social assistance, housing, family, and in-work tax credits/benefits, and "country chapters" that detail the relevant policy parameters in each country.
4. Note that in OECD (2007b) the term "average effective tax rate" is used instead of "participation tax rate" to refer to the same indicator.
5. Note that the calculation of the effect on the PTR of the withdrawal of benefits incorporates the countering effect of one-off in-to-work benefit payments, where applicable. Note also that in a minority of cases, benefit rules can result in an increase in eligibility for some types of benefits when moving from unemployment (or inactivity) into work. For example, the loss of unemployment benefit when entering low-income employment may be partially coutered by new or increased eligibility for social assistance or housing benefits. Such effects can be seen, for certain family types, in Figure 2.1 for Denmark, France and Israel; and in Figure 2.2 for Greece, Hungary and Italy.
6. Note that the METR calculation for a single parent with two children in Japan considers the increase in earnings from 50 to 54 per cent of the average wage. This is to avoid the impact of the loss of the family's entire housing benefit at income equal to 55 per cent of the average wage. This "cliff face" withdrawal of the housing benefit would create a misleadingly high impression of the METRs generally faced by low-income single parent families in Japan, and is therefore avoided. Similarly, in Switzerland, the METR calculation for a one-earner married couple with two children considers the increase in earnings from 51 to 55 per cent of the average wage. This avoids the impact of the loss of the exemption from health insurance contributions which is tied to eligibility for social assistance payments and which ends when earnings reach 50 per cent of the average wage. Again, inclusion of this effect would create a misleadingly high impression of the METRs generally faced by low-income one-earner families.
7. 24 of the 30 OECD countries considered in Figures 2.4 to 2.6 have reduced the tax wedge on single individuals earning 50 per cent of the average wage. 21 countries have reduced the tax wedge for single parents earning 50 per cent of the average wage, while 24 countries have reduced the tax wedge on one-earner couples with two children earning 50 per cent of the average wage.
8. Note that fiscal consolidation related measures in response to the recent economic crisis are largely not captured in the analysis in this chapter which is based primarily on reforms prior to 1 January 2010. See OECD (2010) for a review of potential post-crisis fiscal consolidation measures.
9. OECD (2009) provides a greater focus on the in-work poverty aspects of in-work credits. See also Immervoll and Pearson (2009) for a detailed review of the empirical literature on the effects of in-work credits on both employment and in-work poverty.
10. The 19 hours worked condition is also linked to the payment amount as it ensures that entitlement to the FIS begins only above a certain earnings level linked with the minimum wage (*i.e.* EUR 164.40 which is 19 hours at the minimum wage of EUR 8.65 per hour).
11. In contrast, Ireland also provides temporary income tax relief for long-term unemployed re-entering work, but this is confined to employment of at least 30 hours duration per week (and capable of lasting at least 12 months) in order to support the creation of sustainable full-time employment.
12. The standard US EITC adjusts for between 0 and 2 children. As a crisis related measure, in 2009 and 2010, additional payments were also made for a third child.
13. There are a number of design variations. In some countries (*e.g.* Belgium, France and Italy), the rate of withdrawal varies across the withdrawal area. Ireland does not set a withdrawal threshold, instead basing the amount of credit on the difference between earned income and a specified level at which no credit is provided. As such the amount of credit is decreasing across the entire eligibility range. In New Zealand, while the IWTC is withdrawn above a fixed threshold and at a constant rate, it is not withdrawn until other (non-work contingent) family tax credits have first been withdrawn.

14. Note that the Irish credit may be misleading here, as while it phases out from a very low income level (with any increase in income) and at a high rate, it is a very generous credit and so still offers significant benefit to recipients in the phase-out region.
15. Note that the minimum wage may in fact be a very important parameter for the success of an in-work credit scheme as it may prevent employers from taking part of the credit by reducing wages.
16. This is the point at which all the Working for Families tax credits begin to be phased out. Technically, the family tax credit (a non- work contingent tax credit) is phased out first before the in-work tax credit is then phased out.
17. At the same time, credit size will also be influenced by other factors including the level of other benefits such as family or housing benefits etc., and the level of the minimum wage.
18. See, for example, OECD (2009b); Immervol and Pearson (2009); Immervol *et al.* (2007); OECD (2005a); Bassanini *et al.* (1999).
19. The WFTC in New Zealand is paid via the benefit system where the claimant is in receipt of other benefit payments such as housing benefits. Otherwise it is paid via the tax administration.
20. The LITC remains in place for workers in the public sector due to the different method of collection of SSC in the public sector (making the Work Bonus infeasible).
21. Self-employed and childless individuals are not eligible for advanced payments of the EITC.
22. Low-skilled workers will tend also to have low incomes and may therefore face the labour supply disincentives associated with unemployment and poverty traps discussed earlier. Not all low-income workers though will be low-skilled. For example, low-income workers may also include high-skilled part-time workers. Such workers are unlikely to be priced out of employment.
23. Unlike the others, Finland also imposes an age requirement, thereby targeting low-income older workers.
24. Note that in Belgium the concession is not withdrawn entirely, with the value of the concession remaining constant at EUR 1 600 once income reaches EUR 24 100. Furthermore, for income above EUR 48 000 the concession value begins to increase again.

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Chapter 3

The Taxation of Older Workers

As illustrated in Chapter 1, employment rates of older workers are substantially lower than for younger workers. This difference is driven predominantly by the relatively low labour force participation of older workers, although unemployment is also a factor in relation to some groups of older workers. This chapter considers both factors, though it's primarily focus is on the participation side, considering both the effect of tax on the work incentives of older workers, and possible ways of increasing these work incentives.

While the decision to work or retire is likely to be influenced by a number of factors, empirical evidence suggests that the (often substantial) financial incentives to retire faced by older workers play a significant role. Taxation will affect the financial incentive to retire by affecting both the financial return to continued work, and the level of net retirement income. The financial return to continued work will be influenced by both the tax and pension systems, as the design of a pension system can create an implicit tax or subsidy on continued work by altering the discounted present value of future pension entitlements ("pension wealth"). The chapter provides estimates of the financial incentive to retire by combining this pension wealth effect with the impact of taxes on earned and pension income into an indicator akin to an effective tax rate on continued work. The analysis focuses on workers aged 60 and over, as these are the most likely to be responsive to this "tax" rate.

The indicator is also broken down into its tax and pension components. This analysis suggests that both the tax and pension systems can significantly affect retirement incentives. The impact of tax on retirement incentives is shown to operate through several potentially conflicting channels, with the interaction between tax and pension parameters affecting the overall impact of taxes on work incentives. Gross and net pension wealth calculations are also presented to highlight the impact of taxes on the level of retirement income.

The chapter then focuses on the underlying tax rules that create these work disincentives. This requires consideration of the rules applying to both earned and pension income. While older workers are generally taxed under the same progressive tax schedules as younger workers, most countries have specific tax concessions in place for older workers. These concessions are generally intended to provide income support to older workers, particularly lower-income older workers, but also have significant and often complex implications on work incentives. The effect of these tax concessions on work incentives is considered in detail.

This analysis of the tax rules applying to older workers and the work incentives they create enables the identification of a number of possible tax policy reforms likely to increase work incentives for older taxpayers. Given the need to balance the benefits from increasing work incentives with other policy goals, particularly the provision of income support and revenue generation, the most appropriate reform may vary across countries. In some countries, where pension system parameters drive the impact on financial incentives to work, pension reform should be prioritised ahead of tax reform. Where pension reform is not possible, then tax measures are likely to be an effective way of

increasing work incentives. Nevertheless, even where pension reform can be made, there is often significant scope for tax reform to increase work incentives.

While the low employment rates of older workers are primarily driven by low participation, employment also depends on the demand for labour. In particular, low re-employment of displaced older workers, particularly low-skilled workers who lose their jobs, is a significant policy concern in many countries. As such, the chapter also considers a number of possible measures to increase the demand for older workers.

The chapter draws heavily on responses to a questionnaire issued in early 2010 to Country Delegates to Working Party No. 2 of the OECD Committee on Fiscal Affairs (the "*tax and employment study* questionnaire"). The questionnaire sought information as of 1 January 2010 and information on tax rules relates to that date unless otherwise specified. The primary exception to this is the tax rules used in the calculation of the financial incentive to retire indicator which is based on 2008 rules due to the availability of pension data.

The chapter is structured as follows: Sections 3.1 and 3.2 provide background information on retirement behavior in OECD countries and the different factors influencing the retirement decision. Section 3.3 then focuses on the financial incentives to retire imbedded in tax and pension systems, presenting various measures of the financial incentive to retire. Section 3.4 examines in more detail the tax rules for older workers that create these incentives, before Section 3.5 highlights possible reforms to these tax rules that may increase work incentives for older workers. Finally, Section 3.6 considers measures to increase the demand for older workers.

3.1. The retirement behavior of older workers

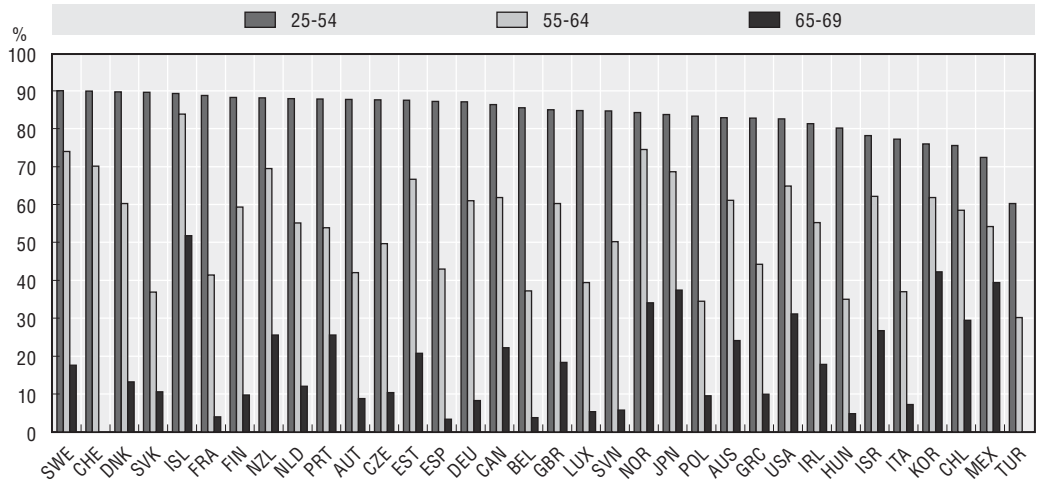
This section briefly provides information on the labour force participation and retirement behavior of older workers.

As illustrated in Chapter 1, employment rates of older workers are substantially lower than for younger workers. This difference is driven predominantly by the relatively low labour force participation of older people. Figure 3.1 illustrates this by comparing the labour force participation rates of 25-54 year olds with 55-64 and 65-69 year olds (see also Figures A.5 and A.6 for a breakdown by gender).

Average retirement ages are also relatively low in most OECD countries. Figure 3.2 shows that the average retirement age in more than half of OECD countries is below the normal eligibility age for public pensions (which itself varies between 57 and 67), with women tending to retire slightly earlier than men. Furthermore, the average retirement age across the OECD has fallen substantially in the last 40 years. For men, the average retirement age fell from 68.6 in the late 1960s to 63.5 in the five years to 2007 and from 66.7 to 62.3 for women over the same period (D'Addio *et al.*, 2010).

These data suggest that there could be scope for increasing the labour force participation of older workers. Moreover, reversing the trend toward earlier retirement is likely to play an important role in ensuring the sustainability of social security systems currently coming under more and more pressure as a result of rapid population aging and longer life expectancies in most OECD countries.[1]

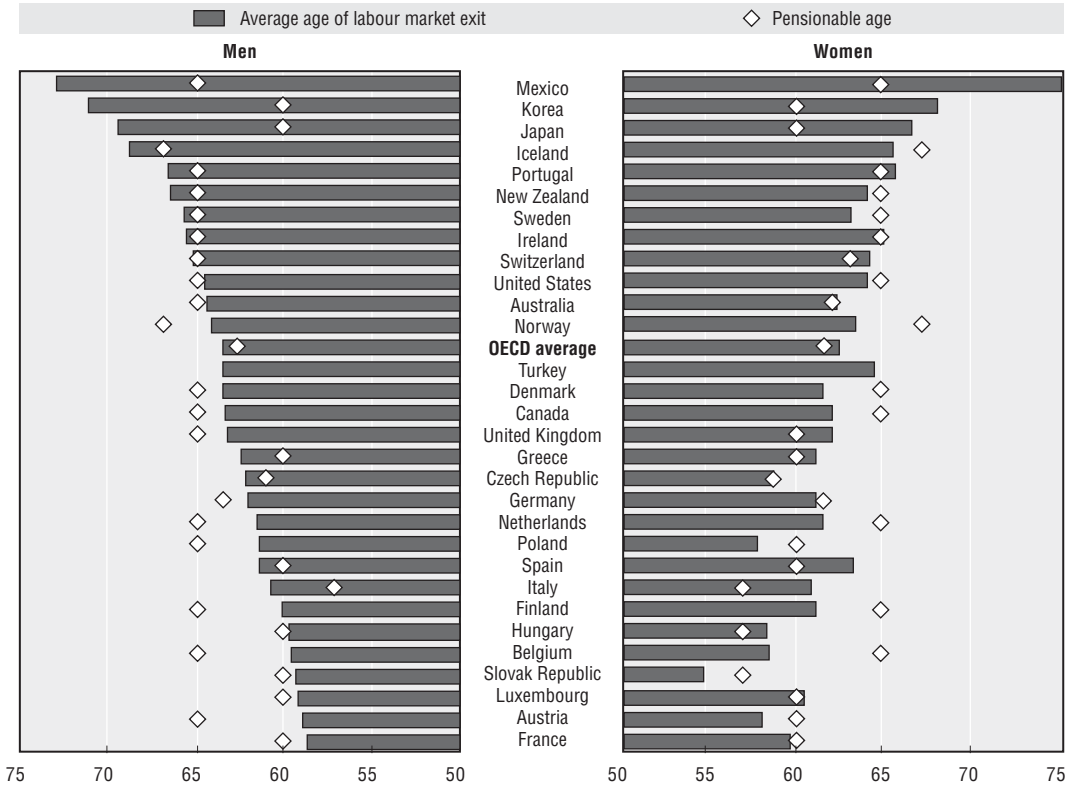
Figure 3.1. **Labour force participation of workers, by age: 2009**



Source: OECD *Employment Database.*

StatLink http://dx.doi.org/10.1787/888932482973

Figure 3.2. **Average age of labour-market exit and normal pensionable age**



Note: The effective retirement age shown is for the five year period from 2002-07; pensionable age is for 2006. Note that these historical pensionable age figures differ from the forward-looking 2008 pension age figures used in the analysis in Section 3.3 of this chapter.

Source: D'Addio *et al.* (2010)

3.2. Factors affecting retirement behavior

Many factors may influence when an older worker retires. In many cases, workers will voluntarily decide to leave employment at some point despite continued employment being possible. In other cases, a lack of available jobs matching the skill set of an older person may lead to their involuntary withdrawal from employment. This section focuses primarily on the supply side, considering below, in turn, both financial and non-financial factors influencing the retirement decision. However, we return to consider demand side issues in Section 3.6.

Financial factors affecting the retirement decision

The financial incentive to retire is influenced by not just the level of earned and retirement income, but also by both pension and tax systems. In particular, as pension entitlements tend to be linked to length of pensionable service and earnings during employment, continued working will generally affect the level of pension income received once retired. This effect can vary significantly with age, in particular the minimum and normal age at which retirement pensions can start to be drawn. At the same time taxes will reduce both the level of earned and retirement income, possibly to differing degrees.

These different factors will affect the decision to retire via two channels – the financial return to continued work; and the level of retirement income. The greater the financial return to continuing work, the greater the opportunity cost of leisure (obtained in retirement) in terms of forgone consumption, and hence the greater the incentive to continue working (*i.e.* to defer retirement). As noted in OECD (2011b) and D'Addio *et al.* (2010), this can be thought of as creating a type of "substitution effect" away from leisure towards consumption. Additionally, the level of retirement income will create a type of "income effect", with a higher level of retirement income encouraging retirement. This is because a higher level of retirement income makes it less necessary to work in order to obtain a particular level of consumption in retirement.

We consider each channel below, before discussing the effect of the pension eligibility age on retirement incentives. The financial incentives in place will only impact on retirement decisions where taxpayers are responsive to those incentives. As such, we also consider the empirical evidence on the impact of financial incentives on retirement decisions.

The financial return from working

The level of earned income is obviously a crucial determinant of the financial return to continued work, however both tax and pension parameters may also have significant impacts.

Tax (including SSC) on earned income will obviously reduce the net return from continued work. In addition, pension systems will often create an implicit tax or subsidy on continued work by altering the discounted present value of future pension entitlements ("pension wealth"). Continuing to work can have two distinct, and conflicting, effects on pension wealth. First, in many countries pension income cannot be received while still working,[2] so there is a cost associated with continued work in terms of the pension income foregone. Second, there is the potentially positive effect of working another year on future pension entitlements (for example, by increasing the number of years of service credits and/or changing the level of earnings on which pension entitlement is based). The comparative magnitude of these two effects will determine whether pension wealth increases or decreases.

In an actuarially neutral pension system, deferring retirement would have no effect on pension wealth because any pension income given up by continuing to work would be fully compensated by higher pension income in future years.[3] However, this is generally not the

case, and so deferred retirement is likely to result in either an increase in pension wealth (an implicit subsidy on continued working), or a decrease (an implicit tax on continued working).

Taxes on pension income will also affect the change in net pension wealth and so the financial return to continued work. Taxes that would have been due on pension income forgone reduce the cost of deferring retirement, whereas taxes imposed on the increments to future pension income reduce the gain from deferring retirement. The overall effect on the change in pension wealth will depend on the size of pension payments and degree of progressivity of pension income taxation.

The level of retirement income

The most common source of retirement income for workers over 60 is from mandatory pension schemes, whether public or private, and the analysis in this chapter is based on such schemes.[4] While the "normal" eligibility age for receiving pension payments in the majority of OECD countries is 65, individuals are eligible for (often reduced) early pension payments from age 60 in 14 OECD countries (and even earlier in four of these countries). This income may, of course, be supplemented by additional sources of retirement income such as voluntary private pension schemes and other savings.

For workers under 60, several other public sources of out-of-work income may also be available to bridge the time until pension eligibility age is reached, thereby enabling, and encouraging, earlier retirement. These include unemployment benefits, disability benefits and certain early retirement schemes. For example, in some countries unemployment benefit schemes lose the requirement to actively seek work after a certain age. Disability benefits may apply an "unfit for type of work" test rather than a strict medical test. Early retirement schemes may provide some form of financial support to early retirees (although these have now been phased out in most countries). In many cases, movement from work into one of these "alternative pathways to retirement" has little or no effect on future pension entitlements, making them particularly attractive.[5]

Taxes on retirement income will reduce the level of retirement income, thereby encouraging continued work through the "income effect" discussed above. The presence of tax concessions for pension income in many countries (discussed in Section 3.4) will often limit the extent of this effect though.

Pension eligibility age

Given the significant influence of pension income on retirement incentives, it is important to distinguish between the incentives to retire prior to pension eligibility age, and those faced after pension eligibility age.

Prior to reaching pension eligibility age, the financial return to continued work is likely to be relatively high due to increases in pension wealth. This occurs because no pension income must be forgone, but continued work is likely to result in increased future pension income. Additionally, the level of retirement income is likely to be relatively low given the inability to receive any pension income, further encouraging continued work. The exception, as discussed above, is when alternative sources of out-of-work income are available. In contrast, once pension eligibility age is reached, pension income may be forgone as a result of continued work, potentially resulting in a decrease in pension wealth that reduces the financial return to work. In addition, retirement income is now higher due to the ability to access pension income, encouraging retirement.

For this reason, the analysis in the following section focuses on the retirement decision faced by workers aged 60 and over, where pension income becomes available in many countries. Such workers are more likely to be influenced by taxation as opposed to workers prior to pension eligibility age where the large effects of pension wealth, or the availability of alternative sources of retirement income, are likely to overpower other factors such as tax.

In several countries, individuals can combine work and pension receipt without penalty. In such cases, there is no loss of pension wealth. However, in these cases the receipt of pension income in addition to earned income may push the taxpayer into a higher tax bracket, increasing their tax burden. This may create an incentive to reduce the number of hours worked, or may result in the worker moving to a less demanding (and lower paying) job. In other countries where work and pension income can be combined, but with pension income subject to income and/or means testing, a worker may again be encouraged to work fewer hours or move to a less demanding job. However, the stronger the degree of income and/or means testing, the more likely the worker is either to defer pension receipt or to retire. The subsequent analysis abstracts from the possibility of part time-work, considering instead the decision to either fully retire or to defer retirement by a fixed period of time.

Empirical evidence

While empirical studies have not focused specifically on the effect of taxes on retirement decisions, a number of studies have considered how retirement behavior responds to the financial incentives imbedded in pension systems. This literature provides strong evidence that retirement decisions are indeed highly responsive to financial incentives.

The study by Gruber and Wise (1999) contains 11 independent papers that adopt the same methodology to consider retirement systems and their effect on retirement behavior in 11 countries. The papers compare early departure from the labour force with the implicit tax rates on continued work generated by pension systems and various alternative early retirement pathways. They conclude that retirement decisions respond strongly to the financial incentives built into pension systems. The follow-up study, Gruber and Wise (2004), confirms this conclusion using micro-data for 12 countries. The study comprises 12 independent papers that, again, adopt a common empirical methodology. The results show that the retirement incentives built into pension systems have a substantial effect on actual retirement behavior. Results regarding the influence of the level of pension wealth on retirement behavior are less conclusive, with estimates often not significantly different from zero.

Two cross-country OECD studies have also considered the effects of financial incentives on retirement decisions. Blöndel and Scarpetta (1999) use panel data for 15 OECD countries over 1971-95 to investigate the effect on the participation rates of males aged 55-64 of various components of the old-age pension system, as well as the overall implicit tax rate on continued work created by the pension system. The components they consider include the pension accrual rate and replacement rates for both old-age pensions and various early retirement pathways. They find a significant positive relationship between the pension accrual rate and participation rates of male workers aged 55-64. The effect of the old-age pension replacement rate on participation is generally found to be statistically insignificant, as is the effect of disability benefits or early-retirement schemes, although the unemployment benefit replacement rate is found to be significant and negatively related to participation rates. As with the pension accrual rate, a significant positive relationship is found between participation rates and the implicit tax on

continued work generated by the pension system. They find that a 10 percentage point reduction in the implicit tax on continued work from age 55 to 65 would lead to an increase in participation rates of males aged 55-64 of around 1.8 percentage points.[6]

Duval (2003), uses panel data for 22 OECD countries over 1969-99, finding strong evidence that implicit tax rates on continued work generated by pension systems influence the retirement decisions of older male workers. However, unlike Blöndel and Scarpetta (1999), he also finds evidence that disability and early retirement schemes (as well as unemployment benefits) all influence early retirement amongst 55-59 year olds.

Non-financial factors influencing the retirement decision

While the focus of the remainder of this chapter is on financial factors affecting retirement decisions, it is important to bear in mind that, in some cases non-financial factors will be the overriding determinants of retirement. Non-financial factors that may influence the retirement decision include: a diminishing ability to carry out work; psychological benefits/costs of working; custom; and family circumstances.

An individual's ability to work is likely to be influenced by both their health status and the physical demands of their job. As health falls it may become more difficult for a worker to undertake the role they are trained for, increasing the disutility associated with the job, and this may influence them to retire. This is particularly likely in roles that require substantial physical exertion. This may occur well before the point is reached where they are no longer able to carry out their required tasks. However, the improving health of older workers and reductions in physical demands of many jobs may reduce the significance of these factors (Favreault *et al.*, 1999).

A related factor is the psychological effect of working. Many jobs are likely to conform with the assumption that labour generates disutility and is only undertaken for the consumption value of the income derived from it – an assumption that is implicit in the standard consumption-leisure trade-off model of the labour supply decision. However, in some cases individuals may derive utility from working that is distinct from the consumption value of income. For example, work may be intellectually stimulating, especially in many high-skilled occupations, or may provide a beneficial means of social interaction (Favreault *et al.*, 1999). This may encourage individuals to continue working when others may retire.

Custom may also influence retirement decisions. For example, if a majority of people tend to retire around a particular age then this may be seen as the social norm and encourage others to do the same. This is particularly likely with regard to the standard eligibility age for public pensions – these may be perceived as the socially approved retirement age. Indeed, Duval (2003) finds evidence that pension eligibility ages have a significant impact on retirement decisions of workers over 60.

Finally, family circumstances may affect retirement decisions. For example, care giving responsibilities may create an incentive for earlier retirement than would otherwise occur. The retirement decision may also depend on the employment status of a partner.

3.3. Quantifying the financial incentive to retire

This section examines the effect of taxation on retirement incentives, considering both the effect of taxation on the financial return to continued work and the level of retirement income.

As noted above the financial return to continued work will be influenced by both tax and pension systems, with in many cases pension design creating an implicit tax or subsidy on continued work by changing the level of pension wealth. To provide quantitative information on the effect of tax on the financial return to continued work, this section combines this pension wealth effect with the impact of taxes on earned and pension income to calculate an indicator akin to an effective tax rate on continued work. Following D'Addio *et al.* (2010) this indicator is referred to as the "financial incentive to retire". The indicator is also broken down into its tax and pension components to determine the relative importance of each factor in determining retirement incentives. The analysis confirms that both the tax and pension systems can significantly affect retirement incentives. The impact of tax on retirement incentives is shown to operate through several potentially conflicting channels, with the interaction between tax and pension parameters affecting the overall impact of taxes on work incentives.

The effect of taxation on the level of retirement income is also considered. Following an approach consistent with the "financial incentive to retire" calculations, both gross and net pension wealth calculations are presented.

The analysis in each case focuses on workers aged 60 and over. As already noted, these workers are the most likely to be influenced by taxes, with younger workers more likely to be influenced by large increases in pension wealth or by alternative sources of retirement income such as unemployment and disability benefits and early retirement schemes. Furthermore, the analysis of retirement income is limited to mandatory (and quasi-mandatory) pension schemes. This avoids issues related to the effect of tax on private saving decisions. Nevertheless it should be borne in mind that greater levels of private retirement income are likely to reduce the incentive to continue working.

The financial incentive to retire

This section follows the approach of D'Addio *et al.* (2010) who combine the taxation of earned income with the change in pension wealth to calculate an overall "financial incentive to retire" ("FIR") indicator. This indicator can be expressed as follows:

$$FIR = \frac{tax\ on\ extra\ gross\ wage\ earnings - change\ in\ net\ pension\ wealth}{extra\ gross\ wage\ earnings}$$

This indicator measures the amount of gross income earned from working an extra year that is "taxed" away in terms of taxes on that extra year's earned income and changes in net pension wealth. As such, it is akin to an effective tax rate on continuing to work. Taxes on earned income will increase the FIR. However, the change in pension wealth may be positive or negative depending on the parameters of the pension system in question. Where the change in net pension wealth is negative, the FIR will also be negative. However, where the change in net pension wealth is positive it may outweigh the work disincentive created by taxation of earned income and produce a negative FIR. In this case continued work is effectively subsidised rather than taxed.

This section calculates the FIR for a number of potential retirement scenarios for 30 OECD countries based on the rules in place in 2008. Given the focus of this chapter on the effect of tax on retirement decisions, we further decompose the FIR indicator into three components: tax on earned income, the change in gross pension wealth, and tax on pension income. This makes it possible to determine the relative importance of the different factors on retirement incentives. While not illustrated in the modelling results, the effect of pension taxes on the FIR

Box 3.1. **The effect of taxes on the financial incentive to retire**

Understanding the impact of taxation on the overall financial incentive to retire is relatively complicated as retirement incentives are affected not just by the tax rates set, but also by the interaction of the parameters of the tax and pension systems. This box breaks down the FIR indicator into its various components in order to illustrate how taxes affect the financial incentive to retire (or, more accurately, the financial disincentive to continue working) as measured by the FIR indicator.

The financial disincentive to continue working for one additional year from age *t* to age *t* + 1 can calculated as the tax paid on that extra year's earned income less the change in net pension wealth from working the extra year, all as a proportion of gross earnings in that year, or:

$$FIR(t, t+1) = \frac{e_t \tau_1 - \Delta PW(t, t+1)}{e_t} \qquad [1]$$

where e_t is gross earnings in year *t*, τ_1 is the average tax rate on earned income in year *t*, and ΔPW is the change in net pension wealth. The change in net pension wealth can be further broken down into two components – the (potential) increase in the future stream of pension income, and the (potential) cost of one year's pension income forgone. Ignoring inflation, this can be expressed as:

$$\Delta PW(t, t+1) = \sum_{i=t+1}^{d} [\, p_{incr}(1+r)^{-(i-t)}](1-\tau_3) \; - \; p_t(1-\tau_2) \qquad [2]$$

where p_t is pension income in year *t*, p_{incr} is the increment in pension income in year *t* + 1 and in future years [$p_{incr} = (p_{t+1} - p_t)$], τ_2 is the average tax rate on pension income in year *t*, τ_3 is the average tax rate on future increments to pension income, *d* is expected age of death, and *r* is the discount rate. Substituting equation [2] into [1] gives:

$$FIR(t, t+1) = \frac{e_t \tau_1 + p_t(1-\tau_2) - \sum_{i=t+1}^{d} [\, p_{incr}(1+r)^{-(i-t)}](1-\tau_3)}{e_t} \qquad [3]$$

Looking at equation [3], we can see that taxes affect the financial incentive to retire in three separate ways. First, taxes on earned income (τ_1) unambiguously increase the FIR, and so increase the incentive to retire. Second, taxes on pension income forgone (τ_2) unambiguously reduce the FIR, reducing the incentive to retire. Finally, taxes on the increment in future pension income (τ_3) unambiguously increase the FIR, again increasing the incentive to retire. Given the differing signs, the overall effect of taxes on the FIR is ambiguous.

Equation [3] also emphasises the importance of the interaction of the tax and pension systems in determining the effect of tax on the FIR – the effect of tax will not only depend on the rates of taxation but also on the levels of earned income, pension income forgone, and increments to future pension income.

Furthermore, it is important to note that while τ_2 and τ_3 are both taxes on pension income they are unlikely to be equal. Due to the progressivity of most tax systems, the tax rate on increments to pension income is likely to be greater than the tax rate on pension income forgone. This may have a substantial effect on the change in net pension wealth. Where future increments to pension income are greater than current pension income forgone (so that the change in gross pension wealth is positive), a sufficiently higher tax rate on future pension increments will result in the change in net pension wealth being negative. In contrast, where there is a decrease in gross pension wealth, the higher tax rate on future pension increments will amplify the negative effect on work incentives.

While, in Figures 3.4 and 3.5, the opposing impact of τ_2 and τ_3 are hidden within the overall measure of pension taxes, it is important to bear this in mind in determining the overall effect of taxes on retirement incentives.

can be further decomposed into their impact on pension income forgone and on future increments to pension income. Box 3.1 examines this decomposition in more detail.

The methodology behind the calculations is first discussed before the results are presented and analysed.

Methodology

The FIR indicator is calculated using the OECD pension models which cover all mandatory pension systems for private sector workers, as well as schemes with near universal coverage.[7] Non-mandatory private pension schemes (except those with near universal coverage) are not included in the modelling.

A key distinction between the approach taken here (and in D'Addio *et al.*, 2010) and that of previous studies calculating changes in pension wealth (for example, Gruber and Wise, 1999; Blöndel and Scarpetta, 1999; and Duval, 2003) is that the modelling of pension rules is *forward looking*. These previous studies aimed to explain historical retirement behaviour, hence the use of historical pension rules. However, with future policy making in mind, we instead quantify the incentives created by the current rules on future retirees. As such, the modelling is of tax and pension rules in place in 2008 (the most recent year available). Furthermore, pension rules currently being phased in are assumed to be fully in place from the start.[8]

To determine the retirement incentives faced in the future by an older worker it is necessary to make a number of assumptions about their past earnings history. We assume that the worker is a single male[9] who starts working in 2008 at age 20 and works continuously until retirement earning the same specified percentage of the average wage every year. Given the complexity of pension systems and the calculation of future income flows, a number of additional technical assumptions must be made regarding the calculations. These are summarised in Box 3.2, and in more detail in OECD (2011b).

Box 3.2. **OECD pensions models: Underlying assumptions**

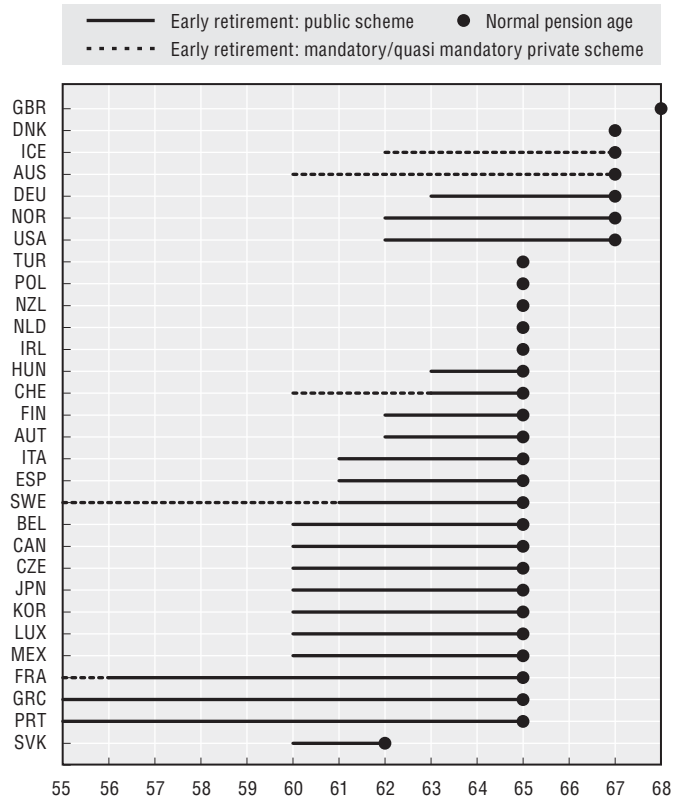
The calculations made in this section are derived from the OECD pension models. The models are used in this report to calculate the financial incentive to retire faced by a worker aged 60 considering deferring retirement until age 65, and by a worker aged 65 considering deferring retirement until age 66. As pension entitlements may vary substantially depending on various factors relating to employment history, a number of base assumptions need to be made. A number of additional assumptions must also be made in order to calculate the discounted present value of these pension entitlements. The assumptions underlying the pension model results are as follows:

- The worker enters the workforce in 2008, aged 20, and works continuously until retirement.
- The worker earns the same specified percentage of the average wage every year until retirement. (Hence, individual earnings are assumed to grow with the average wage).
- Real earnings growth is equal to 2%.
- Price inflation is equal to 2.5%.
- The real return on defined contribution pensions is equal to 3.5%.
- The discount rate is equal to 2%.
- Mortality rates are as specified in the *United Nations Population Database for the year 2050*.

Source: OECD (2011b).

Results are provided for two different retirement decisions – the decision to defer retirement from age 60 to age 65; and the decision to defer retirement from age 65 to age 66. The 60 to 65 decision is chosen as it represents the most common "early retirement window" in OECD countries. As illustrated in Figure 3.3, early (generally reduced) pensions are available from age 60 in 14 OECD countries, and from between 61 and 64 in another eight countries.

Figure 3.3. **Retirement windows: Normal and early pension ages for men, 2008**



Note: Figures are based on pension rules as of 2008. For consistency with the modelling, pension age increases currently being phased in are assumed to already be in place. Note that these forward-looking pension age figures may differ from the historical pension ages presented in Figure 3.2 that were used for comparison against historical labour market exit ages.

Source: Adapted and updated from OECD (2006c).

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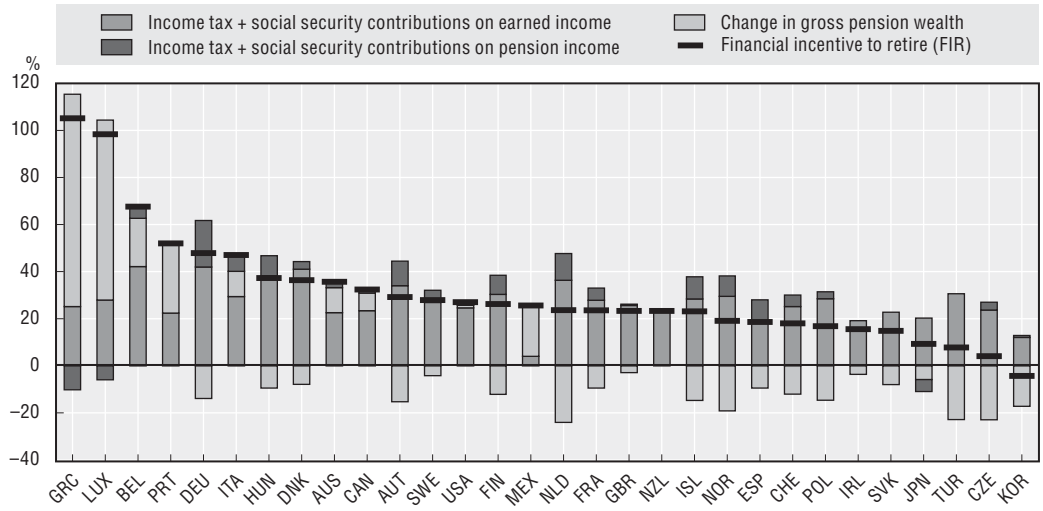
In contrast, the 65 to 66 decision is chosen to give an indication of incentives for "late" retirement. By this age, all countries except Denmark and the UK provide pension eligibility, hence any continued work will generally be affected by the loss of pension income.

Modelling results

Figures 3.4 and 3.5 provide results for the FIR for the decision to continue working from age 60-65 and 65-66 respectively. In each case, the worker is assumed to have earned the average wage throughout their career (results for earnings of 67 per cent and 167 per cent of the average wage are presented in Annex B). The overall FIR indicator is represented by the horizontal dash on each country's respective bar. The bars themselves then decompose this overall indicator into three components: taxes on earned income, taxes on pension income; and the change in gross pension wealth. The effect of the latter two components on the FIR

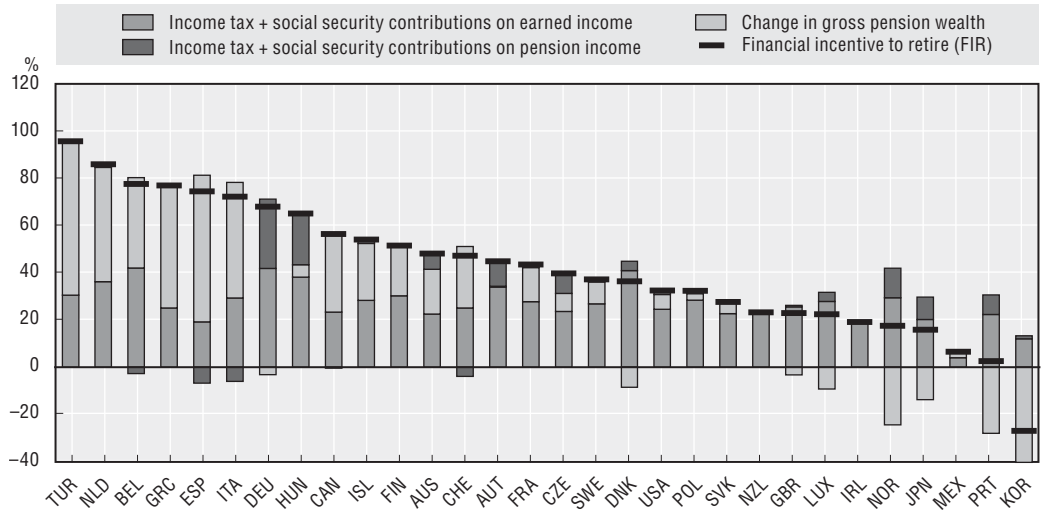
Figure 3.4. **The financial incentive to retire (single male earning 100% of AW; deferring retirement from age 60-65)**



Source: OECD pension models.

StatLink http://dx.doi.org/10.1787/888932483011

Figure 3.5. **The financial incentive to retire (single male earning 100% of AW; deferring retirement from age 65-66)**



Source: OECD pension models.

StatLink http://dx.doi.org/10.1787/888932483030

may be positive or negative. Where the effect is negative it is represented by a negative bar. This can be seen to drag the corresponding horizontal dash (representing the overall FIR) down, in some cases making the overall FIR negative itself (*i.e.* creating a positive financial incentive to continue working). Employee social security contributions (SSC) are included with personal income taxes (PIT) in the taxes on earned income and taxes on pension income bars, where applicable. Employer social security contributions are not included in the analysis.

We consider the results from Figures 3.4 and 3.5 in turn, before discussing the effect of altering the assumption regarding lifetime income on the results.

Deferring retirement from 60 to 65

The results in Figure 3.4 show that workers face significant disincentives to continue working in a number of countries, despite being several years from the "normal" retirement age in most countries. In three countries (Greece, Luxembourg and Belgium), over 60 per cent of income from continued work is effectively lost in taxes and reductions in pension wealth. Nevertheless, in the majority of countries the overall FIR is below 30 per cent.

Looking at the decomposition of the FIR, the results presented in Figure 3.4 show that taxes (on both earned and pension income) have a substantial effect on the financial incentive to retire. By themselves, taxes on earned income reduce the return to continued work by over 20 per cent in all but four countries, while the combined effect of taxes on both earned and pension income reduces the return to work by over 30 per cent in 13 countries, and over 40 per cent in six.

Figure 3.4 also shows that continued work will increase pension wealth in the majority (19) of countries, with the FIR being reduced by as much as 24 percentage points in the Netherlands, 23 percentage points in the Czech Republic, and by more than 10 percentage points in another eight countries. In the majority of countries, this reduction is predominantly driven by the fact that minimal or no pension income has been given up by the deferral of retirement – due to either no pension being available (as the pension eligibility age is not reached until the end, or near the end, of the deferral period), or only a significantly reduced early pension is available.

Nevertheless, in countries with the highest financial disincentives, particularly Greece and Luxembourg, these results are driven by large decreases in pension wealth. In these countries workers are eligible for early pension payments that are not fully actuarially adjusted downwards, explaining the effect on work incentives. An exception is Germany, which has the fifth highest financial incentive to retire despite having an increase in gross pension wealth. This is a result of both the relatively high taxation of earned income and the degree of progressivity in the taxation of pension income. Future increments to pension income from deferring retirement are taxed at a significantly higher rate than pension income forgone to the extent that net increments to future pension income are outweighed by net pension income forgone. As such, there is a small overall decrease in net pension wealth.

In New Zealand, deferred retirement has no effect on pension wealth, meaning the entire disincentive to continue work is tax driven. This is because the New Zealand pension is flat and available at age 65 irrespective of work, so is by design actuarially neutral. Meanwhile in several other countries the effect of pension wealth is minimal (Ireland, UK, US).

Looking specifically at the impact of taxes on pension income, these are generally smaller than the impact of taxes on earned income or changes in gross pension wealth. A notable exception is Germany, as discussed above. However, what is striking about the effect of pension taxes is the variation in sign across countries. While taxes on earned income always act as a disincentive to continued work, taxes on pension income increase work disincentives in most countries, but reduce work disincentives in Greece, Luxembourg and Japan.

This emphasises the importance of the interaction of tax and pension systems in determining the impact on work incentives of taxes on pension income. Figure 3.4 shows that, in general, if the change in pension wealth reduces work disincentives then taxes on pension income act in the opposite direction and increase work disincentives, and *vice versa*. However, in five countries (Australia, Belgium, Canada, Italy and Japan) the effect of taxes on pension income acts in the same direction as the change in pension wealth. In

four of these five countries, this is due to the higher taxation of future pension income relative to current pension income forgone, which in turn is driven by the progressivity of the taxation of pension income. The opposite is the case in Japan due to ceilings on employee SSC (see Box 3.1).

Deferring retirement from 65 to 66

Turning now to Figure 3.5, we see far greater aggregate work disincentives. Over 40 per cent of earned income is lost in taxes and reductions in pension wealth in 14 countries, and over 60 per cent in seven countries, peaking at 96 per cent in Turkey. These results are largely driven by the reduction in pension wealth now present in the majority of countries. Again this is unsurprising, as most countries have reached the normal entitlement age for full pensions, resulting in the loss of significant pension income by deferring retirement.

Despite the predominance of the reduction in pension wealth in many countries, taxes do still have a significant impact on the FIR. As with Figure 3.4, taxes on earned income again take over 20 per cent of income in almost all countries (and over 30 per cent in eight countries). The peak is Germany where taxes on both earned and pension income take away 71 per cent of earned income. The particularly strong effect of pension taxes is again due to the degree of progressivity in the taxation of pension income.

Once again, the effect of pension taxes varies – decreasing work incentives in twelve countries, and increasing work incentives in four. Again, this is determined by the interaction of tax and pension systems.

The financial incentive to retire at different income levels

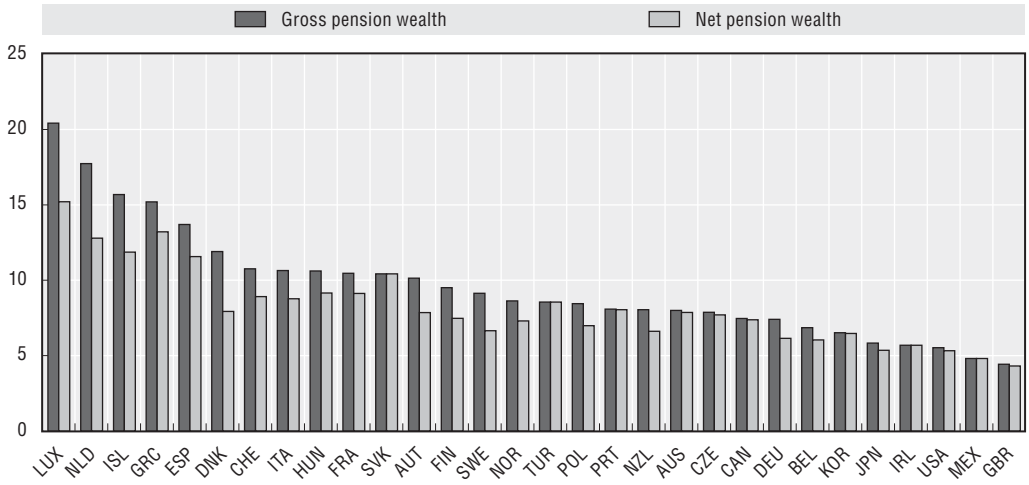
Figure B.1 in Annex B reproduces the above results for income levels of 67 per cent and 167 per cent of the average wage. The overall trends are not substantially different, although individual country results often vary substantially. In general, tax on earned income and the overall FIR tend to increase slightly as income increases from 67 to 100 to 167 per cent of the average wage. This is the case for both the age 60-65 and age 65-66 retirement decisions.

Regarding the 65-66 retirement decision, in Belgium and the Netherlands the impact of pension taxes on the FIR switch sign from negative (reducing the overall FIR) at 67 per cent of the average wage, to positive (increasing the FIR) at 167 per cent of the average wage. These results are driven by the higher tax rates imposed on future increments to pension income as a result of the overall higher level of pension income received by a worker earning income equal to 167 per cent of the average wage (as opposed to 67 or 100 per cent of the average wage).

The level of retirement income

As noted earlier, the level of retirement income will also affect the retirement decision. To illustrate the impact of tax on the level of retirement income, this section presents, in Figure 3.6, gross and net pension wealth calculations (as a multiple of the average wage) at age 65 for a single individual who earned the average wage throughout their career. These calculations are based on the same assumptions underlying the FIR calculations presented above. Pension wealth at age 60 is shown in Figure B.2 in Annex B, but can be misleading as regards the incentive to retire at age 60, given that (early) pension entitlement will not be available until after age 60 in many countries.

Figure 3.6. **Gross and net pension wealth as a multiple of the AW (single male earning 100% of AW; aged 65)**



Source: OECD pension models.

StatLink http://dx.doi.org/10.1787/888932483049

Looking at Figure 3.6, countries with higher levels of pension wealth, such as Luxembourg and the Netherlands, will have less incentive to keep working, for a given financial return to continued work, than countries with lower levels of pension wealth such as Mexico and the UK. The effect of tax can be seen by comparing gross and net pension wealth. Unsurprisingly, in almost all countries taxes reduce the level of pension wealth, thereby reducing the incentive to retire. The exceptions are the Slovak Republic, Turkey, Ireland and Mexico. In these countries pension income is either fully exempt from taxation, or deductions or tax credits fully eliminate any tax liability at the level of pension income generated from a career earning the average wage. Tax concessions for older workers and their effect on retirement incentives are considered in more detail in the next section.

Limitations of the above analysis

When considering the results presented above a number of limitations of the modelling approach must be borne in mind. First, the results apply to very specific scenarios regarding income level and possible retirement age. Results may differ significantly when the scenarios considered are varied. The analysis would need to be undertaken for a far broader set of scenarios in order to provide a basis for a particular policy reform. Additionally, the underlying technical assumptions, such as the discount rate and life expectancy, may differ from those held by a particular individual, and hence the modelling will not necessarily reflect the true (subjective) incentives faced by each worker. For example, if an older worker has a far higher discount rate than that modelled, the modelling will overestimate the value of future pension income earned and report a lower FIR than is actually the case. Likewise, where an individual's life expectancy is greater than that modelled, the modelling will underestimate the value of future pension income and report a higher FIR than is the case.

The modelling also assumes that tax and pension parameters will not change in the future (apart from indexation). This is obviously an unrealistic assumption. A final

limitation is that non-mandatory private pension scheme income is not considered. While this may be a significant concern at high income levels, it is likely to be less of a problem for middle- and low-income earners as the majority of retirement income of such workers tends to be derived from mandatory pension schemes.

Summary of results

Despite these limitations, looking at the results as a whole provides a number of key insights. First, both tax and pension parameters can substantially affect the financial incentive to retire. However, where work incentives or disincentives are very large, these are driven by pension systems rather than tax systems. Such results generally occur when pension systems are not actuarially neutral. As such, pension reform moving towards actuarial neutrality is likely to be the best policy option for improving work incentives in countries currently imposing large financial incentives to retire.

Nevertheless, there is still substantial scope for reducing work disincentives through tax reform. The analysis shows that reducing taxes on earned income will always increase work incentives, but that the interaction of pension and tax systems needs to be considered in order to determine the influence on retirement incentives of taxes on pension income. Where the pension system is actuarially neutral, the taxation of pension income will tend to have little effect on retirement incentives. But where the pension system is not actuarially neutral, the conflicting effects of current pension income forgone and future increments to pension income must be considered in order to determine the impact of taxes on pension income on work incentives.

To determine what types of tax reforms are likely to be most successful in reducing the incentives to retire currently imbedded in tax systems, we need to understand how the income of older workers and retirees is currently taxed. We do this in the next section.

3.4. The tax treatment of older workers and retirees

The previous section has shown that the tax treatment of older workers and retirees can have a significant impact on retirement incentives via both its effect on the financial return to continued work and on the level of retirement income. This section considers the tax rules faced by older people in 31 OECD countries, and examines their differing impacts on retirement incentives. It draws heavily on responses to the *tax and employment study* questionnaire. The following section then considers potential pro-employment reforms to these tax rules.

In most countries older people are not subject to the standard tax treatment faced by their younger counterparts. While they are generally taxed according to the same progressive personal income tax schedules, most countries provide a number of tax concessions to older people. In general, the policy goal of these concessions is to provide income support to older people, particularly lower-income older people. However, they often also have significant and complex effects on work incentives. Additionally, a small number of countries have introduced tax concessions with the specific aim of increasing employment of older workers.

Tax concessions may be placed in one of three broad categories: reduced taxation of pension income, age related tax deductions or credits, and reduced social security contributions. Table 3.1 summarises the tax concessions present for older people in 31 OECD countries. In addition, the progressivity of personal income tax schedules is also

Table 3.1. **Tax concessions for older people in OECD countries (2010, unless otherwise specified)**

	Reduced taxation of (public) pension income	Age related tax deductions/credits	Reduced SSC
Australia	No concessions	The Senior Australians Tax Offset (SATO) provides a non-refundable tax credit of up to AUD 2 230 to individuals 65 and over (64 for women); it is withdrawn at a rate of 12.5% on income above AUD 47 707 The Mature Age Workers Tax Offset (MAWTO) provides a non-refundable tax credit of up to AUD 500 to workers aged 55 and over; the credit phases out at 5% above AUD 53 000	Higher phase in thresholds for the Medicare levy
Austria	Tax credit of EUR 400 for low pension income up to EUR 17 000; the tax credit is fully phased out once pension income equals EUR 25 000	None	Pension income is only liable to sickness insurance contributions
Belgium	Reduced taxation of pension income of maximum EUR 1 901.19	None	Pension income is only liable to SSC contributions for health and disability insurance (can't reduce below a minimum monthly pension of EUR 1 332.27), and to the solidarity contribution
Canada	Pension income splitting was introduced in the 2007 taxation year; up to one-half of eligible pension income can be split with a resident spouse or common-law partner. A non-refundable credit of up to CAD 2 000 is provided for eligible pension income. The credit is transferable to a spouse	A non-refundable age credit is provided to those aged 65 and above; the value of the credit in 2009 was CAD 961 (15% of the age credit amount of CAD 6 408); the credit amount is indexed annually to inflation; the credit is phased out at 15% for those with net income in excess of CAD 32 312 and is fully phased out for those with net earnings above CAD 75 032 (2009). The age credit is transferable to a spouse	No SSC on pension income
Czech Republic	Tax free allowance of CZK 288 000 on pension income	None	No SSC on pension income
Denmark	No concessions	Tax credit of up to DKK 100 000 for workers aged 64 only who were also working from age 60-63; income at age 57-59 must be below DKK 550 000	No SSC on pension income
Finland	Deduction against pension income of up to EUR 6 950 for a single person and EUR 5 960 for each partner in a married couple; withdrawn at rate of 70% on income above the basic allowance		No SSC on pension income for pension or unemployment insurance. Contributions paid for healthcare at 1.5% of pension income
France	No concessions	None	Exempt from all SSC except CSG of 6.6% (unless income below EUR 7 147)
Germany	Only part of pension income is currently included as taxable income; the inclusion rate depends on when the pension is first received; a pension first received before 2005 has a 50% inclusion rate; the inclusion rate increases by 2 percentage points per year until 2020, and then by 1 percentage point per year until 2040, at which point all pension income will be included as taxable income	Tax credit for elderly taxpayers (65 years and above) of 30.4% of taxable income (max. EUR 1 444 in 2011)	No SSC for pension scheme and unemployment insurance; must still pay health care contributions of 8.2% (in 2011) and long term care (1.95% in 2011)
Greece	No concessions	None	Health contributions of 4% must be paid
Hungary	Pension income is exempt from income tax	None	No SSC on pension income
Iceland	No concessions	None	No SSC on pension income

Table 3.1. **Tax concessions for older people in OECD countries (2010, unless otherwise specified)** *(cont.)*

	Reduced taxation of (public) pension income	Age related tax deductions/credits	Reduced SSC
Ireland	No concessions	Age tax credit of EUR 325 for individuals over 65 (doubled for married persons jointly assessed where both over 65)	Individuals aged 66 or over are not liable to pay Pay Related Social Insurance
		An age-related tax credit for private health insurance premiums is available for individuals aged 50 and over; the amount is EUR 200 for ages 50-59; EUR 525 for ages 60-69; EUR 975 for ages 70-79; and EUR 1 250 for ages 80 and above	Individuals aged 70 years or over are not liable to pay the Health Contribution
		Age exemption – individuals aged 65 years or over are exempt from income tax where their income is below EUR 20 000 (EUR 40 000 in the case of a married couple jointly assessed) plus EUR 575 for each of the first two qualifying children and EUR 830 in respect of each additional qualifying child; where the individual's income exceeds the relevant exemption limit by a small amount, a system of marginal relief operates	
		Individuals aged 65 or over whose annual income does not exceed EUR 20 000 or married couples, one or both of whom are aged 65 or over, whose combined income for the year does not exceed EUR 40 000 are exempt from the Income Levy. Individuals aged 70 and over who have a full medical card are also exempt from the income levy	
Italy	Tax credit of EUR 1 725 (EUR 1 783 if over 75) for pension income up to EUR 7 500 (EUR 7 750 if over 75); the credit is phased out at higher income levels and fully exhausted once income reaches EUR 55 000	None	No SSC on pension income
Japan	A fixed deduction of JPY 0.5 m is given against public pension income; additionally, a variable tax deduction is given on public pension income greater than this initial fixed deduction; for additional pension income up to JPY 3.6 m, a further deduction of 25% of that amount is granted; for income between JPY 3.6 m and 7.2 m, a deduction of JPY 0.36 m plus 15% of that amount is given; and for income above JPY 7.2 m, a deduction of JPY 1.08 m plus 5% of that amount is granted	Increased deduction (an additional JPY 0.1 m) for a dependent spouse over 70 or other dependent over 70	Pension income is liable to contributions for health insurance and long-term care insurance
	There is a minimum deduction of JPY 0.7 m	The minimum deduction against public pension income is increased from JPY 0.7 m to 1.2 m for taxpayers over 65	
Korea	100% pension income deduction on income up to KRW 3.5 m; then 40% deduction of additional income up to KRW 7 m; 20% up to KRW 14 m; and 10% thereafter; the maximum possible deduction is KRW 9 m per year	Individuals over 65 receive an additional tax allowance of KRW 1.5 m on top of the standard tax allowance	20% of pension income is subject to SSC contributions for health insurance

Table 3.1. **Tax concessions for older people in OECD countries (2010, unless otherwise specified)** *(cont.)*

	Reduced taxation of (public) pension income	Age related tax deductions/credits	Reduced SSC
Luxembourg	No concessions	None	Pension income is subject to 2.7% sickness contributions, 1.4% long-term care contributions, and 2.5% solidarity surcharge, but not to the pension scheme
Mexico	No concessions	Pensioners receive a tax free allowance equal to nine times the annual minimum wage	No SSC on pension income
Netherlands	No concessions	Pensioners receive a tax credit of EUR 684. Single pensioners with income below EUR 34 649 reveive an additional credit of EUR 418 The maximum labour credit is increased with age form EUR 1 489 for those under 57, to EUR 1 752 between 57-59 years; EUR 2 012 between 60-61 years; and EUR 2 273 between 62-64 years. It falls to EUR 1 057 for those 65 and over. Additional labour credit of 5% of income between EUR 9 041 and 55 831 if aged 62; 7% if 63; 10% if 64%; 2% if 65-66; and 1% if 67 or over	Pensioners pay 13.8% contributions for general health insurance and survivors' pensions. Not liable for old-age pension or unemployment insurance contributions
New Zealand	No concessions	None	No SSC in New Zealand
Norway	Taxed subject to tax limitation rule that ensures minimum pension amount is tax free. Higher income is taxed at 55% until it becomes more advantageous to be taxed at standard rates	Tax allowance of NOK 19 368 for individuals 70 or over, and pensioners 67 and over who are not taxed under the tax limitation rule	Reduced contributions of 3% instead of 7.8% on pension income and on earned income if over 70; pensioners subject to the tax limitation rule are exempt from SSC
Poland	No concessions	None	Pension income is only subject to a health insurance contribution of 9%
Portugal	Tax free allowance of EUR 6 000 on pension income; this is withdrawn at a rate of 13% on income above EUR 30 240	None	No SSC on pension income; workers over 65 with 40 years contributions pay a reduced SSC of 17.9% (employee) and 8.3% (employer)
Slovak Republic	Pension income is not taxed	None	No SSC on pension income Working pensioners must pay sickness, old-age and health insurance contributions
Slovenia	No concessions	A "seniority allowance" of EUR 1 334.18 for individuals older than 65	No SSC on pension income
Spain	No concessions	Increased personal allowance of EUR 918 for individuals over 65. Individuals over 75 receive a further increase in their personal allowance of EUR 1 122 Working individuals (65+ years) receive the extending labour market participation allowance (equal to twice the work related expenses allowance of between EUR 2 652 and 4 080, depending on income)	No SSC on pension income. No SSC on labour income of those aged 65 or over
Sweden	No concessions	Increased personal allowance for individuals over 65; the total (basic plus extra) allowance is SEK 39 600 for individuals with income below SEK 165 800; this decreases by approximately SEK 100 for every SEK 1 000 above this amount, reaching a minimum of SEK 18 400 (for individuals with income above SEK 387 800) Individuals over 65 receive an increased EITC equal to 20% of income up to SEK 100 000, plus 5% of income between SEK 100 000 and 300 000	No SSC on pension income. Labour income of individuals over 65 is subject to reduced SSC of 10.21% (zero for those born in 1937 or earlier)

Table 3.1. **Tax concessions for older people in OECD countries (2010, unless otherwise specified)** *(cont.)*

	Reduced taxation of (public) pension income	Age related tax deductions/credits	Reduced SSC
Switzerland	No concessions	Some cantons grant an additional allowance for older taxpayers	No SSC on pension income. Working pensioners only pay health insurance contributions
Turkey	Pension income is not taxed	None	No SSC on pension income
United Kingdom	No concessions	Increased personal allowance of GBP 9 490 for individuals aged 65-74; GBP 9 690 for over 75s; this is tapered away at a rate of GBP 1 for every GBP 2 of income above GBP 22 900 until reaching the level of the standard allowance for younger individuals of GBP 6 475	No SSC on pension income. No SSC on labour income of those aged 65 or over
Unites States	A portion of public pension income is taxable; this equals the lesser of 50% of the public pension income, or 50% of the excess of the pensioner's total income (including 50% of public pension income) over USD 25 000 (for a single individual; USD 32 000 for a married couple); however, if pensioner's total income exceeds USD 34 000 (for a single individual; USD 44 000 for a married couple) up to 85% of social security benefits may be included in income	Additional standard deduction of USD 1 100 for over 65s that are married; USD 1 400 for single individuals or head of households A non-refundable credit for low income individuals over 65; the amount of the credit varies by filing status, dependent children, eligibility of spouses, adjusted gross income, non-taxable social security income and non-taxable pension income	No SSC on pension income

Source: Responses to questionnaire issued to Country Delegates to Working Party No. 2 of the OECD Committee on Fiscal Affairs.

likely to reduce the tax burden faced by retired people relative to workers as they will tend to earn less income.

Concessions for public pension income

13 OECD countries provide tax concessions for pension income.[10] Three countries (Hungary, the Slovak Republic and Turkey) exempt pensions fully.[11] In another three countries (Belgium, Germany and the US), only a portion of pension income is included as taxable income, while another five countries (the Czech Republic, Finland, Italy, Japan, Korea) provide tax deductions, credits or allowances for pension income. Norway has a different scheme that ensures a minimum income for pensioners, while Canada allows income splitting for pensioners which can reduce the tax burden of couples.

Concessions on pension income are generally intended to provide income support to pensioners, recognising they are likely to have lower incomes than when in work. The Norwegian "tax limitation rule" is a prime example of the targeting of low income pensioners. The rule applies to all pensioners, including old-age and disability pensioners and pensioners entitled to early retirement (from the age of 62) through the AFP-scheme. Under the rule, the minimum pension from the National Insurance Scheme is exempt from tax. However, allowances available against pension income when not applying the tax limitation rule are not available. To target the benefit at low-income pensioners, income above the minimum pension level is taxed at a rate of 55 per cent until it becomes more advantageous to be taxed according to the standard tax rules for pension income (at which point the tax limitation rule no longer applies). In 2006, the rule was effective for around 50 per cent of all pension recipients.[12]

Similarly, in Belgium there are restrictions on the tax deduction provided for pension income. The first restriction is based on the ratio of pension income to aggregate taxable income (ATI). A single person with a pension of EUR 5 000 and net taxable income of EUR 10 000, will receive only half of the basic amount. The second restriction is related to total ATI. If ATI is less than EUR 19 050, the whole reduction applies. Above EUR 38 090, only one-third of the reduction is granted, with the amount pro-rated in between. The tax reduction and the thresholds are adjusted annually in line with the consumer price index.

Finland and Italy also target their concessions at low-income pensioners. Finland provides a tax-free allowance with respect to municipal income tax. The amount of pension income allowance in municipal taxation is based on the full national pension and the basic allowance for all individuals with low incomes.

In 2006, the maximum allowance was EUR 6 950 for a single person and EUR 5 960 for each partner in a married couple. The allowance is withdrawn at a rate of 70% of the amount by which the income subject to tax exceeds the full allowance. This means that there is no allowance once the income exceeds EUR 16 879 (single person) or EUR 14 475 (each partner in a couple). The pension income allowance cannot exceed the amount of pension income. Italy provides a tax credit targeted at low-income pensioners. A tax credit of EUR 1 725 (EUR 1 783 if over 75) is provided on pension income up to EUR 7 500 (EUR 7 750 if over 75). The credit is withdrawn between EUR 7 500 and EUR 55 000 according to a formula.[13]

A different approach adopted in Canada has been to allow income splitting of pension income with a resident spouse or common law partner. This is in addition to a capped pension income tax credit which is transferable to a spouse. While income splitting provides financial support to many older couples, the greatest benefit of the measure goes to high income couples (with substantial private pension income) where one partner earns substantially more than the other, whereas couples where partners earn similar levels of income, and lower income pensioners (facing lower marginal tax rates) will gain less from the measure.

Similarly, the German concession is not aimed at providing low income support. In Germany, for example, the effective concession given to pension income is a result of the phasing in of the move from a TTE to an EET system for all (public and private) pension income. This is intended to encourage retirement savings, applying to all pension income, with a greater benefit being derived from those with higher levels of private pension income.[14]

Age related tax concessions

Age related tax concessions are present in 16 OECD countries. These are mostly in the form of increased deductions or allowances (10 countries), and tax credits (6 countries). Sweden provides both an allowance and a tax credit, while Ireland provides a tax credit for older people as well as exemptions from income tax for those on low incomes. Most age based concessions will benefit both workers and retirees. However, a number of countries provide concessions solely to older workers.

The most common policy rationale for these concessions is also to provide income support to low income older people. To achieve this, the concessions are sometimes withdrawn as income increases. For example, Canada's age credit is targeted at low- and middle-income seniors by being phased out for those with net income in excess of CAD 32 312, and is fully phased out for those with net earnings above CAD 75 032 (in 2009). However, it is possible to transfer unused age credit amounts to a spouse. Similarly, Irish

individuals over 65 that earn less than EUR 20 000 (or families where at least one partner is over 65 earning less than EUR 40 000) are exempt from income tax and the income levy, with a system of marginal relief phasing out the tax benefit at higher incomes. The UK also withdraws its increased personal allowance for over 65s as income rises above GBP 22 900.

In other cases where there is no withdrawal, the policy goal tends to be to account for increased costs associated with old age (such as increased medical expenses, etc). This is the case, for example, with the seniority allowance in Slovenia, and with Norway's special allowance for older workers – neither of which are withdrawn as income rises.

Where concessions are linked to employment they are generally intended to provide both income support, and encourage work. These concessions are generally provided as tax credits. One exception is Spain, which provides a work conditional tax allowance for taxpayers over 65 (in addition to an increased personal allowance). The "extending labour market participation allowance" is implemented by doubling the work related expenses allowance the worker would otherwise be eligible for.

Other countries extend in some way the in-work tax credit programs they have in place for low-income workers in general. For example, Sweden increases the value of their Earned Income Tax Credit for workers over 65. Meanwhile, the Labour Credit in the Netherlands increases as age increases from 57 to 64.

Australia has introduced an in-work tax credit specifically for older workers. The "Mature age workers tax offset" is a non-refundable tax credit of up to AUD 500 for workers aged 55 and older. It phases out once income increases beyond AUD 53 000. Meanwhile, Denmark provides a separate tax credit of up to DNK 100 000 to workers aged 64 only, who were also working from age 60-63 and earned less than DKK 550 000 per year when aged 57-59.[15] This scheme is temporary – applying to workers aged 64 during the period 2010-16.

SSC reductions for older people

The final form of tax concession for older people is reductions in social security contributions (SSC). SSC are generally imposed on both employees and employers. In this section we focus on reductions in SSC legally imposed on employees. Reductions in SSC imposed on employers have been introduced in a number of countries to boost labour demand for older workers. These and other measures to increase labour demand for older workers are discussed in Section 3.5.[16]

As with personal income tax concessions, SSC reductions may relate specifically to pension income, or may be age related and therefore apply equally to working and retired older people. Of the 29 OECD countries considered that impose SSC,[17] pension income is exempt from SSC in 16 and substantially reduced in the remaining 13. Additionally, eight countries provide SSC reductions for earned income based on age.

The general rationale for exempting pension income from employee SSC is that, in addition to the redistributive function of taxes, SSC also have a social insurance function. In effect, a component of SSC buys an entitlement to future benefits – generally in the form of pension entitlements, or unemployment, accident or disability insurance.[18] Where pensioners are no longer subject to these risks then they are generally not required to make the related contributions. Even though such SSC reductions may not necessarily be considered tax concessions in a strict sense, they still result in the differential tax treatment of earned and retirement income, and so affect retirement incentives.

Countries that do not fully exempt pension income from SSC, generally only impose contributions for healthcare and related insurance. This generally occurs in countries where health care is largely funded through SSC, rather than general taxation, and so contributions still provide a future benefit to the pensioner. For example, in Finland, no pension or unemployment insurance contributions are due on pension income, but healthcare contributions are due. Similarly, only healthcare insurance contributions are required on pension income in Austria and Poland. In Belgium, both health and disability insurance contributions are due on pension income. Meanwhile, in Japan and Luxembourg, health and long-term care insurance contributions are due on pension income. A solidarity charge is also paid in Luxembourg.

Where older individuals are still working they will generally continue to pay SSC. However, a number of countries provide SSC reductions based on age. Again, this reflects that in some cases older workers, as with retirees, will not face the same risks as younger workers regarding, for example, unemployment or disability, as they are already eligible for pension income should they stop working. For example, Irish individuals aged 66 and over are not liable for Pay Related Social Insurance contributions, and instead only make health insurance contributions. From age 70 health insurance contributions are no longer due either.

In the Slovak Republic, workers above pension eligibility age (62) are not obliged to pay contributions for unemployment and disability insurance. However, they must still pay sickness and health insurance contributions, as well as pension contributions – as employment still accrues pension points (which determine the final pension value once retired). In Norway, older workers must continue to pay SSC at the full rate of 7.8 per cent. However, once they reach age 70 they only contribute at the same lower rate as is levied on pension income (three per cent). This is because pension points are not accrued for wage income earned by people over 70. Meanwhile, in Spain and the UK all workers aged 65 and over are fully exempted from SSC.

The impact of tax concessions on work incentives

A full exemption from both income tax and SSC on pension income will unambiguously increase the incentive to retire by increasing retirement income. However, as long as some pension income is taxed, tax concessions on pension income will have varying effects on work incentives depending on their design, and interaction with pension parameters.

A pension tax concession (whether income tax or SSC) will always increase retirement income, thereby encouraging retirement through an "income" effect (see Section 3.2). This is the case irrespective of whether the concession is implemented as an exemption, tax credit, deduction or reduced rate. However, the impact of a concession on the financial return to continued work will depend on any change in gross pension wealth. As illustrated in Section 3.3, where pension wealth decreases, pension taxes will generally act in the opposite direction and increase the financial return to working. As such, a pension tax concession will generally decrease the financial return, thereby complementing the effect of increased retirement income, and encouraging retirement. In contrast, where pension wealth increases, pension taxes will decrease the financial return to continue work. So a pension tax concession will increase the incentive to continue working and, at least partially, counter the effect of increased retirement income. In this case, which of the two effects dominates would be a matter for empirical study. In this regard, recall that Blöndel and Scarpetta (1999) find evidence that the components of the change in pension wealth have a more significant impact on retirement decisions than the gross replacement rate, and

that Gruber and Wise (2004) find mixed evidence on the effect of the level of pension wealth on retirement. These suggest the impact of the financial return to working may dominate.

Complicating the analysis further, a pension tax concession could increase the financial return to work even where pension wealth has fallen. This could occur where the total tax rate (income tax plus SSC) on increments to future pension income is high enough relative to the total tax rate applying to any pension income forgone by working that it increases the reduction in (net) pension wealth. In this very specific situation, a tax measure that lowered the total tax rate on future increments to pension income relative to the rate on current pension income would increase the financial return to continued work. For example, an income tax or SSC ceiling could have this effect.

As age-related tax concessions (whether income tax or SSC) also reduce the taxation of pension income, they will have the same impacts on the level of retirement income and on the financial return to work as described above. However, unlike pension concessions, age-related concessions will also increase in-work income, thereby having a positive effect on the overall financial return to working, and encouraging continued work. Again, this leaves the overall impact of a concession ambiguous.

In contrast, the overall effect on work incentives is far clearer where age-related tax concessions are tied specifically to earned income only. Such measures will unambiguously increase the incentive to continue working as they will increase the financial return to working, but will have no impact on the level of retirement income. Of course, they face many of the same design difficulties that in-work credits for low-income working age taxpayers face (see Chapter 2). In particular, the withdrawal of the tax credit as income increases will affect marginal work incentives, potentially leading some workers to move towards part-time work. This effect will be exacerbated in countries where pension income can be received by part-time workers. The use of in-work credits to increase work incentives is considered in more detail in Section 3.5.

3.5. Policies to improve work incentives for older workers

This section draws on the above analysis of tax rules for older people and the work incentives they create to highlight a number of possible tax policy reforms likely to increase work incentives for older workers. As with the rest of this chapter, the focus here is on improving work incentives for workers over 60.[19] As noted in Section 3.3, both tax and pension systems contribute to work disincentives, but with tax often playing a secondary role. That said, the high degree of responsiveness of older workers to financial incentives suggests that significant employment gains can be made from shifting some of the tax burden to younger, less-responsive, workers. A number of possible tax reforms are discussed below.

Age-based rather than pension-specific concessions

Providing age-based tax concessions as opposed to concessions solely for pension income is a relatively simple way of improving work incentives for older people in the 13 OECD countries that currently provide concessions on pension income. While still providing income support to older people, such a reform will also increase the financial return to work, thereby encouraging continued work. Restricting the age of eligibility for the concession to the age of full pension eligibility may also act to reduce early retirement incentives without impacting significantly on broader income support goals.

The budgetary cost of moving from a tax concession on pension income to an age-based concession will depend on how responsive the labour supply of older workers is. If, as evidence suggests, their labour supply is more elastic than younger workers, a revenue-neutral reform in which the latter pay more tax could potentially increase aggregate employment and economic welfare.

Reducing SSC on earned income

Another way of increasing work incentives for older people is to reduce SSC due on the income of older workers. As discussed above, SSC are generally levied fully on older workers, but not at all (or to a far lesser extent) on retired people. The general rationale for imposing SSC on earned income but not on pension income is that contributions "buy" an entitlement to future benefits when still working, but do not once retired. However, as discussed in Chapter 1, there is generally also a significant degree of redistribution involved in social security systems in OECD countries, making contributions closer to "pure" taxes than to compulsory insurance. Indeed, (by definition) all SSC included in the modelling in Section 3.3 involve some degree of redistribution. As such, contributions are likely to have a significant negative impact on work incentives leaving scope for an SSC reduction to increase employment.

Nevertheless, in some countries with a particularly strong linkage between contributions and benefits, it may be difficult to reduce contributions as this would then result in a substantial reduction in benefit entitlement. Indeed, some workers may prefer to pay certain forms of SSC because of the value of the benefit provided. For example, in 2006, older workers in the Slovak Republic were exempted from paying sickness contributions (as a way of increasing the employment of older workers). However, concerns from older workers regarding the loss of the corresponding sickness insurance prompted the reintroduction of the sickness contributions in 2008. In such cases, SSC could be reduced while maintaining full benefit entitlement – however, the resulting fiscal cost would need to be weighed against the likely benefit in terms of increased employment of older workers.

In-work tax credits

Reducing taxation on earned income will always increase work incentives, however many measures that do this (for example, reducing income tax rates, or increasing age-based deductions or tax credits) will generally also reduce the taxation of pension income. This will create a conflicting "income" effect encouraging retirement, as well as either a positive or negative effect on the financial return to working depending on pension parameters. By imposing a work requirement, in-work tax credits (or equivalent allowances/deductions), restrict the tax benefit specifically to earned income thereby ensuring a positive impact on work incentives.

While there is substantial empirical evidence suggesting that in-work tax credits are an effective tool to increase participation of low-income workers (see Chapter 2), there is little empirical work that focuses specifically on older workers. One exception is Haan and Prowse (2010) who estimate a dynamic structural life-cycle model to examine the effect of the introduction of an in-work credit (similar to the US earned income tax credit) in Germany. They find that both a general (non-age restricted) in-work credit, and an in-work credit restricted to workers aged 60 and above, lead to the postponement of retirement. In general, it can be expected that an in-work credit for older workers is likely to discourage retirement as long as the credit provided is substantial enough.

As noted in Section 3.4, in-work tax credits have been introduced for older workers in a number of countries, either as "stand alone" measures or as extensions to in-work credit schemes in place for low-income workers. A number of the credits currently provide only a small financial benefit, suggesting that their impact on participation is likely to be relatively small. Additionally, some countries currently provide their in-work credit up to a certain age (*e.g.* the Danish scheme is provided only up to age 64). However, there is likely to be merit in providing the credit for continued years in the workforce beyond the "normal" retirement age also.

The main drawbacks of in-work credits are that they can be administratively complex and, if targeted at lower-income older workers, the withdrawal of the credit with income will create incentives for some older workers to reduce the number of hours they work. In many cases the credits currently implemented are not withdrawn, although this tends to result in a lower credit value being provided, and may conflict with goals associated with income support.

Exempting pension income from tax

A number of countries already exempt pension income from tax (income tax and SSC). One of the key effects of this is to sever the link between changes in pension wealth and the influence of taxation on work incentives. Where pension wealth increases with continued work, such an exemption will generally increase work incentives, but where pension wealth falls, the exemption will reduce work incentives. Nevertheless, in countries where pension parameters result in pension wealth varying substantially across income levels (such as in the Netherlands) or across potential retirement ages, and pension reform is not feasible, this may be a possible way of reducing the overall disincentives to continued work.

To avoid increasing retirement income, (and to minimise the fiscal cost of such an exemption), pension entitlements could be reduced correspondingly, so that net pension income stays approximately the same.[20] Where concerns exist regarding the influence of such an exemption on the progressivity of the income tax schedule, standard allowances or deductions (where present) could be adjusted downwards according to the level of pension income (as is the case, for example, in the Slovak Republic).[21]

Flat rate pension taxation

A final potential reform, also linked to the taxation of pension income, is to tax (public) pension income at a (low) flat rate rather than at higher progressive rates under the personal income tax. By reducing the tax paid on the increments to pension income associated with continued working, the financial return to working will increase. Increasing the tax paid on lower levels of pension income would also increase work incentives, however this would conflict with income support goals for lower income older people.

3.6. The effect of taxation on the demand for older workers

The availability of a job is obviously essential to the continued employment of an older worker. This may not be a significant issue for many workers continuing in the same job (due, for example, to the build-up of strong firm-specific skills, and/or strong employment protection laws). However, for workers that leave a job for some reason, re-employment may be difficult.[22] For example, workers in industries that have become obsolete due to technological change may find re-employment difficult as their skill-set may be highly

industry-specific. Younger workers from such industries may re-train, but this may be less practicable for many older workers who may instead opt to retire. Additionally, age-related skill atrophy may make some workers less employable than they previously were. Indeed, this may be a particular concern for low-skilled workers where a binding minimum wage may result in it being uneconomic for a firm to employ them.

Older workers may also struggle for re-employment due to age-based discrimination by employers – possibly because of the shorter length of time that older workers will work for a firm and hence the smaller return to the firm likely to be generated by any on-the-job training and the build up of firm-specific skills. To address such concerns, many countries have introduced strong labour market protection legislation to protect older workers. However, such legislation may be a two edged sword – while likely to assist workers already in jobs, there is evidence that such rules may negatively affect the re-employment prospects of older workers.[23]

The effect of taxes on job availability

Tax is likely to play a role in these cases by increasing the labour costs associated with employing older workers. While incidence is an empirical issue, it is unlikely that taxes (including SSC) are entirely borne by employees, hence the imposition of a tax will increase total labour costs and labour demand will fall. Again, this is especially likely in the case of low-skilled workers. As discussed in Chapter 1, wage floors created by unionised wage bargaining, or the presence of a relatively high minimum wage may prevent employer SSC from being passed on to the employee, making it uneconomic to hire them, given their productivity level.[24] That said demand side problems are likely to reduce in the future as labour becomes scarcer as a result of population aging.

Tax measures to increase demand for older workers

14 OECD countries have introduced tax measures to increase demand for older workers. These measures are summarised in Table 3.2. In most cases (12 of 14 countries) they take the form of a reduction in employer SSC, whether via a reduced rate, an exemption, a fixed amount reduction, or a reimbursement of SSC after initial payment.[25] In Mexico, an enhanced tax deduction against the employer's income tax liability is given, while in Finland a subsidy is provided to employers via the tax system (and hence it is considered here).[26] A number of countries also provide similar non-tax measures, such as wage subsidies, to employers to encourage the employment of older workers (for example, Belgium, Spain and Sweden).

Table 3.2 shows that the measures introduced vary considerably. Many countries target measures at new hires, reflecting concerns about the reduced re-employability of unemployed older workers as compared to unemployed younger workers. This is the case in Germany, Hungary, Luxembourg, the Netherlands, and Slovenia. Many of these countries also require the worker to have been unemployed for a minimum length of time. For example, Slovenia requires the worker to have been unemployed for at least one year.

Other countries provide (generally smaller) reductions for all older workers. This is the case in Austria, Finland, Ireland, Mexico, the Slovak Republic and Sweden; while Belgium, Poland and the Netherlands provide separate measures for both new hires and all workers over a certain age. For example, Poland applies a permanently reduced employer SSC rate on workers of early pension age (60 for men, 55 for women) to encourage the general employability of older workers, but also a one-year reduction for new hires aged 50 or over

Table 3.2. **Tax measures to increase labour demand for older workers, 2010**

	Concession type	Size of concession (per year)	Age	Eligibility criteria	Duration
Austria	Employer SSC	17.3% (instead of 21.7%)	58/60 +[1]	All workers	Unlimited
Belgium (1)	Employer SSC	Max. EUR 400	50+	All workers	Unlimited
Belgium (2)	Employer SSC	EUR 1 600 to EUR 4 000	45+	New hire	5¼ years
Finland	Subsidy (via tax system)	44% of wage between EUR 900 and EUR 1 600; withdrawn at 55% above EUR 1 600	54+	All workers	Unlimited
Germany	Employer SSC	50% reduction in employer SSC	50+	New hire, previously long-term unemployed	3 years
Hungary	Employer SSC	Year 1: exempt; year 2: 10% (instead of 27%)	50+	New hire	2 years
Ireland	Employer SSC	Exempt	66+	All workers	Unlimited
Luxembourg	Employer SSC	Full reimbursement	45+	New hire, previously unemployed for 1+ months	Unlimited
Mexico	Tax deduction	125% deduction of wages	65+	All workers	Unlimited
Netherlands (1)	Employer SSC	EUR 6 500 per year	50+	New hire, previously entitled to benefit payments	3 years
Netherlands (2)	Employer SSC	EUR 2 750	62+	All workers	3 years
Poland (1)	Employer SSC	15.88% (instead of 18.43%)	60+, 50+ for women	All workers	Unlimited
Poland (2)	Employer SSC	15.88% (instead of 18.43%)	50+	New hire	1 year
Slovak Republic	Employer SSC	31.2% (instead of 35.2%)	62+	All workers	Unlimited
Slovenia	Employer SSC	Full reimbursement	55+	New hire, previously unemployed for 1+ years, or occupation in excess supply	1 year
Spain (1)	Employer SSC	EUR 1 200	45+	New hire, previously unemployed	Unlimited
Spain (2)	Employer SSC	EUR 4 100	45+	Temporary contract	Length of contract
Spain (3)	Employer SSC	50% reduction in SSC, increasing by 10 percentage points each year (max. 100%)	60+	Workers with 5+ years employment in the business	Unlimited
Sweden	Employer SSC	10.21% (instead of 31.42%); exempt if born before 1937	65+	All workers	Unlimited

1. Exemption from unemployment insurance contribution of 3% from age 58; and accident insurance contribution of 1.4% from 60.
Source: Responses to questionnaire issued to Country Delegates to Working Party No. 2 of the OECD Committee on Fiscal Affairs.

in order to encourage the re-employment of older workers. Similarly, Belgium provides a small permanent SSC reduction for all workers aged 50 and over, and a larger time-limited reduction for new hires (aged 45 and over). A particular motivation behind the Belgian reductions was the presence of automatic age bonuses in many wage bargaining agreements that often result in high labour costs of older workers that may exceed their productivity (as the age bonuses are unrelated to performance).

Spain has an extensive set of employer SSC reductions. To encourage the re-employment of older workers, a fixed employer SSC reduction is provided for permanent new hires, and a larger reduction for temporary new hires. Spain also provides a concession specifically to encourage retention of older workers within a business. This provides a large reduction in SSC for all workers aged 60 or over who have at least five years work history in that business. The reduction begins at 50 per cent and then increases each year by another 10 percentage points until reaching a full 100 per cent reduction.

Both the age of eligibility, and the generosity of measures also vary across countries. Most countries target their measures at workers in their 50s. However, some provide reductions for employment of workers as young as 45, while others are restricted to workers aged in their 60s.[27] Measures targeted at new hires tend to have lower age requirements than measures aimed at older workers in general. Measures targeted at new hires also tend to be larger but temporary, whereas measures targeted at older workers in general tend to be smaller but of longer duration. An exception is the Spanish reduction for

retaining older workers which is likely to be more generous for many retained workers than the reductions for new hires.

The rationale for Ireland's employer SSC exemption contrasts with the other measures discussed. In Ireland employers are exempt from Pay Related Social Insurance (PRSI) contributions for employees aged 66 and over. While this does have the effect of reducing labour costs for older workers, it was not introduced to encourage employment of older workers, but rather on the grounds that these are contributions towards the employee's pension which can no longer increase as of age 66.

Box 3.3. **Assessing the effectiveness of tax measures to increase demand for older workers: Finland**

Box 2.5 discussed a number of studies from different countries that examine the effectiveness of tax measures, particularly employer SSC reductions, at increasing demand for low-skilled workers. These studies generally find such measures to have a positive effect on low-skilled employment. There is only limited evidence looking specifically at the success of tax measures in increasing the employment of older workers. However, two recent studies have been undertaken regarding Finland's tax-administered employer subsidy. Huttunen *et al.* (2009) follow a difference-in-difference approach to investigate the impact of the Finnish wage subsidy on employment. They find that the subsidy was not effective in increasing employment of low-wage older workers, though it appears to have increased hours worked in the industrial sector.

Following a similar approach, Karikallio and Volk (2009) find that the subsidy did have a small positive effect on the employment of older workers in the public sector (mainly in municipalities), but had no significant effect on employment in the private sector. Most of the effect in the public sector was due to the lengthening of careers and increasing of hours worked, as opposed to increased hiring of older workers. A survey of businesses carried out as part of the study suggests that ignorance of the subsidy was a major reason for low take-up in the private sector.

Notes

1. For example, OECD projections suggest that in 2047, on average, there will be just two workers supporting each pensioner in OECD countries, compared to seven in 1950.
2. In Italy, Luxembourg, Turkey and New Zealand the pension can be combined with employment without any penalty.
3. In practise, an actuarially neutral system will be based on average life expectancy for the population, so will not be actuarially neutral for all individuals. An individual with a shorter than average life expectancy will still be better off retiring early, while an individual with a longer than average life expectancy will be better off by deferring retirement.
4. See OECD (2011b) for an in depth review of the design of pension systems in OECD countries.
5. Blöndel and Scarpetta (1999), in a study of 15 OECD countries, find evidence of unemployment benefits negatively affecting participation rates of male workers aged 55-64, but find little evidence of disability benefits or early retirement schemes affecting retirement decisions. Nevertheless, they note increases in disability numbers across the 15 OECD countries considered, despite general health statistics also improving. Duval (2003) finds evidence of unemployment, disability and early retirement schemes inducing early retirement amongst 55-59 year olds.
6. Blöndel and Scarpetta (1999) also consider the effect on participation rates of a broader implicit tax rate incorporating, in addition to pension benefits, unemployment-related benefits available prior

to entitlement to old-age pension benefits. Again, a significant positive relationship is found between participation rates of males aged 55-64 and this broader implicit tax rate.

7. See OECD (2011b). The OECD pension models rely on the APEX (Analysis of Pension Entitlements across Countries) infrastructure originally developed by Axia Economics, with funding from the OECD and the World Bank.

8. Note that France, Greece and Norway have made significant reforms to their pension systems since 2008. These reforms are not taken account of in the results presented in this chapter. In France in 2010 the legal pension age was increased gradually from 60 to 62. At the same time, the full rate pension age was increased from 65 to 67. The minimum age for early retirement, dedicated to long careers, was also raised by two years. These reforms are phased in over the 1951 to 1956 generations. The contribution time required to receive a full pension has also been raised and will reach 41.5 years starting from the 1960 generation. In Greece, a new pension law was passed in July 2010 with the purpose of ensuring the pension system's medium and long-term sustainability. The reform overhauls the country's existing private and public systems. The reform introduces a unified statutory retirement age of 65 (effective from 2013) and increases the minimum early retirement age to 60 (from 2011). Additional changes include: increasing the minimum contribution period for retirement on a full pension from 35-37 to 40 years of employment (from 2015); cutting pension benefits by six per cent a year for people retiring between the ages of 60 and 65 with less than 40 years of pension contributions; cutting the average annual accrual rate from two to 1.2 per cent; eliminating the 13th and 14th monthly pensions; and extending the calculation of pensionable earnings from the last five years to the lifetime earnings. In Norway, significant reforms to the public old age pension come into effect in 2011. In the new system, pension earnings are based on lifetime income between 13 and 75 years (rather than the best 20 years). Persons who have no or low pension earning will have their earnings-related pension supplemented by a guarantee pension. Additionally, flexible retirement between 62 and 75 years based on actuarial neutrality is introduced for new pensioners, with the annual pension increasing the longer retirement is deferred. Additionally, a life expectancy adjustment is introduced for new pensioners, and wage indexation (less 0.75 per cent) of pension payments is introduced for all pensioners. Those born after 1962 will be covered by the new system, while those born before 1954 will be covered by the current pension earning rules. The cohorts born between 1954 and 1962 will have their pensions calculated partly by the current rules and partly by the new rules.

9. As pension provisions may vary for men and women, so may pension wealth and financial incentive to retire calculations. Pension wealth and financial incentive to retire calculations for women were not yet available at the time of publication. However, the forthcoming paper by D'Addio and Whitehouse (2011) will provide results for women from the OECD pension models.

10. Many countries also provide tax concessions for private pension income. An analysis of such concessions is beyond the scope of this report.

11. In the Slovak Republic, working pensioners are eligible for the same basic tax allowance as other taxpayers. However, because pension income is exempt from income tax, the allowance is reduced by the sum of pensions received (the tax allowance of a working pensioner equals the basic tax allowance less pension income).

12. Note that, as of 2011, the tax limitation rule is replaced by a special tax allowance for old age and early retirement pensioners. This allowance is withdrawn only against pension income, as opposed to all income (as under the tax limitation rule). The tax limitation rule still applies to disability pensioners,

13. For a pensioner under 75: for income from EUR 7 501 to EUR 15 000, the tax credit equals 1 255 + 470 * (15 000 – net income)/7 500; from EUR 15 001 to EUR 55 000, the credit equals 1 255 * (55 000 – net income)/40 000. For a pensioner over 75: from EUR 7 751 to EUR 15 000, the tax credit equals 1 297 + 486 * (15 000 – net income)/7 250; from EUR 15 001 to EUR 55 000, the credit equals 1 297 * (55 000 – net income)/40 000.

14. The inclusion of pension income in the tax base (currently at 56 per cent in 2010), will increase until it reaches 100 per cent in 2040. It increases by 2 percentage points every year until 2020, and then by 1 percentage point until fully implemented in 2040. At the same time, the taxation of contributions to, and returns generated from, private pension schemes is steadily being reduced. These reductions will be fully implemented well before the increases in the taxation of distributed pension income, effectively creating an additional concession towards pension saving (in addition to the timing benefit from moving from a TTE to an EET system).

15. This ceiling has been criticised by the Danish Economic Council (2008) on the grounds that workers aged 57-59 have strong incentives to reduce their income in order to fall below the ceiling and access the credit when aged 64. The Council therefore has recommended the removal of the ceiling.

16. Nevertheless, it should be borne in mind that while employer SSC reductions have not been targeted at employees, the long-run incidence of employer SSC reductions may be partly (or fully) borne by employees in terms of higher wages. Equally, part of reductions in employee SSC may in the long-run be borne by employers in the form of downward adjustment in wages, with the final incidence depending on the relative bargaining strength of employers and employees.

17. Australia and New Zealand do not levy SSC. However, both countries have mandatory payments similar in nature to SSC. New Zealand imposes a mandatory levy of 1.3 per cent of earned income for private accident insurance. This is not due on pension income. Similarly, Australia's medicare levy, which is not considered a SSC, has a higher phase in threshold for older people.

18. This point is emphasised by Keenay and Whitehouse (2003).

19. The primary reform for workers under 60 in most countries is likely to be to reduce the availability of unemployment and disability benefits, and early retirement schemes as paths into early retirement.

20. Given the progressivity of most tax systems, individuals receiving larger pensions would tend to gain more from an exemption. This could be mitigated by an age based concession for lower-income pensioners that could be used against other sources of income or cashed out if no other income source existed.

21. A more complex alternative approach (again, where pension reform cannot be undertaken) could be to "harmonise" the taxation of older workers with the pension system. That is, in countries where pension taxes increase the financial return to work (generally when pension wealth falls with continued work), taxes on pension income could be increased, for example by removing any exemptions, deductions or tax credits currently in place. Meanwhile, in countries where pension taxes decrease the financial return to work (generally when pension wealth increases with continued work), taxes on pension income could instead be reduced. Before undertaking such a reform, detailed analysis would need to be conducted across different prospective retirement ages and different income groups to determine that the effect of pension taxes is constant across the entire target group of older workers. The analysis in Section 4.3 suggests this is only likely to be the case for a very limited number of countries (for example, Greece or Korea). If implemented in countries where the effect of pension taxes on the financial return to work varied (such as in the Netherlands or Belgium), incentives to work would be increased for some workers and decreased for others. As noted above, for such countries a better approach may be to exempt pension income from tax. A better solution, overall, of course, would be an actuarially neutral pension reform.

22. See, for example, Daniel and Heywood (2007).

23. See, for example, Lahey (2008) for evidence on the US. Neumark (2008) surveys the literature on old-age worker discrimination.

24. For example, Blöndal and Scarpetta (1999) argue that union bargaining in industries with intermediate levels of centralisation may result in reduced employment of older workers as the negative impact of higher wage demands are not fully taken account of in wage negotiations.

25. Most countries provide reduced rates, exemptions or fixed reductions that reduce or eliminate the amount of SSC the employer pays to the tax administration. In contrast, employers in Luxembourg and Slovenia make normal SSC payments to the tax administration and are later provided with a reimbursement. In Slovenia the reimbursement is provided by the Employment Service of Slovenia.

26. The employer calculates and retains the amount of the subsidy from the taxes they have withheld from the employee on behalf of the tax administration. Note that this subsidy was temporary and expired at the end of 2010.

27. The employer SSC reduction for new hires in Luxembourg actually begins at age 30, but increases in generosity for workers aged 40+, and 45+. Only the reduction for age 45+ is described in Table 4.1. Similarly, the German employer SSC reduction is available for workers younger than 50, but for such workers the bonus is only paid for one year instead of the three year period for older workers.

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Chapter 4

The Taxation of Mobile High-Skilled Workers

This chapter looks at the international dimension to the taxation of employment income, particularly in relation to high-skilled individuals. Globalisation and the growth of MNEs have, empirical evidence suggests, increased the extent to which corporate income tax rates and regimes affect the location of investment (see, for example, Altshuler *et al.*, 2001; OECD, 2007c). But have such trends had an impact on labour markets and is a global market for "talent" developing? The attractions of the US market for skilled (English-speaking) workers has, for instance, been suggested as a possible explanation for trends in top incomes in English-speaking countries showing similar trends to the United States (albeit to a less marked degree).

The chapter reviews the (limited) evidence on whether international competition has been a source of downward pressure on PIT rates. It then looks in more detail at inward migration; and in particular at the rationale for more targeted tax regimes to attract high-skilled foreign workers and the form such regimes take in OECD member countries.

As of 2010, targeted tax concessions for high-skilled workers have been introduced in 15 OECD countries. In a number of countries, concessions have been introduced to reduce the effect of tax on migration decisions. This has particularly been the case in high-tax countries aiming to become more competitive destinations for high-skilled workers, and in countries concerned about particular tax rules discouraging high-skilled workers from locating in a country. Meanwhile, other countries have used tax concessions to actively attract and/or retain high-skilled workers. Reasons for such active policies may include an expectation of positive knowledge-related spillovers or fiscal gains, and concerns about skill shortages. Tax concessions will not always be warranted, however. Indeed, design difficulties may limit the effectiveness of tax concessions, while often more direct policy tools may be available for addressing a particular policy concern. Furthermore, tax concessions will create equity concerns by treating differently high-skilled and less-skilled workers, and often foreign and domestic workers.

In countries that have introduced concessions, the design has generally been driven by the particular policy goal of the concession, and hence varies significantly across countries. The chapter discusses the main design features of concessions introduced for mobile high-skilled workers in OECD countries, highlighting the key issues faced by tax policy makers.

In this chapter, migration is assumed to involve a change in both country of residence and country of employment, thereby excluding the case of a worker who commutes to another country. Unless otherwise specified, a high-skilled worker is defined as a worker possessing a tertiary qualification or engaged in work that usually requires a tertiary qualification. A high-skilled worker will often also be a high-income worker. Consequently, tax concessions applying to high-income workers are also considered in the chapter. The chapter draws heavily on responses to a questionnaire issued in early 2010 to Country Delegates to Working Party No. 2 of the OECD Committee on Fiscal Affairs (the "*tax and*

employment study questionnaire"). The questionnaire sought information as of 1 January 2010 and information on tax rules relates to that date unless otherwise specified.

The chapter is structured as follows: Section 4.1 provides background on the mobility of high-skilled workers. Section 4.2 considers the impact of tax on migration decisions and the resulting implications for tax policy. Section 4.3 considers possible arguments for and against introducing targeted tax concessions for high-skilled workers, while Section 4.4 examines the design of targeted tax concessions that have been introduced in OECD countries.

4.1. The mobility of high-skilled workers

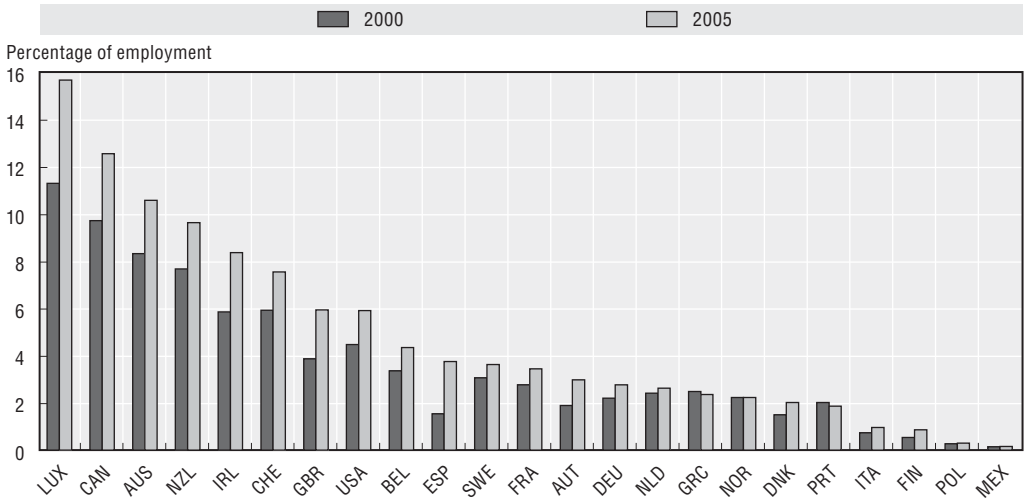
Tax systems in most OECD countries have generally been developed under the assumption of an immobile labour base. This immobility resulted largely from the significant costs associated with migration, and meant that it was unlikely for tax differences between countries to have any significant impact on the location of labour. However, in the last 15 to 20 years, a number of factors have led to the increased mobility of labour, particularly high-skilled labour. First, migration costs have reduced significantly. These include both reduced monetary costs (such as transportation and set-up costs) as well as reduced psychological costs relating to moving away from family and social networks (largely due to improved, and more affordable, information and communications technology).[1] Second, education standards in source countries (particularly developing countries) have improved increasing the potential supply of high-skilled workers. Third, the growth of multinational enterprises has made markets for managers, scientists and other professionals more international, thereby increasing international demand for high-skilled workers.[2] This section briefly provides supporting evidence of an increase in the mobility of high-skilled workers.

There are a number of difficulties with obtaining internationally comparable migration flow data for high-skilled workers.[3] However, stock data of foreign-born high-skilled workers can be used to provide indicative evidence of both the level of mobility, and how it has changed in recent years. Figure 4.1 compares the number of foreign-born high-skilled workers resident in 23 OECD countries (as a percentage of employment) in 2000 and 2005. High-skilled workers are defined as workers who have completed at least the first stage of tertiary education.[4] Figure 4.1 shows that there has been an increase in the stock of foreign-born high-skilled workers in almost all of these countries (20 out of 23 countries for which data are available). Furthermore, Figure 4.1 also shows that the aggregate stock of foreign-born high-skilled workers now constitutes a significant proportion of workforces in many of these countries (more than five per cent of employment in eight of 23 countries). This suggests a significant degree of mobility of high-skilled workers.

4.2. The effect of tax on migration decisions

Given the increased mobility of high-skilled workers illustrated in the previous section, it is possible that tax differentials may now play a far more significant role in migration decisions than in the past. Nevertheless, the decision to migrate is still very complex and is influenced by a large number of factors. This section examines the extent to which tax may influence the migration decisions of high-skilled workers, considering both theoretical and empirical evidence, and considers the potential implications of tax-induced migration for tax policy.

Figure 4.1. **Stock of foreign-born high-skilled workers as a percentage of employment, 2000-2005**



Source: OECD Database on Immigrants in OECD Countries (DIOC).

StatLink http://dx.doi.org/10.1787/888932483068

Migration theory

While it is clear that a large number of factors influence migration decisions, there is no one agreed theory of migration. Instead there are several different theories with each providing some insights into the drivers of migration.[5] While standard neo-classical migration theory suggests that tax is likely to play a role in migration decisions, other theories suggest little role for tax.

The standard neo-classical theory of migration focuses on wage differentials as the driving factor in migration decisions. Individuals effectively undertake a cost/benefit analysis – assessing the expected return from migration, taking account of both the probability of gaining employment after migrating and the expected return from that employment (as opposed to at home), against the cost of migrating.

Under this theory, tax can be expected to influence the migration decision through its impact on the expected net wage in the home and foreign country. Higher taxes in the foreign country will lower the expected net wage and hence the expected return from migration, thereby discouraging migration. Conversely higher taxation at home will increase the expected return from migration, thereby encouraging migration. Given that most OECD countries have progressive tax systems, neo-classical theory also implies that high-skilled workers (who will generally earn higher incomes) are more likely to migrate due to tax differentials than lower income workers.

Extensions of the neo-classical approach allow for both monetary and non-monetary costs and benefits of migration. In addition to wage differentials, location-specific advantages, such as a better climate and better public good provision factor in on the benefit side. Migration costs include monetary costs such as visa fees, transportation costs and living costs while looking for work, as well as the monetary and psychological costs associated with adapting to a new culture and possibly a new language, and the psychological costs associated with moving away from family, friends and other social and cultural networks.

The interaction between public good provision and taxes is likely to be particularly important in determining the effect of taxation on migration decisions. Indeed, this interaction has been emphasised in the Tiebout (1956)-inspired local public goods literature, where individuals are posited to choose their location within a country based on the tax-local public goods mix that best matches their preferences.[6] A similar, if smaller, interaction may also be expected at the international level. For example, high taxes may be less likely to encourage outward migration where they pay for public goods valued by the taxpayer. That said, the progressivity inherent in most tax systems implies that many (highly paid) high-skilled workers will receive less benefits from public expenditure relative to the tax they pay as compared to (lower income) less-skilled workers, and may therefore find jurisdictions with less progressivity more attractive.[7] Some forms of public expenditure may favour the high-skilled though. For example, significant government expenditure on tertiary education or policing may reduce the likelihood that a higher tax burden would encourage outward migration of the high-skilled.

The migration decision may also be influenced by changes in social security benefit entitlements as a result of moving country. For example, in the absence of any agreement between countries for the mutual recognition of social contributions, permanent migration may result in reduced future pension benefits as compared to those that would have been received if the worker remained in the home country (as entitlement to future benefits already accrued from contributions made in the home country would effectively be "lost"). Temporary migration decisions may also be affected as contributions made in the temporary destination country may not contribute to either the home or destination country social security systems, providing no expected future return. Additionally, the period of absence from the home country may defer eligibility for pension entitlements on return (for example, if contributions are required to be made for a minimum number of years). In either case, migration may result in a significant loss of future pension benefits as compared to remaining in the home country, thereby discouraging both temporary and permanent migration.

One aspect not explicitly accounted for within the basic neo-classical wage differential framework is the taxation of capital income. For many high-skilled workers this may not be a significant issue, but for the subset of high-income high-skilled workers with significant capital income, this may be an important consideration.[8] Also, taxes imposed on the reimbursement of costs associated with migration (such as relocation expenses) may also reduce the return to, and thereby dissuade, migration.[9]

More recent theories of migration have taken a broader approach than neo-classical theory. In particular, the "new economics of migration" suggests that migration decisions are made at the family rather than individual level, and that a wage differential is not necessary for migration to occur because families may wish to diversify economic risks through migration even in the absence of wage differentials (Stark, 1991). For example, a family may wish to send one of its members to another country where labour market conditions are negatively or only weakly correlated with those in the home country. The "new" theory also suggests that families may be motivated not just by absolute wages, but also by their wage relative to that of other workers. These factors suggest that tax differentials may play a far more limited role, if any, in the migration decision than under neo-classical theory.

Other broader theories emphasise the importance of networks, and of cultural, political and historical links. Administrative factors such as a fast and/or simple immigration process, efficient skills recognition procedures, and rules on family immigration may also impact on migration decisions.

Whether tax has an impact on migration decisions is, in the end, an empirical question. We now turn to the empirical literature.

Empirical evidence on the effect of tax on migration decisions

This section considers the empirical evidence on the effect of tax on international migration decisions. Unfortunately, historical restrictions placed on the movement of labour have made empirical studies of the effect of tax on international migration difficult, and hence the empirical literature is relatively sparse. As such, this section largely relies on empirical evidence on the effect of taxation on internal migration decisions (in countries with decentralised tax systems) to draw inferences about the likely impact of tax on international migration decisions. Not only does looking at internal migration overcome the empirical problem created by restrictions on the movement of labour, but it removes cultural and language differences that are likely to have a strong influence on migration decisions. By effectively controlling for these factors, studies of internal migration are likely to provide some insight into the influence of tax on international migration. In particular, if tax has no significant impact on internal migration decisions where there are no cultural and linguistic obstacles (and where in some cases employment may not even need to change), then tax is likely to have very little impact on international migration decisions where such obstacles are in place.

One study of international migration is Wagner (2000). He compares a sample of Canadians living in Canada with a sample of Canadians living in the US, constructing estimates of the gross incomes and taxes that would have been paid if they worked in Canada. He finds that both gross income differences and tax differences affected households' decisions on whether to move from Canada to the US, and that this effect was stronger for more highly educated workers.

Turning to internal migration, tax differentials are only present in a limited number of countries that impose tax at both central and sub-central levels. Of these countries, Switzerland has the greatest variation in tax rates, and so unsurprisingly most empirical work has focused on it.[10] For example, Liebig and Sousa-Poza (2005), using micro-data for 1999-2001 from the Swiss Household Panel, find no significant tax effect on migration – with the dominant factors instead relating to housing. While Liebig and Sousa-Poza (2005) conduct their analysis for the entire population, Liebig, Puhani and Sousa-Poza (2007) consider 27 different subgroups distinguished by age, education and nationality/ residence permit. To do this they use micro-data from the 2000 Swiss census and the Swiss Wage Structure Survey to compare community of residence and income tax rates in 1995 and 2000 for over 1.5 million observations across more than 600 Swiss communities. They find the tax rate has a small but significant impact on migration decisions, with a generally larger effect for younger, highly-educated workers than for older less-educated ones. In particular, the tax rate has a strong impact on young Swiss college graduates, with an increase in tax rates of one percentage point implying an out-migration of 33 out of 1 000 young Swiss college graduates. Schmidheiny (2006) also uses micro-data and finds similar results, as do earlier studies using macro-data by Kirchgässner and Pommerehne

(1996) and Feld and Kirchgässner (2001). In contrast, Feld (2000) finds no support for tax influencing migration decisions.

While sub-central tax differentials are smaller in other countries, there is some evidence from the US and Canada also supporting tax induced migration. For example, Hsing (1995) uses 1990 US census data to analyse the impact of welfare benefits and tax burdens on interstate in-migration rates. He finds that a one per cent increase in the state tax burden reduced in-migration by 1.32 per cent. Gius (2011) uses US National Longitudinal Survey of Youth (NLSY) micro-data to investigate state migration between 1993 and 1994, 2000 and 2002, and 2004 and 2005. State taxes were estimated based on income figures provided in the NLSY dataset. He found that individuals were more likely to move to states with lower income tax burdens. Most recently, Young and Varner (2011) use micro-data for New Jersey to investigate the migration response of top income earners to an increase in the top state tax rate in 2004. The increase applied to only the very highest earners (USD 500 000 or more). They find minimal responsiveness amongst top income earners in general, although those of retirement age or who earn their income from investments were found to be more responsive. Meanwhile, for Canada, Day and Winer (2006) use aggregate migration data for 1974-96, and find that provincial tax rates have a small effect on internal migration. Surprisingly, the effect is smallest for high-income workers.

While this literature is to an extent mixed, it suggests that tax can affect migration decisions, especially for the high-skilled, but that this effect is likely to be relatively small. This is unsurprising given the number of other factors that affect the migration decision. However, as mobility continues to increase it is likely that the influence of tax on migration decisions will also increase. This poses a number of issues for tax policy.

Implications for tax policy

The conclusion that tax can affect the location decisions of high-skilled workers has two main implications for tax policy: first, it places pressure on the ability of governments to redistribute income; and second, it creates a number of potential rationales for introducing tax concessions for high-skilled workers.

Pressure is placed on the ability of governments to redistribute income due to the potential for tax differentials between countries to encourage high-skilled workers to migrate to other countries. To avoid the associated costs of this migration, countries may need to reduce the tax burden faced by high-skilled workers – thereby reducing the progressivity of the tax system and the ability to redistribute income. Meanwhile, a case may be created for introducing tax concessions for high-skilled workers for two broad reasons: first, to minimize the costs associated with the tax system discouraging high-skilled foreign workers from immigrating; and second, a case may be argued for the use of tax concessions to attract foreign workers to immigrate for one of various non-tax reasons.

While it is difficult to isolate the impact of increased labour mobility on the overall progressivity of income tax systems in OECD countries, the impact of increased labour mobility can clearly be seen in the introduction of tax concessions aimed at mobile high-skilled workers in many OECD countries. Consequently, these tax concessions are the predominant focus of the remainder of this chapter. Below we consider in more detail the implications of a mobile labour base for tax policy, before focusing specifically on tax concessions for high-skilled workers in remaining following two sections.

The impact of labour mobility on income tax progressivity and redistribution

If the tax system of a country induces some high-skilled nationals to emigrate (or deters some foreign high-skilled workers from immigrating) then this creates a cost in terms of lost output, tax revenue, and possibly other positive spillover benefits associated with the presence of those high-skilled workers in the country. To minimise such costs governments may wish to reduce the tax burden on mobile high-skilled workers. While this is a viable approach for high-skilled immigrants (as they can be clearly distinguished from high-skilled nationals), it is more difficult for emigrants as in most cases potential emigrants cannot be easily distinguished from immobile high-skilled nationals. The consequence of this is that in order to reduce the tax burden of potential high-skilled emigrants, the tax burden of all high-skilled nationals would need to be reduced. This may have an impact on a government's redistributional goals, requiring a trade-off between reducing the potential losses from tax-induced migration and achieving the desired level of income redistribution.

From a theoretical perspective this efficiency-equity trade-off has been considered extensively in the optimal income taxation literature (see, for example, Mirrlees, 1982; Wilson, 1982; Simula and Trannoy, 2010). This literature, based on the original work of Mirrlees (1971), formally models the efficiency-equity trade-off where mobile and immobile nationals cannot be distinguished, and derives optimal income tax rates for a given redistributive preference. The general consensus from this literature is that the risk of emigration will lower optimal tax rates (as compared to those for a closed economy), but that average tax burdens on skilled nationals can still be substantial (Wilson, 2009). In particular, where the mobile element of a population is relatively small, a government may be willing to lose these skilled workers to ensure substantial tax revenue continues to be generated from the majority of skilled workers that remain. This is consistent with the sizeable tax rates on high-income workers in many OECD countries.

An alternative way of reducing the cost of tax induced emigration is to tax emigrants. In an optimal income tax framework, Mirrlees (1982) shows that, where possible, taxing emigrants is preferable to pure source based taxation. However, taxing emigrants poses many administrative difficulties so that few countries attempt to do so (Wilson, 2009). Indeed, the only OECD country that attempts to tax emigrants is the US.[11] However, in recognition of the administrative difficulties this entails, substantial deductions are provided to emigrants resulting in only very high-income emigrants (with income above USD 91 500 in 2010) having any US tax liability, thereby excluding many high-skilled emigrants.

A tax on emigrants has also been suggested by Bhagwati (1972),[12] in the context of workers moving from less developed to developed countries, to compensate for the lost return on the source country's investment in human capital (via public funding of education). Determining the appropriate size of such a tax would be difficult as the sending country may also receive benefits from high-skilled migration in terms of remittances, return migration and by increasing incentives for human capital development (OECD, 2008). Again, administration of the tax would be a key difficulty.

Introducing tax concessions for high-skilled workers

Unlike mobile high-skilled nationals, mobile high-skilled foreigners can generally be easily distinguished from immobile high-skilled nationals. As such, they can be targeted with specific tax concessions to reduce the extent to which international tax differentials

dissuade high-skilled immigration that would have occurred in the absence of those tax differentials. By not altering the taxation of high-skilled nationals, no significant compromises need to be made regarding the redistributional preferences of the government.

Additionally, by being able to influence migration decisions, the tax system becomes a potential policy tool for addressing a number of broader migration-related policy concerns. These include capturing positive externalities associated with the presence of high-skilled workers, addressing perceived skill shortages, capturing fiscal gains and complementing other tax policies. While, in general, more direct solutions should be favoured, it may be that these policy concerns justify the introduction of tax concessions for some high-skilled workers, where the perceived benefits outweigh the costs of moving away from uniform tax treatment of all workers.

In some limited circumstances, tax concessions could also be used to attempt to retain high-skilled nationals that would otherwise have emigrated (either due to international tax differentials or for non-tax reasons). Again, though, this would be difficult due to the inability to distinguish between mobile and immobile high-skilled nationals. One indirect way of achieving this may be through the use of tax concessions for income types that are more likely to be received by high-skilled workers than less-skilled workers (for example, employee stock options).

The arguments for and against tax concessions are considered in more detail in the next section.

4.3. Tax concessions for high-skilled workers: arguments for and against

Targeted tax concessions for high-skilled workers have become increasingly common across the OECD, with 16 OECD countries, as of 2010, having now implemented some form of tax concession. This section and the next focus on these concessions. First, this section considers various rationales for and against introducing tax concessions. The following section then considers the detailed design of the concessions that have been introduced across the OECD, drawing heavily on country responses to the *tax and employment study* questionnaire.

As discussed in Section 4.2, there are two broad rationales for introducing tax concessions for high-skilled workers: to reduce the effect of tax on migration decisions; and to attract and/or retain high-skilled workers. Each is discussed in turn below, with country examples provided where relevant; however discussion of the details of specific schemes is left for Section 4.4. Arguments against the introduction of tax concessions for high-skilled workers are then discussed, again with country examples provided where relevant. In the end, the decision whether or not to introduce a tax concession requires a careful weighing of these different arguments, taking account of country specific circumstances.

Reducing the effect of tax on migration decisions

A number of countries have introduced tax concessions in order to reduce the effect of tax on the migration decisions of foreign high-skilled workers considering immigrating. This is particularly the case when aspects of countries' tax systems are seen to discourage high-skilled workers from locating in the country. Examples include high-tax jurisdictions aiming to increase their competitiveness for high-skilled workers; countries aiming to reduce impediments to high-skilled migration created by specific tax rules, and countries responding to the introduction of concessions in other countries.

Increasing competitiveness of high-tax jurisdictions for high-skilled workers

As already noted, tax systems across the OECD have typically been designed with immobile permanent residents in mind. As such, progressive tax systems have been implemented to achieve equity goals, with high income earners often facing very high tax burdens. With a more mobile base, tax differences between countries on labour and/or capital income may have a non-negligible influence on migration decisions. This may be a particular problem for countries with more redistributive systems and/or greater public expenditure that require relatively higher tax rates on high incomes than other countries (although the level of public expenditure may mitigate the negative effect on migration incentives where it matches workers' preferences).

Introducing a tax concession specifically for high-skilled workers may be an attractive solution as it may reduce the disincentive for high-skilled workers (and possibly MNE head offices) to locate in a country while enabling the country to largely retain its desired level of redistribution and public expenditure.[13] In this way a tax concession for high-skilled workers may be seen as a means of making a high tax jurisdiction sustainable in the presence of mobile labour. Such concerns were, at least in part, behind the introduction of tax concessions in Belgium, Denmark, Finland and Sweden. Additionally, it was also considered important in Belgium, Finland and Sweden to maintain competitiveness with regard to the location decisions of MNEs.

Reducing impediments to migration created by specific tax rules

Another reason for introducing tax concessions may be to reduce the impact of particular tax rules that may act to discourage high-skilled workers from locating in a country (even where the overall tax burden is relatively low). For example, the taxation of reimbursements for costs related to expatriation, or the imposition of social security contributions that provide little or no future benefit to temporary migrants may discourage high-skilled immigration, as may the complexity and risks associated with dealing with a new tax system – particularly regarding the treatment of capital income. In the case of social security contributions, there is also an equity rationale for reduced taxation, as it may be considered unfair to tax an individual who will receive no benefit from the expenditure funded by the tax. Similarly, regarding payments for expatriation costs, if the individual derives no private benefit from such payments (*i.e.* they only cover the increased costs associated with moving country) then it is arguable that they should not be considered as income.

Australia and New Zealand have both introduced concessions to minimise impediments to high-skilled migration created by the level and complexity of their tax rules for foreign source capital income, and the potential for double taxation. To reduce similar tax impediments, Belgium, France, the Netherlands and Switzerland have all introduced concessions targeted at employer payments for expatriate costs. Meanwhile, another factor behind the introduction of a concession in Sweden was the fact that many of the people receiving the concession would not receive any of the public pension and other future benefits from the state, which to a large extent are the reason for the relatively high taxes and social security contributions in Sweden, thus making the effective tax burden higher than on a Swedish national.

Responding to the introduction of tax concessions in other countries

Countries may also introduce tax concessions as a response to the introduction of tax concessions in neighbouring countries. In such cases, the absence of a tax concession may result in a country effectively having a relatively high tax burden on high-skilled workers as compared to those countries with tax concessions, thereby discouraging high-skilled workers from locating in the country. On the other hand, a country may also simply observe a successful policy in a neighbouring country and decide to mimic this, rather than acting out of concern for the impact that the other country's concession may have on their own competitiveness for high-skilled workers. Denmark, Ireland, Spain and Sweden all note that the fact that other countries had tax concessions in place was an important factor in their decision to introduce a concession.

Using the tax system to attract and/or retain mobile high-skilled workers

The increased mobility of high-skilled workers also opens up the possibility for countries to use the tax system to try to attract and/or retain high-skilled workers that would not otherwise have located in that country. Such active measures may be worthwhile where there is some form of positive benefit or externality associated with increasing the stock of high-skilled workers in a country, and where more direct means of capturing these benefits are not feasible. Potential rationales include: capturing positive knowledge spillovers, particularly from workers engaged in R&D activities; addressing skill shortages; deriving a fiscal gain; and complementing other government policies.[14]

Knowledge-related spillovers

Knowledge spillovers occur when high-skilled workers pass on new knowledge to fellow colleagues, thereby increasing the productivity of the domestic workforce. This knowledge is often in codified form, although high-skilled workers are potentially a more important source of tacit knowledge, such as "knowhow", that cannot easily be transferred without physical proximity. This knowledge may also "spillover" more widely to other geographically proximate individuals and organisations (OECD, 2002).

Knowledge spillovers may be particularly important regarding high-skilled workers engaged in R&D activities such as scientists, researchers and engineers. Furthermore, spillovers may be greater from the employment of foreign rather than domestic high-skilled workers as this encourages knowledge circulation and reduces the likelihood of research duplication. Related network spillovers may also result from increased R&D where the commercial value of a new technology depends on the development of a set of related technologies. In this situation, where a firm decides to undertake a related R&D project, this will increase the probability of a "critical mass" being reached to make the technology commercially viable.

Positive externalities, especially regarding R&D, played a role in the introduction of tax concessions in Denmark, Finland, Italy, Korea and Sweden, while R&D spillovers were the sole reason for introducing Belgium's tax concession for researchers, particularly given that most R&D expenditures relate to labour costs.

Skill shortages

Another potential rationale for providing tax concessions for high-skilled workers is to address skill shortages. Concerns about skill shortages have been raised in a number of

OECD countries due to recent large increases in the demand for high-skilled labour, combined with demographic changes reducing domestic labour supplies (Liebig, 2005).[15] Skill shortages may arise where labour markets are unable to immediately adjust to mismatches in demand and supply of skilled labour caused by external shocks. In a fully flexible market, the wage would simply adjust in response to a demand or supply shock until demand equalled supply again.[16] However, wages may be inflexible for various reasons. For example, market regulation may restrict the ability of wages to respond to an increase in demand. Meanwhile, even if wages do rise, significant education lags may prevent supply from immediately increasing to meet demand. Furthermore, government regulation may limit the number of workers trained with certain skills, restricting the ability of the labour force to respond to increased demand for those skills. The presence of a slow regulatory response to a demand shock, combined with lengthy education lags, may result in persistent skill shortages in various areas.

Migration may also be seen as a means of addressing certain regional skill-shortages. For example, some countries may have difficulties in filling certain posts in remote or rural areas despite there being a sufficient supply of workers with the required skill set in the country as a whole (to meet overall demand at the given wage). New migrants, however, may be willing to work in areas that domestic workers are not willing to, at the given wage. Additionally, political factors may result in some occupations being considered in short supply, creating a rationale for government to address the perceived shortage by encouraging migration. For example, political concerns over the perception (whether accurate or not) of a shortage of certain types of skills (for example, medical staff or teachers) may be sufficient to result in a government response.

Denmark, Finland and Ireland note that their tax concessions are designed, in part, to address skill shortages.

Fiscal gain

Another reason why it may be attractive for countries to attempt to increase their stock of high-skilled workers is that, in general, high-skilled workers will provide a fiscal gain to the destination country. As high-skilled workers will generally also be higher income workers, they will contribute significantly to the tax revenue of the destination country, even after taking into account the effect of tax concessions. At the same time, though, they will create only minimal cost to the destination country given the low marginal cost of most public goods, and also as their education will not have been funded by the destination country (unlike domestic high-skilled workers).[17] Finally, as long as they are young enough, high-skilled migrants will also be net contributors to the social security system in the destination country.

While the fiscal benefit is obvious for very high income workers, the fiscal benefit is likely to be present for many workers, not just the high-skilled and highly-paid. For example, Bonin, Raffelhüschen and Walliser (2000) calculate that immigrants to Germany aged 12 years and above will provide a net fiscal gain to Germany despite the education costs faced. The benefit peaks for migrants at age 30, and is still positive up to age 46 at which point social security payments result in a net cost of immigration. These calculations assume new migrants have the same characteristics as the current migrant population. A focus on high-skilled, and hence higher paid, workers will therefore likely provide even greater fiscal gain.

Complement other government policies

A final rationale for active measures to attract and/or retain high-skilled workers is to complement other government policies, including other tax incentives. In particular, many countries provide tax concessions on capital income to attract foreign direct investment, and/or retain domestic capital investment. Concessions for high-skilled workers may complement such measures by reducing production costs,[18] particularly for high-technology industries that rely on significant amounts of high-skilled labour, making FDI more attractive. Additionally, it may become more attractive for a multinational enterprise to locate its head office in a country that also provides tax concessions for the top staff.

Belgium, Finland and Sweden note that maintaining competitiveness with regard to the location decisions of MNEs was an important consideration in introducing their tax concessions. For example, in Belgium, the tax concessions introduced for high-skilled workers were partly intended to complement the now repealed Coordination Centre regime which provided low effective tax rates for MNEs in order to attract MNE headquarters to Belgium.

Arguments against tax concessions for high-skilled workers

The presence of one or more of the preceding positive rationales creates a prima face case for some form of government intervention to attract high-skilled workers. However, there are still a number of potential reasons why a tax concession may still not be justified. First, concessions may not be necessary due to an already highly attractive labour market. Second, tax concessions may not work due, for example, to limited labour mobility, or tax concession design difficulties. Third, even if they do work, there may be more efficient alternative policy measures available. Finally, in some cases concessions may not be justifiable on broader equity grounds.

Strong labour market characteristics

If the underlying characteristics of a labour market are strong enough to attract high-skilled migrants then a tax concession is unlikely to be warranted. Factors affecting the attractiveness of a country include the level of wages, language and cultural factors, quality of life, ability for permanent (rather than temporary) migration, and labour market opportunities for family members. While in some countries fiscal inducements may be required to balance out other factors making the destination potentially less desirable (*e.g.* lower wages, language and cultural differences), high wage countries, in particular, may find that liberal immigration policies will suffice to gain the desired level of high-skilled immigration.[19]

The US provides a prime example where the attractiveness of the labour market (in terms of wages, the ability to work in prestigious "industry-leading" businesses, and the general standard of living in the country) means that there is no shortage of supply of high-skilled workers wishing to work in the country. Indeed, restrictions are placed on the amount of high-skilled migration (reflecting broader immigration policy favouring family migration over labour migration).

Limited labour mobility

For some countries, the degree of responsiveness of foreign high-skilled workers may not be considered sufficient to justify the introduction of a tax concession to attract foreign

high-skilled workers. This may be due to a number of factors, for example language may significantly restrict the potential pool of foreign workers.

Germany provides an example where tax concessions have not been introduced due to the perceived limited mobility of high-skilled workers. This view is supported by research commissioned by the German Federal Ministry of Finance estimating tax elasticities of mobile production factors. The study by Feld *et al.* (2009) undertakes a meta-analysis of the international empirical literature. They conclude that while both capital and corporate profits are significantly negatively related to profit tax rates, high-skilled labour is far less responsive to taxation.

Design and targeting difficulties

Even where there is considered a prima face case for tax concessions, the design of the concession poses many difficulties. For example, when aiming to attract high-skilled workers, there is likely to be significant uncertainty as to what the optimum level of migration is. Furthermore, even if this is known with any degree of accuracy, it still needs to be determined just how substantial a tax concession will need to be in order for it to generate that optimal level of migration. This requires knowledge of the responsiveness of potential migrants to tax incentives, something that, as discussed in Section 4.2, is very difficult to ascertain given data limitations. Furthermore, the required increase and the responsiveness to financial incentives are likely to vary across different groups of potential high-skilled migrants. The result of this is that some inaccuracy must be accepted if government intervention is to proceed (whether via the tax system or some other mechanism). If this inaccuracy is too great then the measure may not be justifiable. Additionally, as discussed in more detail in the next section, the design of a concession may result in some complexity due to the need to target the concession based on the particular policy goal. This may lead to some uncertainty of application of the concession, reducing its effectiveness.

More efficient alternative policy measures

It should also be borne in mind that just because the tax system can address a problem does not necessarily mean that it should be used to address that problem. Where government intervention can improve on the market outcome, a cost-benefit analysis then needs to be undertaken to determine the most appropriate form of intervention. As a general rule, it is likely to be more efficient to address a particular market failure directly (*i.e.* at its source) than indirectly by inducing further distortions through the tax system to address the concern.

For example, it may be that a skill shortage can be better addressed through an education based solution than through the tax system. That said encouraging training is likely to be a slow process, with potentially continuous lags. Furthermore, education policies have limitations because part of the unskilled-population may not have the ability, or the desire, to train to the required skill level to address the shortages. Additionally, there may be internal mobility issues, in that a skilled-worker may be unable, or unwilling, to move to another region where a skill shortage exists. A second possible solution is to increase labour force participation rates, thereby addressing the demographic supply side problems. As noted in Chapters 1 and 2, there is significant scope for tax policy to encourage participation of second earners and low-income workers who currently often face significant work disincentives. Where such direct approaches are unable to fully

address the skill shortage, there may then be a case for migration to address the concern – and hence tax concessions may be justified. In particular, education policies appear unable to address short-term skill shortages, so migration appears an effective solution to short-term skill shortages.

Additionally, other tax solutions may be preferable to tax concessions for high-skilled workers. For example, lowering personal and/or capital income tax rates and shifting towards less mobile bases such as consumption and immovable property may be seen as better ways of making a country more competitive for high-skilled workers. At the same time, such reforms would be likely to have positive effects on growth (Johansson *et al.*, 2008).

Equity considerations

Finally, introducing a tax concession for high-skilled workers will raise equity concerns as it will result in differential tax treatment of high-skilled and less-skilled workers, and domestic and foreign workers. As such, concessions may not be considered politically acceptable in some countries, or may require limitations on the extent of the concessions. That said, where a tax concession enables a country to maintain higher tax rates on high-skilled nationals, the benefits in terms of greater income redistribution may mitigate or outweigh the costs in terms of reduced horizontal equity arising from the differential treatment of domestic and foreign workers.

Australia, Denmark, Korea and Sweden have all adjusted their tax concessions to account for equity concerns. These are discussed in more detail in the next section.

4.4. Tax concessions for high-skilled workers: key design issues

As already noted, 16 OECD countries have introduced tax concessions broadly targeted at mobile high-skilled workers. This section considers the design of these concessions, highlighting the key issues and trade-offs faced in their development.

In most cases, tax concessions are transparent with fixed criteria for eligibility, although some countries operate more discretionary regimes. Table 4.1 summarises the main features of tax concessions that have been introduced in OECD countries for mobile high-skilled workers, highlighting four key design features: the type of concession, whether it has a time restriction, the type of worker targeted, and the type of skill required. Table 4.1 clearly shows that the design of tax concessions varies significantly across countries. This reflects both the differing (and often multiple) rationales for introducing the concessions, and the practical trade-offs required to best achieve the various goals. Nevertheless, two broad design approaches can be identified: countries tend to have either introduced a specific concession (*i.e.* restricted to a particular type of income) but with broad targeting provisions, or a generic concession with narrow targeting provisions (*i.e.* restricted to a particular skill type or level). The approach taken has been driven by the particular policy goal of the concession.

Countries that aim to reduce tax impediments to migration associated with the taxation of a particular type of income have tended to adopt the first approach, introducing a very specific concession related to that particular type of income. These include tax exemptions on foreign sourced income, and deductions or exemptions for employer provided fringe benefits covering costs related to expatriation. As these tax impediments affect only high-skilled workers receiving that type of income, detailed targeting criteria are not required. Such an approach has been followed in Australia, Belgium (for the income

Table 4.1. **Tax concessions for high-skilled workers in OECD countries, 2010**

	Type of concession	Time restriction on eligibility for concession	Worker type	Skill requirement
Australia	Exemption from income tax on foreign sourced income	4 years	Temporary and permanent foreign migrants	–
Belgium (1)	75% exemption from wage withholding tax	–	Temporary and permanent foreign migrants	Research workers only
Belgium (2)	Income tax exemption for expatriate allowances or expense reimbursements	–	Temporary foreign migrants	Must perform activities that require special knowledge or responsibility
Denmark	Reduced tax rate on labour income (25% for 3 years, or 33% for 5 years at workers discretion)	3 or 5 years	Temporary foreign migrants (if the migrant stays beyond 3-5 years, they may be required to pay back some of the tax advantage)	Foreign scientists and key staff earning over DKK 63 800 per month
Finland	35% withholding tax on earned income, rather than state and municipal taxes	4 years	Foreign migrant who has not been resident in Finland in the previous 5 years	Employees with special expertise who earn over EUR 5 800 per month
France	Partial exemption from income tax for payments for installation costs	One-off	Foreign migrant sent by a foreign company to France	–
Ireland	Reduction in personal income tax due on earned income	–	Foreign migrant sent by a foreign company to Ireland	–
Italy (1)	90% exemption from personal income tax on earned income; this income is also not included in the IRAP tax base	3 years	Foreign migrants or Italian nationals returning to Italy	Researchers that have carried out documented research activities for at least two years
Italy (2)	80% (women) and 70% (men) exemption from personal income tax on earned income	3 years	EU or Italian nationals returning to work in Italy after at least two years abroad, having previously lived in Italy for at least two years	Tertiary educated; employed or self-employed for at least two years or studied abroad for at least two years
Korea	50% tax exemption on earned income	2 years	Temporary and permanent foreign migrants	high-skilled working for foreign investment corporation in a high-tech field
Netherlands (1)	Tax free allowance equal to 30 per cent of earned income	10 years	Temporary and permanent foreign migrants	Knowledge workers
Netherlands (2)	Tax free reimbursement of school fees for children attending international schools	10 years	Temporary and permanent foreign migrants	–
New Zealand	Exemption from income tax on foreign sourced income	4 years	Temporary and permanent foreign migrants or returning (after more than 10 years) New Zealand nationals	Available to all migrants or returning nationals (but only once in a lifetime)
Poland (1)	Deduction of 50% of income from artistic, scientific, sport or expert activities	–	–	Engaged in artistic, scientific, sport or expert activities
Poland (2)	Deduction of 20% of income from work involving transfer of copyright	–	–	Engaged in work involving transfer of copyright
Portugal	20% flat rate on earned income	10 years	Migrants (including Portuguese nationals) that have not been tax resident in Portugal in the previous five years	Income derived in high value-added scientific, artistic or technical activities defined by Ministerial order
Spain	Taxation under non-resident rules (reduced personal income and capital gains tax rates)	6 years	Non-resident migrants that have not been resident in Spain in the last 10 years	–
Sweden	25% exemption from income tax and SSC	3 years	Temporary foreign migrants (max. stay 5 years)	Experts/specialists, researchers, managers and other key personnel; also require some difficulty in recruiting such expertise in Sweden
Switzerland	Deduction of expatriate related expenses	5 years	Temporary foreign migrants (max. stay 5 years)	Managers or specialists
United Kingdom	Remittance basis taxation of foreign sourced income	–	Non-domiciled tax residents	–

Source: Responses to questionnaire issued to Country Delegates to Working Party No. 2 of the OECD Committee on Fiscal Affairs.

tax exemption for expatriates), France, the Netherlands (for the tax exemption for school fee reimbursements), New Zealand, and Switzerland.

In contrast, countries aiming to capture positive externalities and/or address skill shortages have tended to follow the second approach, adopting a very generic income tax

reduction (such as a reduced tax rate or exemption on labour income). This concession then has detailed targeting provisions to restrict eligibility to those workers most likely to generate the desired externalities or address the particular skill shortages. Such an approach has been followed in Belgium (for the income tax exemption for researchers), Italy, Korea, and Portugal.

The latter approach has also been adopted by high-tax countries looking to maintain competitiveness by reducing labour taxes on high-skilled workers towards those of other countries. To achieve this goal, a generic concession on labour income is sufficient. As the concessions in these high-income tax countries often have a secondary goal of capturing externalities, they tend to have narrow targeting conditions as well. Concessions in Denmark, Finland and Sweden have all followed this approach.

Irrespective of the broad design approach taken, most concessions are still effectively highly restricted – whether by the specificity of the concession itself, or the narrowness of the targeting provisions. A consequence of this is that the take-up of these "niche" schemes can be very low (see Box 4.1). A smaller number of schemes (such as the temporary tax exemptions for foreign sourced income in Australia and New Zealand) are broader in nature, and take-up of these schemes can be expected to be more substantial. While the degree of targeting, and hence take-up, is guided to a large degree by the policy goal of the particular scheme, the overall low take-up does raise some questions as to the effectiveness of the schemes.

Box 4.1. **Take-up of targeted tax concessions for high-skilled workers**

Information on take-up of targeted tax concessions for high-skilled workers is available for a limited number of countries. Unsurprisingly, this information suggests that take-up is strongly related to the degree of targeting of the tax concession.

Many highly targeted schemes have relatively low take-up, both in aggregate terms and as a percentage of the labour force, emphasising the "niche" nature of these schemes. For example, between 2004 and 2006, around 1 850 researchers benefited from the tax exemption for researchers in Italy. This equates to approximately 0.003% of the labour force on average each year. Around 750 people each year use Sweden's tax relief for foreign key personnel (approximately 0.015% of the labour force). Similarly, between 320 and 350 workers use the reduced tax rate regime in Finland each year (approximately 0.013% of the labour force). In Denmark, an average of 2 184 employees used the reduced tax rate regime each year between 2005 and 2009. This equates to a slightly higher 0.075% of the labour force on average each year. Each of these schemes target tightly the type of skill required for eligibility.

In contrast, take-up can be expected to be higher for schemes with less stringent targeting criteria. In New Zealand, for example, 73 000 workers (as of 1 January 2010) have received the temporary tax exemption from foreign sourced income since its 2007 introduction. This equates to approximately 1% of the labour force on average in each of the scheme's first three years. This scheme imposes no specific skill requirement. Instead it is available to any worker meeting broader immigration criteria.

The remainder of this section discusses the key design features of these tax concessions in detail. The type of concession chosen is considered first, then the length of the concession. The type of worker targeted is then discussed, followed by skill requirements.

Type of concession

The most obvious design issue is what form the concession should take. As noted, in a number of cases, the specific policy rationale for the concession drives its form. However, in many cases a number of different possibilities have been adopted to achieve the same or very similar policy goals. Four main forms of concession have been adopted: reduced tax rates on labour income; fixed allowances or exemptions from personal income tax; deductions and exemptions for employer-provided fringe benefits; and exemptions from foreign sourced income.

Reduced tax rates on labour income

Reduced tax rates on labour income have generally been adopted in countries targeting externalities, skill shortages, or high labour tax countries endeavouring to maintain competitiveness for high-skilled workers. Reduced personal income tax rates have been introduced in Denmark, Finland, Portugal and Spain.

In Finland and Portugal, rather than being subject to the standard progressive income tax schedules, eligible high-skilled workers are subject to flat tax rates on earned income of 35 and 20 per cent, respectively. In Denmark, workers can choose to be subject to a flat rate of 25 per cent for three years or of 33 per cent for five years (see below for a discussion on length of concessions).

In Spain, eligible high-skilled workers may opt to be taxed under the Spanish non-resident income tax regime which imposes reduced rates of income tax (on both labour and capital income). Labour income is taxed at a flat rate of 24 per cent (while capital gains are taxed at 19 per cent instead of rather than).

General deductions, allowances and exemptions from personal income tax

A similar approach adopted in a number of countries is to provide general deductions, allowances or exemptions from personal income tax. Belgium, Italy, the Netherlands and Sweden adopt such an approach.

As with rate reductions, this form of concession has generally been used in regimes aimed at capturing positive externalities. As such the exemptions are often very generous as additional targeting criteria are then used to target specific recipients (and lower the fiscal cost of the concession). For example, the Italian concession provides a 90 per cent exemption for qualifying workers, the Belgian and Canadian concessions aimed at capturing R&D spillovers provide 75 per cent exemptions, while Korea provides a 50 per cent exemption from income tax on earned income.

In contrast, the Netherlands provides a much lower tax free allowance equal to 30 per cent of regularly received employment income as this is endeavouring to allow for additional costs associated with expatriation, and does not target the concession further. Meanwhile, Sweden provides a lower tax exemption of 25 per cent, as well as significant further targeting measures. This reflects the mixed goals of capturing positive knowledge spillovers and reducing the general tax burden on labour income.

Specific deductions and/or exemptions for employer provided fringe benefits

More specific deductions and/or exemptions are often used where a country attempts to reduce the effect of tax on migration decisions. In particular, a number of countries provide exemptions from fringe benefits paid by employers to cover costs purely related to

having to move countries. Such payments account for the fact that expatriates have higher expenses than they would if they worked in their home country. Because these payments simply place the worker in the same position they were previously in (*i.e.* there is no additional consumption value to the worker), their taxation would make migration less attractive, potentially altering migration decisions.[20]

Countries providing such exemptions include Belgium, France, the Netherlands and Switzerland. Belgium allows tax free allowances and reimbursements relating to expatriate expenses, moving and installation costs, cost of living differentials and children's school fees. France provides a specific tax reduction for migrant workers sent by a foreign company to work part-time or full-time in France (the *régime de l'impatrié*) which partly exempts from personal income tax extra wages due to installation costs. Similarly, Switzerland allows the deduction of various working expenses of expatriates. These include, for non-resident expatriates, travel costs between place of residence abroad and Switzerland and housing costs in Switzerland. For resident expatriates they include housing costs in Switzerland, moving costs, and the costs of private international schools if public schools do not offer comparable education. The taxpayer can either deduct actual costs, or claim a lump-sum deduction of CHF 1 500 per month. The Netherlands allows tax free reimbursement of school fees for children attending international schools.

Tax exemptions from foreign sourced income

Tax exemptions for foreign sourced income have been adopted to address concerns about the taxation of capital income affecting migration decisions in Australia and New Zealand. These measures exempt all (unearned) foreign sourced income from taxation (for four years).

The Australian exemption is particularly aimed at reducing potential double taxation of foreign sourced capital income and at reducing the complexity otherwise associated with dealing with both Australian and source country tax laws regarding the same income.

The exemption in New Zealand was intended to avoid potential migrants (or returning New Zealanders) from facing extra tax costs on moving to New Zealand, compared to those they would face at home or in other countries. These additional costs include not just the potentially more onerous taxation of foreign sourced income in New Zealand, but also the costs associated with having to restructure tax affairs and, similarly to Australia, risks associated with exposure to complex new tax laws. An additional concern related to the potential for these additional tax costs to be passed on to New Zealand employers through higher wage demands.

Other measures

There are a number of other tax rules and schemes in place in OECD countries that have the effect of attracting and/or retaining high-skilled workers, though in many cases this may not be their intent. For example, standard features of some tax systems, or tax incentives introduced for other reasons may be beneficial to high-skilled workers. Low tax jurisdictions, in general, are likely to be more attractive to high-skilled workers.

A less extreme example is R&D tax credits. R&D tax credits are present in many countries, generally reducing corporate tax liability with the purpose of encouraging R&D and innovative activities that are perceived to generate significant positive externalities. Implicitly this goal requires the attraction and retention of the high-skilled workers necessary to carry out the R&D activities – indeed, as already discussed, the positive

externalities from R&D are part of the motivation for a number of specific tax concessions for high-skilled workers. Given that researchers' skills are generally in high demand, part of the benefit of an R&D tax credit is likely to be passed on to researchers in the form of higher wages. Consequently, an R&D tax credit is likely to provide an indirect incentive for high-skilled researchers to locate in countries with generous R&D tax credits.

A number of countries also have generous rules regarding the taxation of capital income that may be attractive to high-skilled workers – the Australian and New Zealand regimes discussed above being obvious examples. But other rules not necessarily intended to target high-skilled workers also exist. One example is the ability of non-domiciled UK tax residents to pay taxes on foreign sourced income on a remittance basis – that is, only foreign sourced income that is remitted to the UK is subject to UK tax.[21] These rules were introduced over 200 years ago and so were clearly not designed with mobile high-skilled workers in mind. However, they are likely to be attractive to high-skilled workers with substantial capital income, particularly foreign workers that can relatively easily satisfy the non-domicile requirement. Additionally, many higher income UK residents are also able to use these rules to reduce their tax burden, potentially aiding the retention of high-skilled workers as well.

The concessionary tax treatment of employee stock options is another example of rules that are not necessarily targeted at high-skilled workers, but that will benefit many of them. Belgium, Canada, Denmark, France, Ireland, Italy, Spain, the UK and the US all provide concessionary tax treatment of employee stock options. In many cases, these concessions are introduced to better align the incentives of managers with the incentives of business owners, thereby addressing "moral hazard" forms of market failure. However, as high income workers (and presumably high-skilled workers) are generally more likely to be remunerated through stock options than lower income workers, the predominant benefit of tax concessions will go to them. Additionally, as the concessionary tax treatment is not explicitly targeted at high-skilled workers they may also be used as a more covert means of attracting and/or retaining high-skilled workers.[22] Indeed, this may be important in countries where it is not politically acceptable to have open inequality of tax treatment between foreign and domestic workers or high-skilled and less-skilled workers.

Length of concession

Another key design issue, and one closely linked with the type of concession adopted, is the length of the concession. Of the 15 OECD countries that have introduced targeted tax concessions for high-skilled workers, 10 have placed some form of time restriction on them. An obvious consequence of a time restriction is that it will limit the fiscal cost of the measure. However, this must then be traded off against the likely effectiveness of the concession in encouraging high-skilled workers to migrate to, or remain in, the specific country. A time restriction may also be imposed on equity grounds, while in some cases a permanent concession may not be considered necessary once migration has been induced.

Providing reduced taxation for one group of (generally high-income) taxpayers, and not others will clearly raise equity concerns. These concerns must be balanced against the expected benefits of attracting and/or retaining high-skilled workers. Limiting the length of availability is a way of reducing the long-term inequities of such differential tax treatment, but still having an impact on migration decisions. This is especially the case if the concession becomes less necessary and therefore has less impact on migration decisions in later years after migration. For example, in Australia, the foreign sourced

income exemption is limited to four years in order to match the standard period of a temporary worker visa. If migrants stay longer than this then they become subject to full Australian law as continuation of the concession for permanent rather than temporary residents was not seen to be justified on equity grounds.

Equity concerns also played a major role in recent changes to the time limitations applied in Korea to their tax exemption for high-skilled workers. Prior to 2009, Korea provided a tax exemption for 5 years, however this has been reduced to two years (and the exemption reduced from 100 to 50 per cent) in order to mitigate the potential inequity between skilled and non-skilled workers and between Korean and migrant workers.

Only a temporary concession may be necessary where it is intended to account for the increased costs associated with expatriation – as these costs are likely to decrease over time. This is the rationale for the Netherlands placing a time restriction on their tax free allowance, and tax free school fee reimbursements for high-skilled workers. The time limit was initially 10 years, at which point it was assumed that the worker had fully assimilated into the Dutch society and would no longer face additional costs associated with expatriation. The time period was reduced to five years in 2009 to acknowledge that the costs of expatriation are lower in later years.

Additionally, where targeting permanent migrants, only a temporary concession may be seen as required to induce migration, as once the migrant is settled in the new country they may be far less likely to leave again due to broader non-tax considerations. For example, the four-year time limitation on the New Zealand tax exemption for foreign sourced income is intended to give migrants a "free look", so they can move to New Zealand without having to restructure their tax affairs or get tripped up by the new tax laws they are becoming exposed to. Once they have decided to remain in the country the concession becomes unnecessary, so is removed.

Finally, as the Danish and Swedish tax concessions are targeted at temporary rather than permanent migrants, they are only available for a temporary period. However, similar equity considerations factor into their decisions to restrict their concessions to temporary migrants (these are discussed in the next section).

Worker type

Countries may also target specific types of high-skilled worker. Most tax concessions are targeted at permanent foreign migrants. However, a number of countries target either temporary foreign migrants, or their own nationals.

Temporary migrants may be targeted to address short-run skill shortages, while equity considerations may also influence the decision to target temporary rather than permanent high-skilled migrants. Belgium, Denmark, Sweden and Switzerland all provide tax concessions specifically for temporary foreign migrant workers.

For example, when originally introduced, the Danish tax concession for high-skilled workers was targeted at migrants staying for a maximum of three years. This was enforced via an "after-taxation" mechanism where if the migrant did not then leave Denmark they would be required to pay back the tax benefit they had derived in the previous three years. This restriction was intended to balance the need to both address skill shortages and remain competitive in attracting high-skilled workers, against equity concerns regarding the differential taxation of foreign high-skilled workers and Danish nationals. In 2008, the rules were changed to allow temporary migrants to stay for five years (with a slightly

smaller concession). Furthermore, in most cases the worker can now stay on longer than five years without being subject to after-taxation. These changes reflect a stronger emphasis being placed on the benefits associated with high-skilled migration.

While most countries restrict their concessions to foreign nationals, a number also target their own citizens. This is particularly likely to be the case in countries concerned about the retention of high-skilled workers. For example, the concessionary stock option schemes in Belgium, Canada, Denmark, France, Ireland, Italy, Spain, the UK and US apply to both domestic and foreign workers.

In Italy, the three-year 90 per cent personal income tax exemption for researchers applies to both foreign and Italian high-skilled workers currently living abroad. Additionally, the "tax shield to encourage back talents" scheme, introduced in 2011 and providing an 80 per cent (70% for men) income tax exemption for three years, applies to both foreign (EU) and Italian high-skilled workers that return to Italy after at least two years abroad.

In New Zealand, the temporary tax exemption from foreign sourced income is targeted at both foreign workers and New Zealanders that have not been resident in New Zealand for at least 10 years. This reflects concerns regarding high levels of outward migration of the high-skilled. The 10 year requirement is intended to avoid providing the concession to New Zealanders who were most likely to return to New Zealand any way. Similarly, the Portuguese 20 per cent tax rate on earned income applies to both foreign migrants and returning Portuguese nationals. In either case, the worker must not have been tax resident in Portugal in the previous five years.

Skill requirements

A final key design issue is what type of skill is required, and how it should be targeted. Most countries require the worker to be in some way "high-skilled". For concessions targeting positive externalities, this targeting is generally very important and very specific, whereas for measures addressing perceived skills shortages, or reducing specific tax impediments to migration, the requirements tend to be less specific. Four broad targeting approaches have been adopted by countries: industry-specific targeting, skill-specific targeting, income-based targeting, and, finally, targeting through broader immigration rules rather than the tax system.

Industry specific targeting

One option is to link the concession to a particular industry. This is generally the case where that industry is perceived to generate positive externalities. Korea and Portugal both take such an approach. Korea requires that the individual works for a foreign investment corporation in a high-technology industry. This is intended to help strengthen Korea's international competitiveness by adopting advanced foreign technology to domestic industries. In Portugal, the individual needs to be working in a business that carries out high value-added scientific, artistic or technical activities as defined by Ministerial Order.

Skill-specific targeting

The most common approach adopted by countries is to specify the required skill level of the worker by reference to their job type, or the specific skills it requires. The exact requirements vary between countries again depending upon the exact policy goals. Countries that focus on capturing knowledge and R&D related spillovers generally require

the worker to be a researcher or scientist. Other countries with broader goals have less specific criteria, such as being "key personnel" or having special knowledge.

Examples of the narrower approach include Belgium and Italy, who restrict eligibility to their personal income tax exemptions to just research workers in the case of Belgium, and to researchers and professors in Italy. Belgium also provides a concession with broader skill targeting – its income tax exemption for expatriate expenses does not require the worker to be a researcher, but rather the less onerous burden of performing tasks that require "special knowledge", enabling a wider range of high-skilled workers to access the concession. This reflects the broader goal of the latter concession to reduce the effect of tax on high-skilled migration decisions. Sweden also applies broader skill criteria – providing its concession to experts, specialists and researchers, as well as to managers and other "key personnel" (although some difficulty in recruiting the expertise locally is also required),[23] Similarly, Switzerland allows its deduction for expatriate related expenses to be claimed by managers and specialists.

One potential problem with such skill-specific tests is that they can be administratively difficult and costly to enforce. In this regard, a balancing is required between the accuracy of targeting (and hence the generation of greater externalities) and administrative simplicity. An administratively simple approach is adopted by Italy, where the taxpayer self-declares that they are a researcher and claims the 90 per cent exemption. Audit activity is then relied on to minimise abuse of the concession. In contrast, the Swiss Tax Administration checks that every taxpayer who has claimed a deduction for expatriate related expenses does indeed qualify for the concession as a manager or specialist.

Sweden provides an example of a country that has heavily prioritised accuracy, but at the cost of a relatively resource and compliance intensive system. In order to access Sweden's 25 per cent income tax exemption, the worker must make an application to the Board of Taxation of Researchers. This board then looks at each individual case to determine whether the necessary criteria have been met. This approach has been the subject of recent criticism regarding the administrative costs involved along with a perceived lack of transparency and certainty. A major concern is that when a Swedish company currently recruits a high-skilled migrant they are uncertain whether the worker will receive the concession. This may reduce the effectiveness of the concession in attracting high-skilled workers.

Switzerland addresses this last concern by allowing potential migrants to apply to the Swiss Tax Administration in advance of a proposed move to obtain a decision on whether they would qualify as a manager or specialist, and hence would be eligible for the deduction of expatriate related expenses.

Income targeting

A simpler alternative to skill-specific targeting is to proxy skill by income level. This approach has been taken in both Denmark and Finland, where concessions are provided to migrants that earn more than a specific amount each month. There is no application process, hence the approach provides certainty and simplicity.

The potential cost of this approach is a reduced ability to accurately target the concession because any high-income migrant worker will receive the concession, irrespective of whether they are likely to generate positive externalities, address skill shortages, or provide some other specific benefit. This makes the approach less suitable in

countries wishing to narrowly target their concession (for example, on knowledge spillovers from researchers). Indeed, in Denmark the goal is very broad – it is intended to support high value-added activities generally, whether these are from researchers and managers, or from wider groups such as entertainers or athletes. It is effectively a market-led approach, with businesses determining which workers warrant support by hiring them and paying them high wages and thereby signalling their high value, rather than requiring the government to determine which workers are (or are not) of high value.

Another potential problem with this approach is that high-skilled workers are not necessarily highly paid. As a result, an income test could exclude some high-skilled workers from receiving the concession. To address this problem, the earnings test in Denmark is not binding for persons with a PhD who are carrying out research work. A research institution or research council must approve that these two requirements are met.

Broader Migration policy

Other countries have no skill or income requirements, and instead rely on broader migration policy, rather than additional tax rules, to ensure that the desired migrants are targeted. Such an approach has been taken in both Australia and New Zealand where immigration systems that are geared towards allowing high-skilled migration are effectively used to determine eligibility. Both countries have points-based high-skilled immigration programs, along with schemes enabling migration for workers with skills deemed to be in high demand which are administered by immigration officials. This approach works effectively in these countries as the tax concessions themselves are not designed to attract or retain any specific type of worker. Rather they are intended to minimize the impact the tax systems may have on migration decisions. This targeting is able therefore to be left to the general immigration system, with any further targeting within the tax system being likely to only add complexity.

Notes

1. Additionally, as migration numbers have increased, better support networks have been able to be developed in destination countries further reducing the psychological costs associated with migration.
2. Note though that legal restrictions including numerical limits and difficulties surrounding recognition of foreign qualifications still place significant restrictions on high-skilled migration in some countries. Chaloff and Lemaître (2009) provide a summary of immigration rules for high-skilled workers in OECD countries.
3. See OECD (2008), Chapter 3.
4. This corresponds to categories ISCED 5 and ISCED 6 of the International Standard Classification of Education (ISCED 1997).
5. Given our focus on the effect of taxation on migration decisions, we focus on microeconomic theories of migration. Massey *et al.* (1993) provide a detailed survey of both micro- and macro-economic theories of migration.
6. See Banzhaf and Walsh (2008) for a recent empirical analysis of the Tiebout hypothesis. Dowding *et al.* (1994) provide a survey of earlier empirical results.
7. Furthermore, even with a proportional tax system, high-income workers will pay proportionately more than low-income workers for public services available equally to all (for example, health care).
8. The taxation of capital income may be less important in countries with dual income tax systems or in non-dual systems that offer a range of tax relief in respect of the taxation of capital income.

9. Where the reimbursement of migration costs is untaxed it will fully offset the cost of relocation, leaving the workers migration decision unaffected. However, where taxed, the overall effect would be to reduce the return to migration, thereby discouraging migration. This assumes no private benefit is derived from the reimbursement. If a degree of private benefit is derived from the reimbursement payment, then this component could be taxed as income without discouraging migration.

10. Switzerland has 26 cantons that each autonomously organise their tax systems, with the effect that income taxes are primarily determined at a local rather than national level. Furthermore, cantons are then divided into roughly 3 000 municipalities, with each municipality generally having some freedom to set tax rates. This system results in substantial variation in average tax burdens across cantons and in some cases even municipalities.

11. Note though that under an agreement between France and Monaco, a French citizen that lives in Monaco will pay the same income tax as if they lived in France.

12. See also Bhagwati and Dellalfar (1973).

13. Furthermore, by lowering the tax burden on high-skilled workers in general it will reduce the distortions to human capital accumulation, as well as to work incentives and other margins (as discussed in Chapter 1).

14. Additionally, an increase in the stock of high-skilled labour may provide additional benefits to the labour market in terms of increased flexibility, and better job matching, and will also place downward pressure on wages, thereby reducing the costs of production and increasing investment. Where high-skilled and less-skilled labour are complements, an increased stock of high-skilled workers may also increase the productivity of less-skilled labour.

15. The large increases in demand for high-skilled labour can be mainly attributed to skill-biased technological change. On its own, technological change is unlikely to cause long-run skill shortages. However, recent technological change has been skill-biased leading to an ever increasing demand for high-skilled labour at the expense of less-skilled labour (Acemoglu, 2002). For example, the automation of many production processes has resulted in increased demand for high-skilled workers at the expense of less skilled workers. In addition, other factors, such as increased specialization in human capital intensive industries (driven by increased international trade), may also have contributed to the increasing demand for high-skilled workers in OECD countries. Furthermore, many OECD countries can expect skill shortages to worsen in the next two decades, with demand increasing, but with significant declines in the working age population as youth cohorts entering the labour force are outnumbered by those retiring (Chaloff and Lemaître, 2009). Of course this trend is mitigated, to an extent, by the fact that a greater proportion of new youth cohorts will become high-skilled.

16. While this may result in a high wage reflecting the scarcity of high-skilled labour, it would not constitute a rationale for government intervention.

17. They will either have been educated in another country, or if educated in the destination country will likely have been fully-funded. In either case, the additional human capital comes at zero education cost to the destination country.

18. Depending on incidence, a tax concession may both lower the labour costs to the company, and increase the return to the worker.

19. In such cases, limits may be required on the amount of immigration in order to best match the positive effects of immigration with the integration capacity of the given country.

20. Furthermore, under a broad Haig-Simons approach these payments would not constitute income and so arguably should not be taxed.

21. However, non-domiciled taxpayers that have been resident in the UK for seven of the last nine years, and have more than GBP 2 000 of non-remitted income or capital gains, are required to pay a Remittance Basis charge of GBP 30 000 per year to be continue to use the remittance basis approach.

22. Liebig (2005) argues that turn-of-the-century changes to stock option taxation were the first examples of active tax competition for high-skilled workers. For a more detailed discussion of the tax treatment of employee stock options, see OECD (2005b).

23. In fact, around 85 per cent of recipients of the Swedish concession are in managerial roles.

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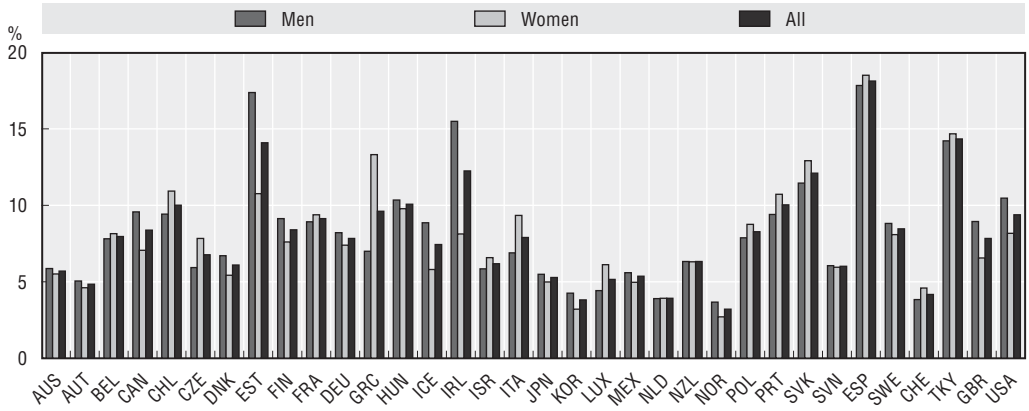
ANNEX A

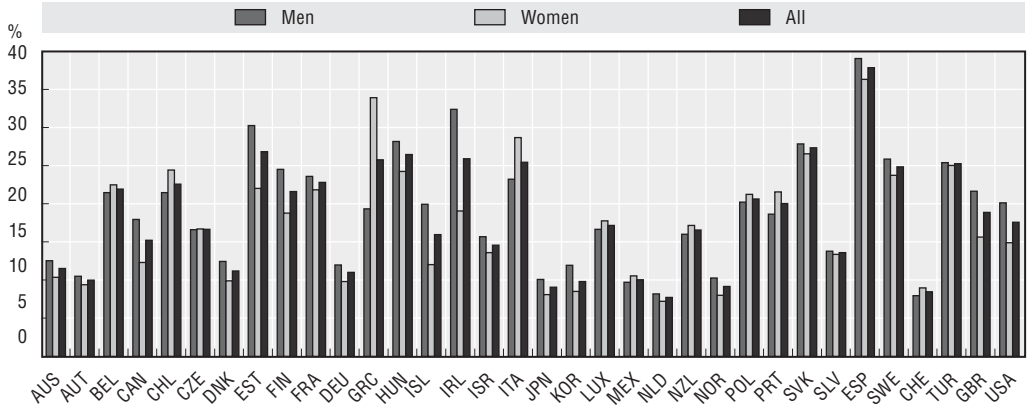
Additional Labour Force and Tax Burden Information

Figure A.1. **Unemployment rates (age 15-64): 2009**



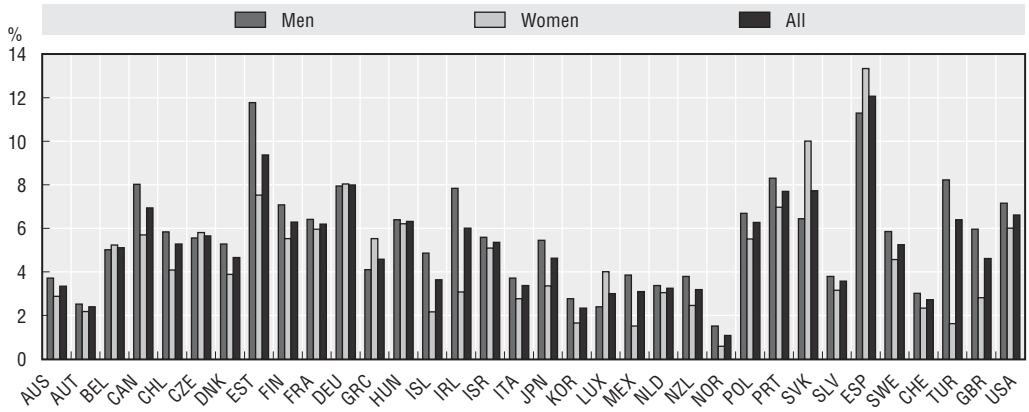
Source: OECD *Employment Database.* StatLink http://dx.doi.org/10.1787/888932483087

Figure A.2. **Unemployment rates (age 15-24): 2009**



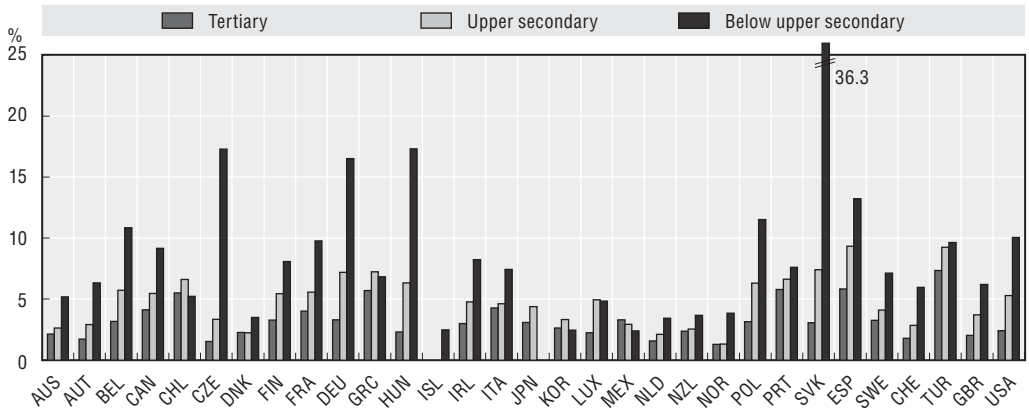
Source: OECD *Employment Database.* StatLink http://dx.doi.org/10.1787/888932483106

Figure A.3. **Unemployment rates (age 55-64): 2009**



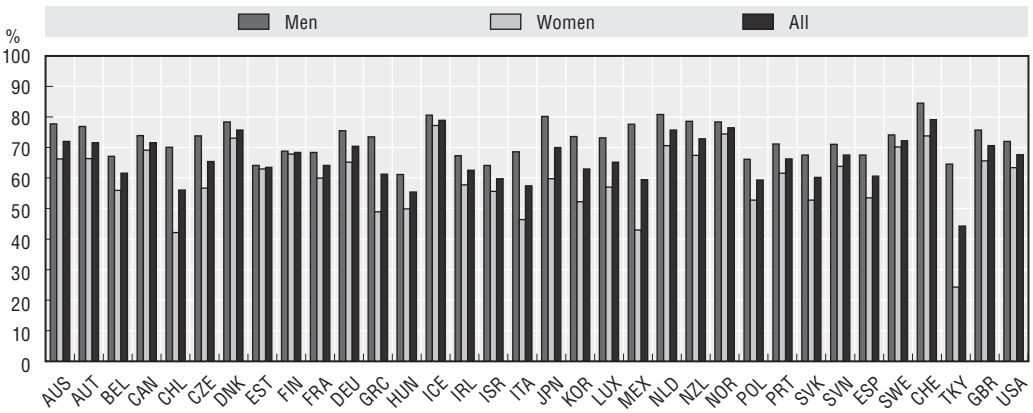
Source: OECD *Employment Database.* StatLink http://dx.doi.org/10.1787/888932483125

Figure A.4. **Unemployment rates (age 25-64) by education level: 2008**



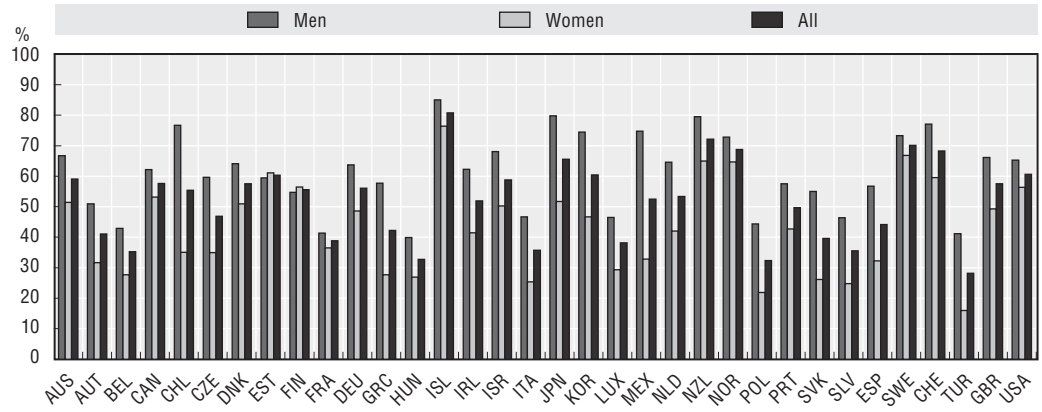
Source: OECD *Employment Database.* StatLink http://dx.doi.org/10.1787/888932483144

Figure A.5. **Employment-to-population rates (age 15-64): 2009**



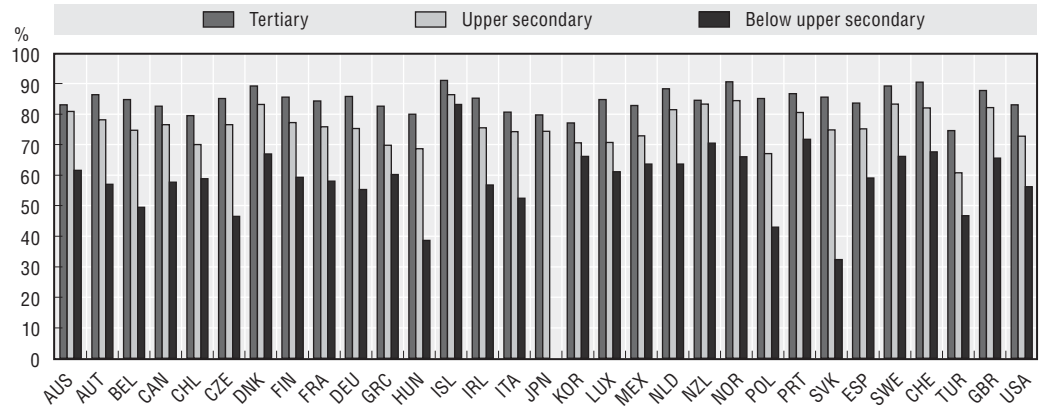
Source: OECD *Employment Database.* StatLink http://dx.doi.org/10.1787/888932483163

Figure A.6. **Employment-to-population rates (age 55-64): 2009**



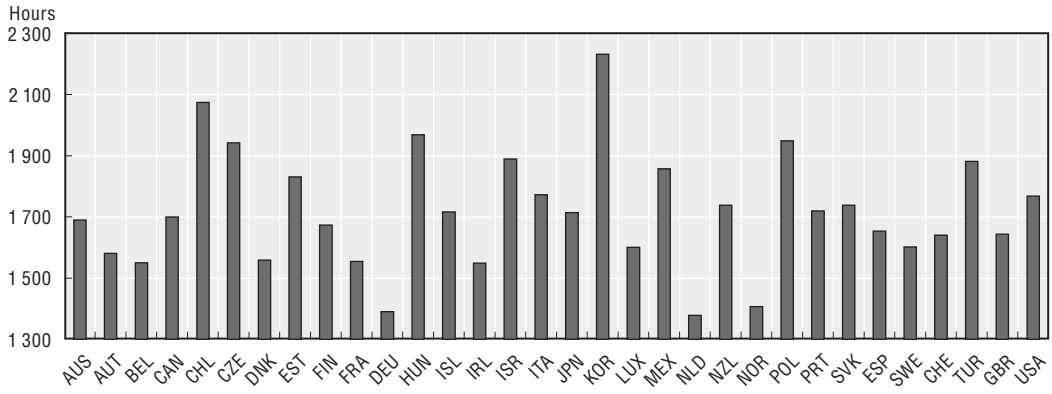
Source: OECD *Employment Database.* StatLink http://dx.doi.org/10.1787/888932483182

Figure A.7. **Employment-to-population rates (age 25-64) by education level: 2008**



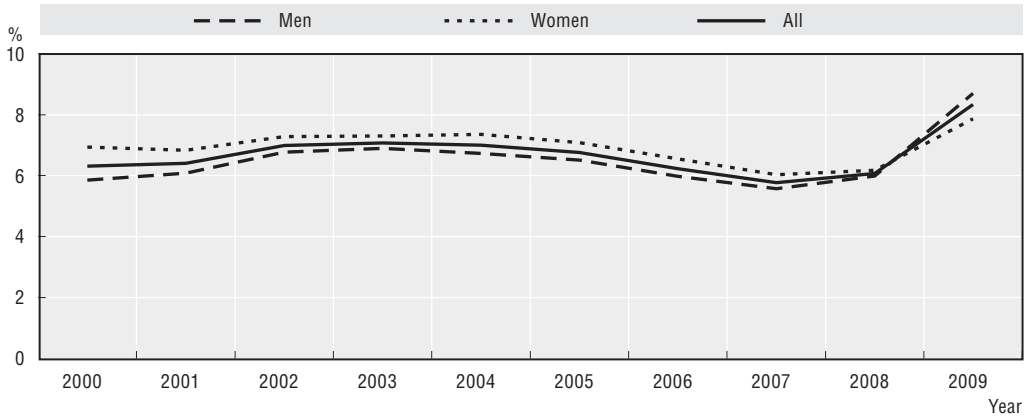
Source: OECD *Employment Database.* StatLink http://dx.doi.org/10.1787/888932483201

Figure A.8. **Hours worked per worker per year: 2009**



Source: OECD *Employment Database.* StatLink http://dx.doi.org/10.1787/888932483220

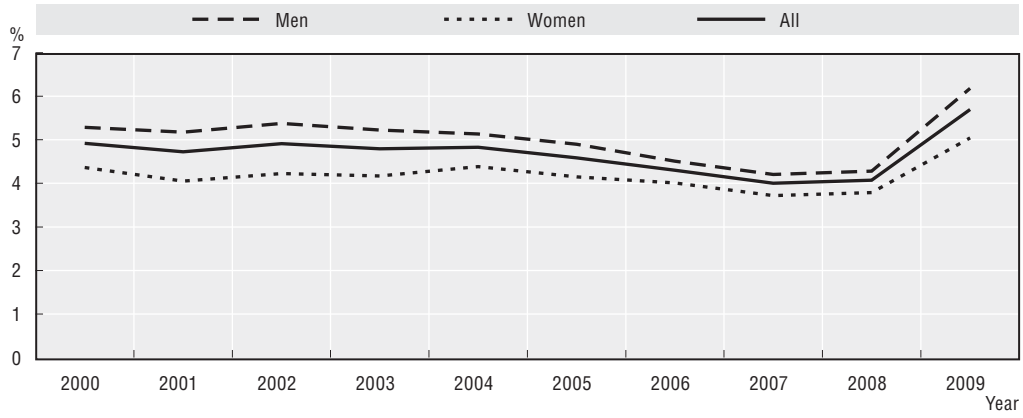
Figure A.9. **OECD average unemployment rates (age 15-64): 2000-09**



Source: OECD *Employment Database.*

StatLink http://dx.doi.org/10.1787/888932483239

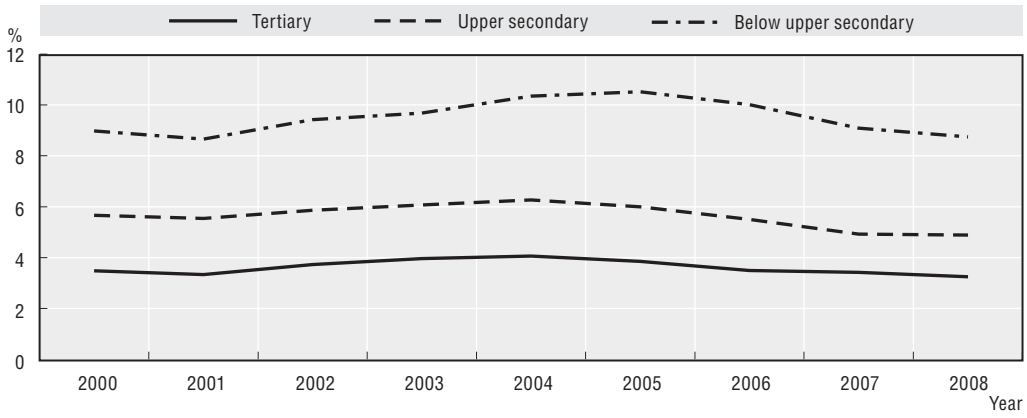
Figure A.10. **OECD average unemployment rates (age 55-64): 2000-09**



Source: OECD *Employment Database.*

StatLink http://dx.doi.org/10.1787/888932483258

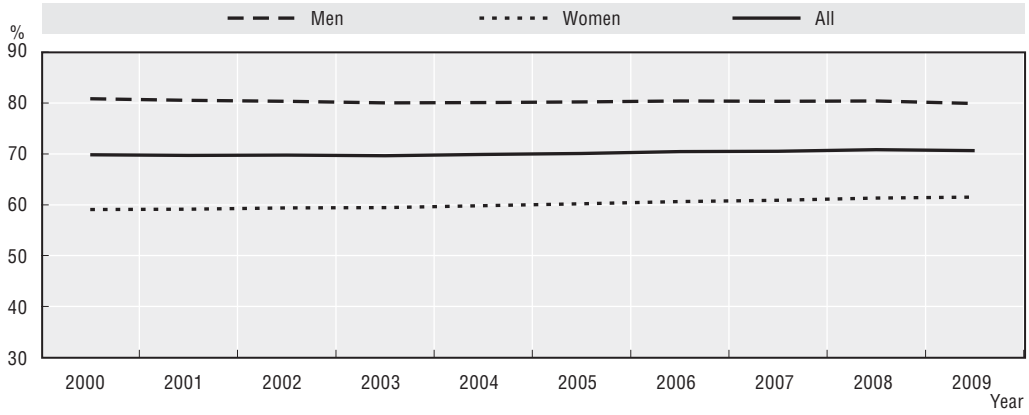
Figure A.11. **OECD average unemployment rates (age 25-64) by education level: 2000-08**



Source: OECD *Employment Database.*

StatLink http://dx.doi.org/10.1787/888932483277

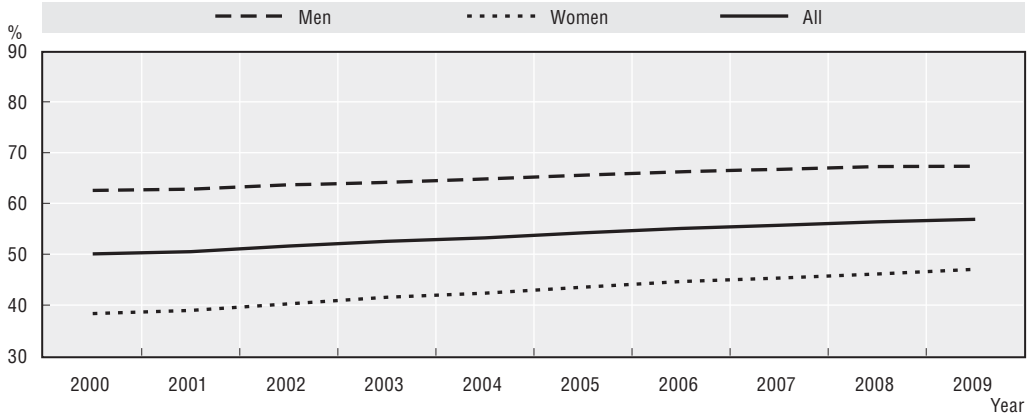
Figure A.12. **OECD average participation (labour force-to-population) rates (age 15-64): 2000-09**



Source: OECD *Employment Database.*

StatLink http://dx.doi.org/10.1787/888932483296

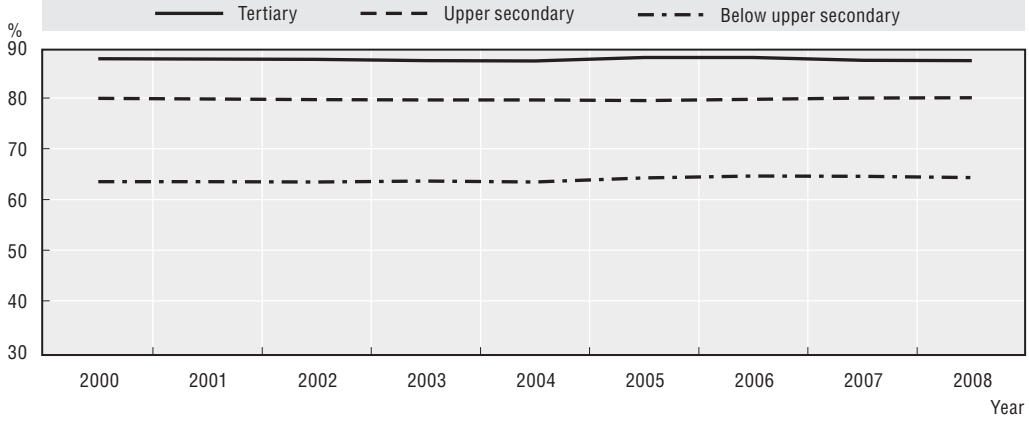
Figure A.13. **OECD average participation (labour force-to-population) rates (age 55-64): 2000-09**



Source: OECD *Employment Database.*

StatLink http://dx.doi.org/10.1787/888932483315

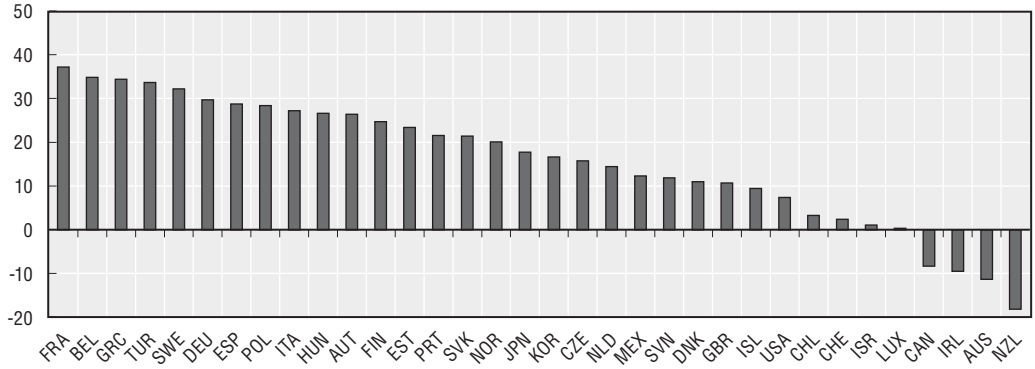
Figure A.14. **OECD average participation (labour force-to-population) rates (age 25-64) by education level: 2000-08**



Source: OECD *Employment Database.*

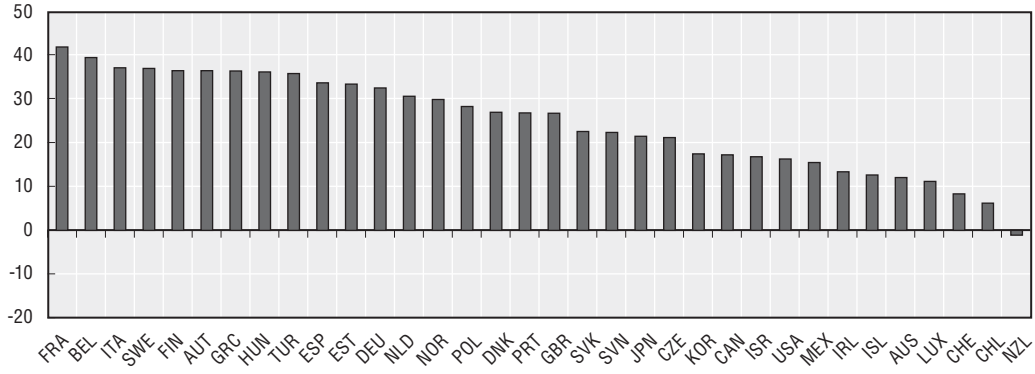
StatLink http://dx.doi.org/10.1787/888932483334

Figure A.15. **Average tax wedge for single parent with two children earning 67% of the average wage: 2010**



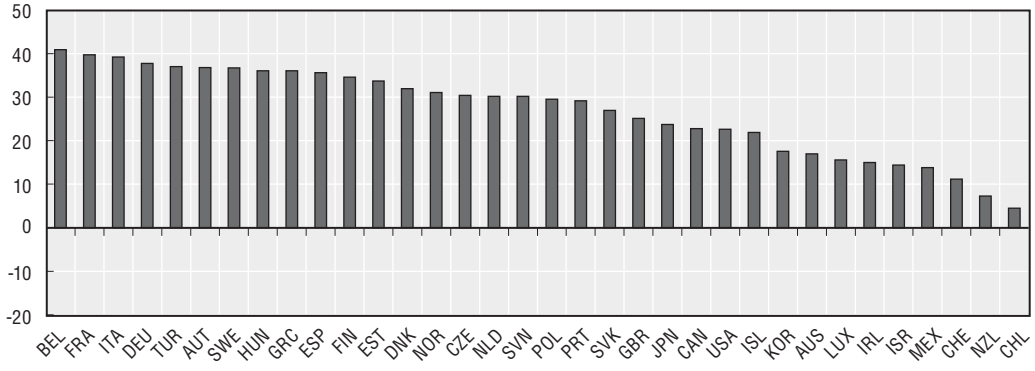
Source: OECD Taxing Wages models. StatLink http://dx.doi.org/10.1787/888932483353

Figure A.16. **Average tax wedge for one-earner family with two children earning 100% of the average wage: 2010**



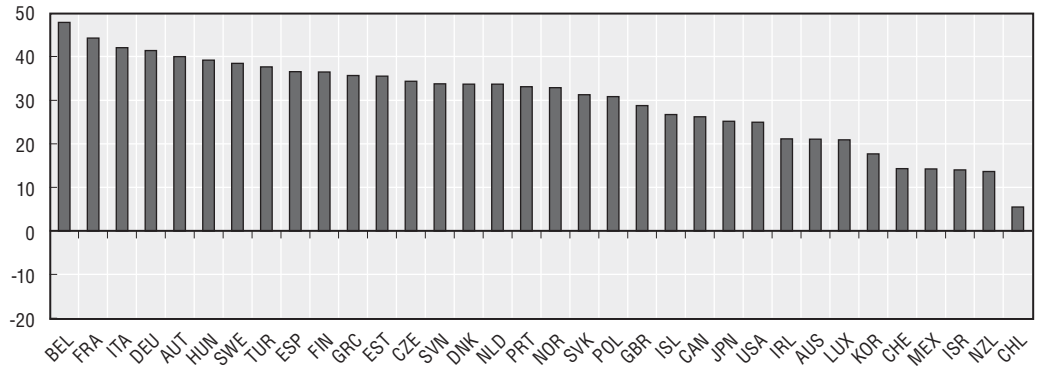
Source: OECD Taxing Wages models. StatLink http://dx.doi.org/10.1787/888932483372

Figure A.17. **Average tax wedge for two-earner family with two children earning 100%/33% of the average wage: 2010**



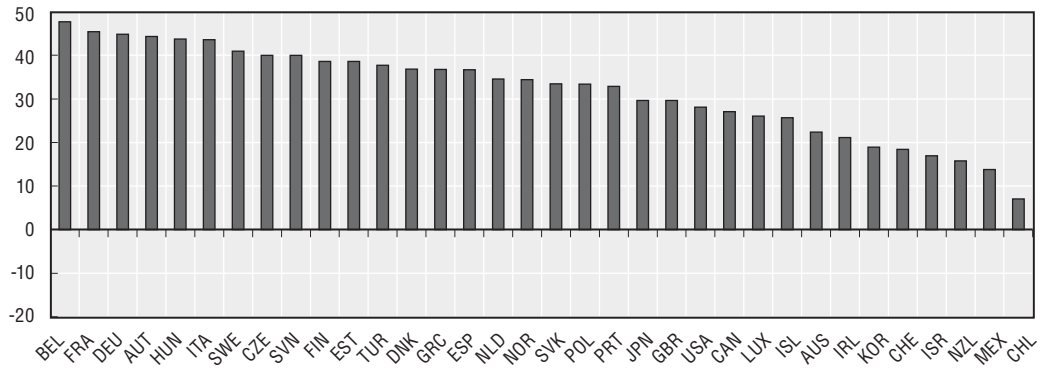
Source: OECD Taxing Wages models. StatLink http://dx.doi.org/10.1787/888932483391

Figure A.18. **Average tax wedge for two-earner family with two children earning 100%/67% of the average wage: 2010**



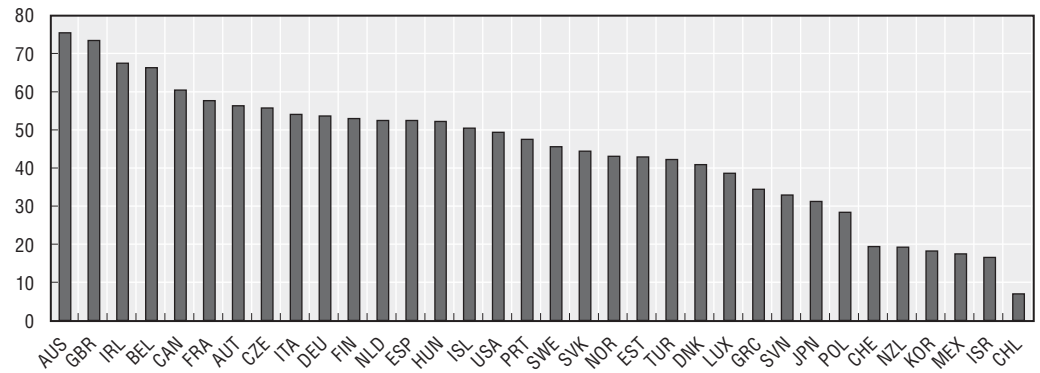
Source: OECD Taxing Wages models. *StatLink* http://dx.doi.org/10.1787/888932483410

Figure A.19. **Average tax wedge for two-earner family with no children earning 100%/33% of the average wage: 2010**



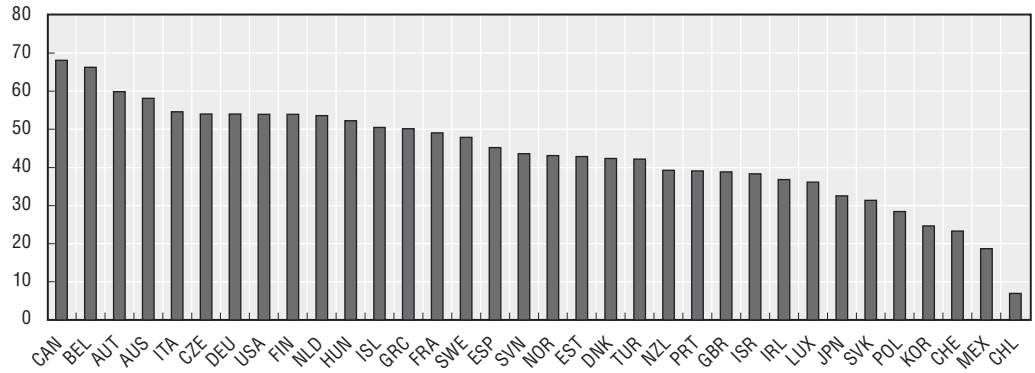
Source: OECD Taxing Wages models. *StatLink* http://dx.doi.org/10.1787/888932483429

Figure A.20. **Marginal tax wedge for single parent with two children earning 67% of the average wage: 2010**



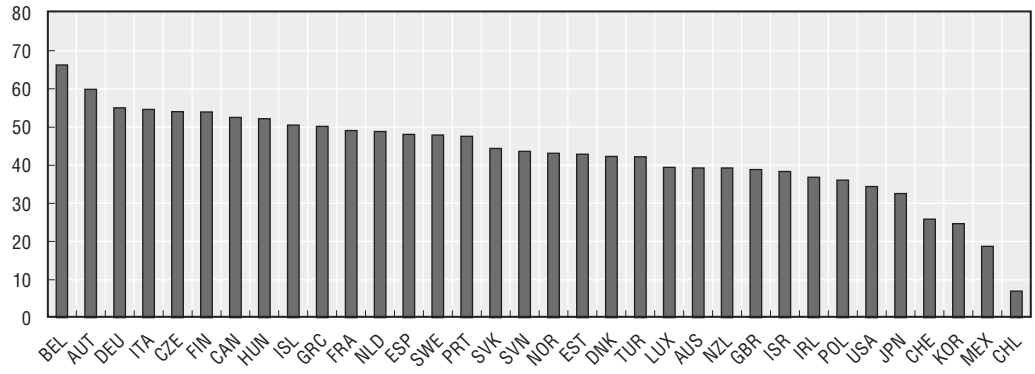
Source: OECD Taxing Wages models. *StatLink* http://dx.doi.org/10.1787/888932483448

Figure A.21. **Marginal tax wedge for one-earner family with two children earning 100% of the average wage: 2010**



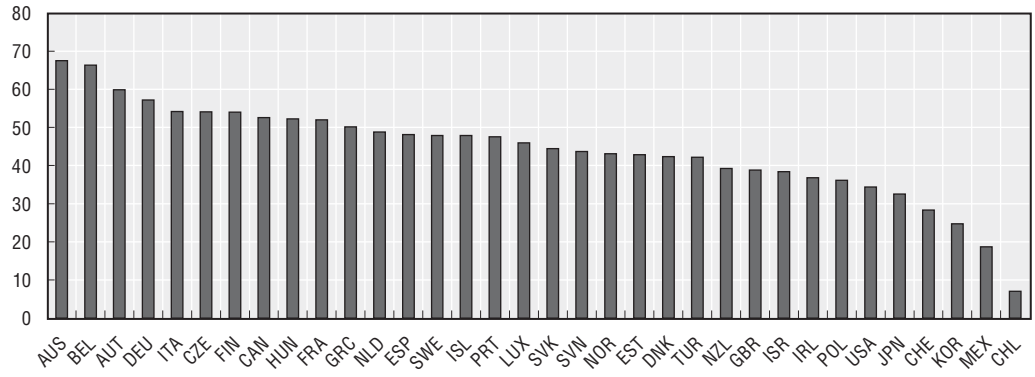
Source: OECD Taxing Wages models. StatLink http://dx.doi.org/10.1787/888932483467

Figure A.22. **Marginal tax wedge for two-earner family with two children earning 100%/33% of the average wage: 2010**



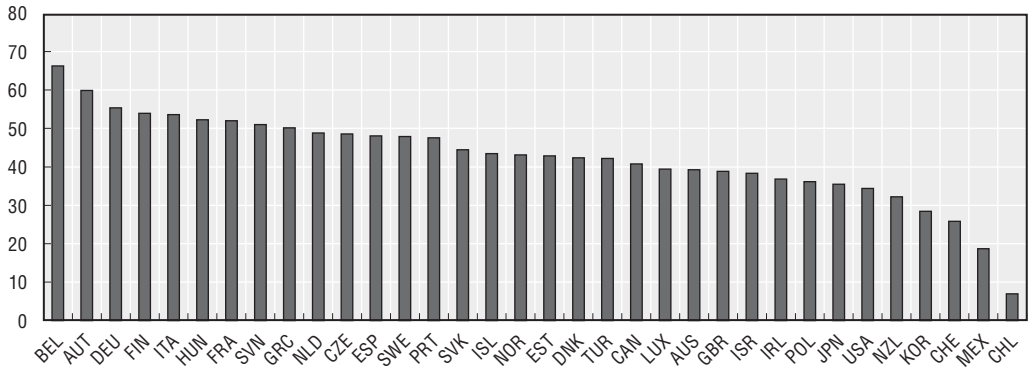
Source: OECD Taxing Wages models. StatLink http://dx.doi.org/10.1787/888932483486

Figure A.23. **Marginal tax wedge for two-earner family with two children earning 100%/67% of the average wage: 2010**



Source: OECD Taxing Wages models. StatLink http://dx.doi.org/10.1787/888932483505

Figure A.24. **Marginal tax wedge for two-earner family with no children earning 100%/33% of the average wage: 2010**



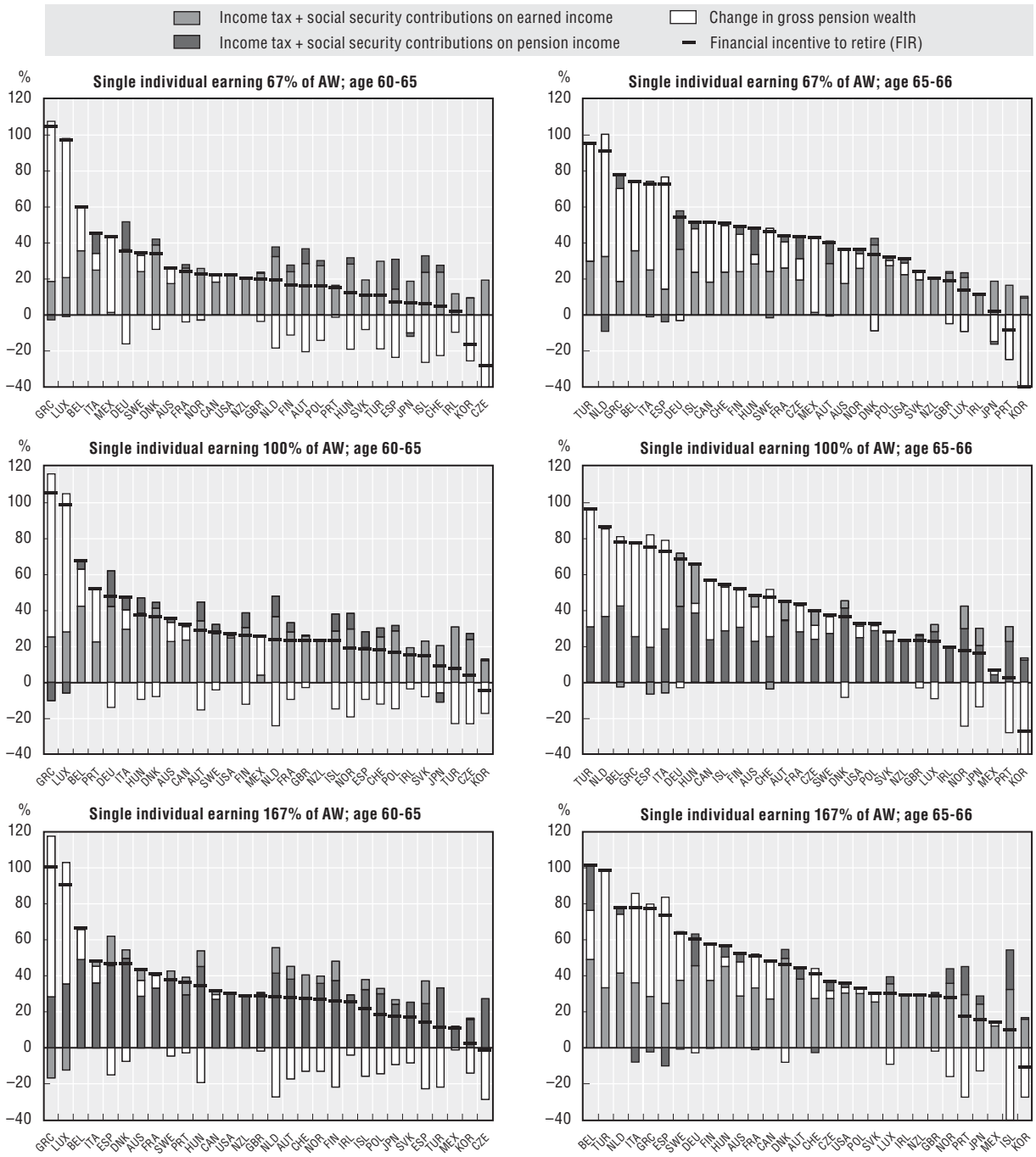
Source: OECD Taxing Wages models.

StatLink http://dx.doi.org/10.1787/888932483524

ANNEX B

Additional Retirement Incentive Modelling Results

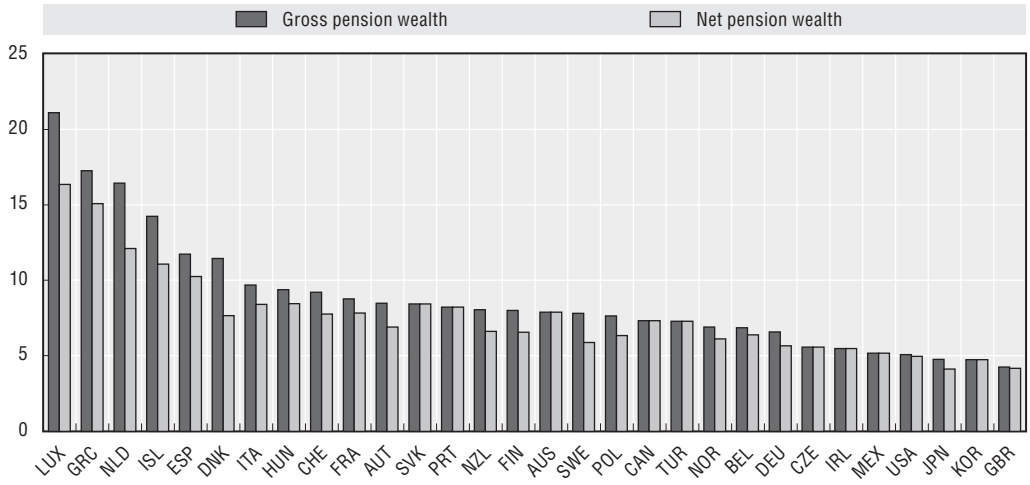
Figure B.1. **Disincentive to continue working from age 60-65 (left) and 65-66 (right)**



Source: OECD pension models.

StatLink http://dx.doi.org/10.1787/888932483543

Figure B.2. **Gross and net pension wealth as a multiple of the AW (Single male earning 100% of AW; aged 60)**



Source: OECD pension models.

StatLink http://dx.doi.org/10.1787/888932483562

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(23 2011 48 1 P) ISBN 978-92-64-12059-4 – No. 58939 2011

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OECD (2011), *Taxation and Employment*, OECD Tax Policy Studies, No. 21, OECD Publishing.
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