THE IMPACT OF TAXATION: EFFECTIVE TAX RATES

The analysis presented in this chapter seeks to quantify from several perspectives the combined impact of key components of each of the surveyed countries' business tax systems. These results provide information on the extent to which taxable income coincides with economic income, on how the different tax systems potentially distort firms' financing and distribution decisions, and on how they affect break-even returns to investment and after-tax returns to savers. The results are presented in terms of effective tax rates with comparisons of these rates across the fourteen countries considered.

Care must be exercised in interpreting the results, given the range of simplifying assumptions and data limitations inherent in this type of analysis. Attention should not focus on the individual measures for particular countries. Of more interest is the comparison of effective tax rates across different types of investments and different countries. For the limited sample of cases considered, the Australian system shows some marked variations from a neutral benchmark, mainly in the areas of R&D and mining. Less substantial variations occur for plant and equipment, an outcome which is apparent for almost half the countries.

Introduction

Purpose

7.1   This chapter presents the results of a quantitative analysis of the fourteen surveyed countries' business tax systems. The analysis examines the effect on Australian firms of Australia replacing in its entirety its current system of business taxes with the business tax system of any one of the other 13 surveyed countries. Results are presented as three different types of 'effective tax rate', which measure the extent to which the definition of taxable income under each system coincides with economic income, and the effects of each tax system on break-even rates of return to different types of investment and on after-tax returns to savers.

Approach

7.2   Real world business tax systems have thousands of features, all of which potentially affect firms. Quantitative comparisons of different systems cannot hope to take account of all these features; instead, it is necessary to focus on those few key aspects which are likely to have the greatest impact. This raises the possibility that the results would be different if other features of the various tax systems had been incorporated in the analysis. Also, as with any exercise in economic modelling, the results reflect the assumptions incorporated in the model. The statistics presented in this chapter can therefore not be regarded as being any more than indicative of the effects of each country's tax system.

Measurements

Average tax rates

7.3   The analysis reported in this chapter is used to examine how different systems of business taxes impact on rates of return to investments in different types of assets.[1] In contrast, public debate on the effects of the business tax system often focuses on taxes paid by firms in relation to accounting profits. This type of measure (which is sometimes referred to as an 'average tax rate' — or incorrectly by some commentators as an effective tax rate) is a useful measure of the revenue effects of taxes. However, it is of limited usefulness in comparing and evaluating alternative business tax systems.

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1   The Appendix contains a more detailed explanation of the approach used to estimate the effective tax rates presented in this chapter.

7.4   As explained in Chapter 2 of *A Strong Foundation*, accounting profits may include dividends paid out of income which has already been taxed in the hands of another company. To prevent this income being taxed twice, dividends are excluded from taxable income. Consequently, firms receiving dividend income will have misleadingly low average tax rates.

7.5   More generally, the average tax rate focuses just on tax payable for a single year. There are many reasons why a single year's average tax rate may not accurately reflect the ongoing effect of taxation on firms' profitability or on their investment decisions.

Effective tax rates

7.6   To overcome the problems with average tax rates, studies of the impact of tax rules typically calculate 'effective tax rates'. Effective tax rates measure how closely the definition of income for tax purposes conforms with some theoretical benchmark. This raises the question of which is the appropriate benchmark. As explained in *A Strong Foundation,* the benchmark against which the Review of Business Taxation compares the income tax system is comprehensive nominal income. However, most of the results reported in this chapter evaluate the extent to which different countries' tax rules coincide with comprehensive real (that is, inflation adjusted) income.

7.7   It is important to understand why this approach has been taken. In theory, the comprehensive real income tax base and the comprehensive nominal income tax base have desirable neutrality properties. Either approach to defining taxable income would result in a tax system which did not distort firms' choices between competing investments, their decisions about capital structure, or their distribution decisions. In practice, a comprehensive real income tax base is less attainable than a comprehensive nominal income tax base because of the range of complex practical and conceptual issues that would need to be resolved. Consequently, the approach generally followed by countries is more towards a nominal income tax base.

7.8   However, the effective tax rates presented in this chapter mainly measure tax payments relative to real, rather than nominal income. This approach has been adopted for several reasons. Firstly, it allows application of a methodology which has been developed and applied in a very substantial body of academic literature. Secondly, both measures are equally useful for evaluating how closely a particular tax system conforms to a neutral benchmark. Thus, they can each be used to evaluate whether the tax system tends to favour one set of investments over another. Finally, real effective tax rates also provide information on how a tax system affects firms' incentives to invest in different types of asset and how it affects savers' wealth.

7.9   Effective tax rates can be calculated in either of two ways. Under one approach, they measure the present value of the taxes which will be payable on an investment if the forecast cash flows eventuate,[2] and compare this to the present value of economic income which the investment is expected to generate. If the tax rules accurately measure economic income, the ratio of taxes paid to economic income will equal the statutory tax rate.

7.10   Alternatively, attention can focus on the effects of the tax system on rates of return, rather than on present values. Under this approach, the effective tax rate is measured as the percentage difference between the before-tax rate of return to the investment and the after-tax rate of return. Again, if taxable income is the same as economic income, the effective tax rate will equal the statutory tax rate. But if income as defined for tax purposes exceeds economic income (perhaps because purely inflationary gains are taxed) or falls short of economic income (perhaps because of tax concessions), the effective tax rate will be greater than or less than the statutory tax rate.

7.11   Example 7.1 sets out calculations of effective tax rates illustrating each of these possibilities. In Case 1, taxable income equals economic income. The before-tax rate of return is 10 per cent and the after-tax rate of return is 6.4 per cent. Consequently, the effective tax rate is 36 per cent, equal to the statutory tax rate.

Example 7.1: Calculating effective tax rates — Case 1

Taxable income equals economic income								
Year	Outlay	Net receipts	Before-tax cash flow	Economic value of asset	Economic depreciation	Economic income	Tax @ 36%	After-tax cash flow
0	-1000		-1000					-1000
1		300	300	800	200	100	36	264
2		280	280	600	200	80	28.8	251.2
3		360	360	300	300	60	21.6	338.4
4		130	130	200	100	30	10.8	119.2
5	100	120	220	100	100	20	7.2	212.8
Total Tax							104.4	
Internal Rate of Return			10.0%					6.4%
Effective Tax Rate					36%			

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2   The approach involves applying the current tax rules to forecast cash flows to determine the amount of tax that will be payable over the life of an investment. Clearly, because the method involves calculating future tax liabilities in respect of a hypothetical investment, it does not use data on actual tax paid by real firms. See the Appendix for more detail.

7.12   In Case 2, the depreciation rate for tax purposes exceeds the rate at which the asset is actually depreciating. Consequently, the net present value of taxable income is lower than the net present value of economic income. The after-tax rate of return rises to 6.9 per cent and the effective tax rate falls to 31.3 per cent. This is despite the fact that total tax collected over the life of the investment is unchanged, although its timing has been delayed.

Example 7.1: Calculating effective tax rates — Case 2

Taxable income less than economic income								
Year	Outlay	Net receipts	Before-tax cash flow	Economic value of asset	Tax depreciation	Taxable income	Tax @ 36%	After-tax cash flow
0	-1000		-1000					-1000
1		300	300	800	300	0	0	300
2		280	280	600	300	-20	-7.2	287.2
3		360	360	300	300	60	21.6	338.4
4		130	130	200	0	130	46.8	83.2
5	100	120	220	100	0	120	43.2	176.8
Total Tax							104.4	
Internal Rate of Return			10%					6.9%
Effective Tax Rate					31.3%			

7.13   In Case 3, the depreciation rate for tax purposes is lower than the rate at which the asset is actually depreciating. Consequently, the net present value of taxable income is higher than the net present value of economic income. The after-tax rate of return falls to 6.0 per cent and the effective tax rate rises to 40.2 per cent. Once again, total tax collected over the life of the investment is unchanged.

Example 7.1: Calculating effective tax rates — Case 3

Taxable income exceeds economic income								
Year	Outlay	Net receipts	Before-tax cash flow	Economic value of asset	Tax depreciation	Taxable income	Tax @ 36%	After-tax cash flow
0	-1000		-1000					-1000
1		300	300	800	100	200	72	228
2		280	280	600	100	180	64.8	215.2
3		360	360	300	300	60	21.6	338.4
4		130	130	200	200	-70	-25.2	155.2
5	100	120	220	100	200	-80	-28.8	248.8
Total Tax							104.4	
Internal Rate of Return			10%					6.0%
Effective Tax Rate					40.2%			

7.14   In all three cases, the tax system results (as would be expected) in investors receiving a lower rate of return. Sometimes, however, the tax system effectively subsidises investments, with after-tax rates of return exceeding before-tax rates of return. In these cases, the effective tax rate will be negative. For this to occur, the investor must be able to use the taxable losses that arise against income from other sources. Example 7.2 uses the same basic investment as Example 7.1 to illustrate how negative effective tax rates may arise. Instead of being written off over its useful life, 125 per cent of the asset's cost is deductible against the first year's cash flow. This effectively reduces the after-tax cost of the asset by $1000 x 125% x 36%, or $450. The rate of return to the after-tax cash-flows is now 13.9 per cent, and the effective tax rate is negative 38.6 per cent.

Example 7.2: Negative effective tax rates

Year	Outlay	Net receipts	Before-tax cash flow	Economic value of asset	Statutory depreciation	Statutory income	Tax @ 36%	After-tax cash flow
0	-1000		-1000					-1000
1		300	300	800	1250	-950	-342	642
2		280	280	600	0	280	100.8	179.2
3		360	360	300	0	360	129.6	230.4
4		130	130	200	0	130	46.8	83.2
5	100	120	220	100	0	120	43.2	176.8
Total Tax							**-21.6**	
Internal Rate of Return			**10%**					**13.9%**
Effective Tax Rate					**-38.6%**			

Marginal effective tax rates

7.15   Effective tax rates are typically calculated for 'marginal' investments. A marginal investment is one where the investor is indifferent as to whether the investment is made or not, given the cost of capital he or she faces.[3] Analysts focus on marginal investments because tax rules are more likely to influence decisions about whether to proceed with these investments. Effective tax rates on marginal investments are generally referred to as 'marginal effective tax rates' (METRs) and, as explained above, can be measured either as the present value of taxes over the present value of economic income, or as the percentage difference between before-tax and after-tax rates of return.[4]

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3   Equivalently, a marginal investment has an expected net present value of zero.
4   Both approaches to measuring effective tax rates will give the same results for marginal investments, but not for other investments.

Effective tax rate for investment

7.16   It can be misleading to attempt to draw inferences from the METR about the extent to which a business tax system depresses firms' incentives to invest. The reason is that taxes on business potentially have either or both of two effects — they increase the cost of capital to business and/or decrease rates of return to savers — and the METR does not provide any indication of the relative significance of each effect.

7.17   To measure the effects of each country's business tax system on incentives to invest, we calculate the percentage difference between estimates of 'break-even' rates of return to different types of investments under each system, and the break-even rate of return if Australia did not tax any income from capital. We refer to this statistic as the 'effective tax rate for investment'. The effective tax rate for investment is useful as an indicator of the extent to which each country's business tax system is likely to result in more or less investment occurring relative to the amount of investment in the absence of taxes. This concept is explained in more detail in Example 7.3 and in relation to Figure A.1 in the Appendix.

Effective tax rate for savings

7.18   The after-tax return to Australian savers is a function of the cost of capital to Australian investors and taxes on returns to saving. This has to be compared with the prevailing rate of return available in international capital markets, which would be the return to investors in the absence of any taxes. The effective tax rate for savings is the percentage decrease in the return to savings attributable to Australia's tax system. This concept is also demonstrated in Example 7.3.

Example 7.3: Measuring the effects of the tax system

Suppose foreign investors require a real after-tax rate of return of 5 per cent on money lent to Australians. Similarly, suppose Australians are able to earn a real rate of return of 5 per cent on money lent to foreigners. If Australia did not tax income from capital, the inflation-adjusted Australian interest rate would be 5 per cent. If it was any lower, Australians would save abroad rather than at home, while non-residents would be unwilling to invest in Australia since they could earn more elsewhere. Similarly, if Australian savers held out for a return in excess of 5 per cent, Australian firms would borrow abroad (at 5 per cent) rather than domestically.

If Australia does not impose any taxes on income from capital, the hurdle rate of return in Australia will be a risk adjusted 5 per cent. A rate of return in excess of this will be needed before Australian firms will be willing to borrow to finance an investment.

Example 7.3: Measuring the effects of the tax system

Now suppose Australia imposes two taxes: interest paid to non-residents is taxed at 20 per cent and interest paid to domestic savers is taxed at 40 per cent.

Since non-residents are able to earn 5 per cent after tax elsewhere in the world, they will only lend money to Australian firms so long as they still earn 5 per cent after paying tax at 20 per cent. So the minimum before-tax rate of return at which foreigners will lend to Australians will increase from 5 per cent to 6.25 per cent. The increase in the interest rate required by foreign investors will have two flow-on effects:

- The 'break-even real rate of return' will increase to 6.25 per cent.

- The before-tax interest rate obtainable by Australian savers will also increase to 6.25 per cent. Consequently, the after-tax interest rate enjoyed by Australian savers will be 6.25 x (1-.40) = 3.75 per cent.

We can calculate the following indicators of the effects of these taxes:

- The **marginal effective tax rate** is

$$\frac{.0625 - .0375}{0.0625} = 40\%$$

Because all interest income is taxable, the marginal effective tax rate equals the statutory tax rate on domestic savers' interest income.

- The **effective tax rate for investment** is

$$\frac{.0625 - .05}{.0625} = 20\%$$

  If Australia repealed its taxes on capital, the break-even rate of return for investment would decrease by 20 per cent.

- The **effective tax rate for savings** is

$$\frac{.05 - .0375}{.05} = 25\%$$

  The real after-tax return to savings is 25 per cent lower than it would be if Australia did not tax income from capital.

The marginal effective tax rate is the sum of the effective tax rates on investment and savings, with the latter weighted by the ratio of the before-tax to after-tax required rates of return. Hence, for this example,

$$40\% = 20\% + \frac{5}{6.25} \text{ x } 25\%$$

Limitations

7.19   Example 7.3 abstracts from a number of factors which make it difficult in practice to estimate the effects of taxes on rates of return. The Appendix discusses these issues and provides a more comprehensive discussion of the approach used to calculate effective tax rates. The Appendix also explains the methodology's limitations. The following are among the more significant:

- Like any analysis which focuses just on the effects of taxes, the approach does not take account of differences across countries in the amount of government expenditure of benefit to business. The results therefore do not indicate the overall impact on businesses of each of the fourteen countries' governments.

- The analysis makes no allowance for any of the ways in which a business tax system may impact on macroeconomic variables such as growth rates, the inflation rate or the current account.

- The approach assumes taxes only affect investment or savings via their effect on the cost of capital. This assumption will be less realistic where capital markets are less than perfect. For example, where firms have difficulty obtaining external finance on reasonable terms, and therefore have to rely more on (after-tax) internally generated cash flows to finance investment, the impact of the tax system may be different from that calculated using this methodology.

- While the analysis does indicate the magnitude of tax-related distortions in rates of return to different investments, it does not provide any indication about the extent to which tax-distorted rates of return lead to firms making different investment decisions.

- The approach does not use data on actual taxes paid. Among other things, this makes it difficult to incorporate satisfactorily the effects of tax planning into the analysis or to reconcile easily estimated effective tax rates with observed tax collections.

7.20   These limitations mean it is necessary to exercise considerable caution in interpreting the results reported in the next section. Effective tax rates provide a useful way of summarising the interaction of the various tax rules which impact on businesses, and for identifying how changes in the rules or the underlying assumptions will impact on firms' tax liabilities and investment incentives. However, they do not provide any guidance about how the business tax system in practice affects key economic variables such as aggregate investment and its composition, or economic growth.

Assumptions

7.21   The results described below are calculated under the assumption that Australia maintains intact all aspects of its tax system other than its business tax rules, but replaces its business tax rules with the regimes applying in each of the other thirteen countries surveyed. It is clearly improbable that Australia would ever take this approach to business tax reform. Nonetheless this approach is useful because it enables us to estimate the effects of each country's business tax rules in isolation from the myriad of other influences on firms' competitiveness.

7.22   In calculating the results, other aspects of the Australian tax system have, in general, not been altered, including:

- Australia's network of existing tax treaties. While tax treaties generally remain unaffected by changes in domestic tax law, Australia may not be able to renegotiate its current treaties if it has another country's domestic tax system.

- Australia's personal tax scale. This has been generally held at the top individual tax rate of 47 per cent.

7.23   Limited results are provided, however, using the actual personal tax rates applying to top-bracket individuals in each country. Also, the analysis reflects differences in the extent to which each country's company tax system is integrated with its personal tax system, since this is a key determinant of marginal effective tax rates.

Key comparisons

Marginal effective tax rates

7.24   This section uses estimates of METRs under each tax system to examine:

- the extent to which the business income tax base under each country's tax system coincides with economic income;

- the effect of inflation on the business tax base; and

- the consequences of different approaches to integrating the tax treatment of companies and individuals.

The business income tax base

7.25   Table 7.1 presents 'base case' estimates of marginal effective tax rates for different types of asset if each country's system for taxing business income were substituted for Australia's. Key assumptions made in calculating these numbers are that:

- all investment is debt financed and all domestic saving is via debt;

- all interest is taxed at Australia's top personal tax rate of 47 per cent; and

- there is no inflation.

7.26   These assumptions allow us to put to one side the interaction of inflation and unindexed tax systems, and variations across countries in personal tax rates and the extent to which the tax treatment of shareholders and firms are integrated. (In particular, assuming 100 per cent debt financing is equivalent to assuming each country has a fully integrated tax system.) Consequently, differences in calculated effective tax rates reflect differences only in tax bases, such as rates of depreciation and the extent to which capital expenditures are immediately deductible.

7.27   The approach taken to calculating the METRs presented in Table 7.1 means the METR for an asset will equal Australia's top statutory tax rate of 47 per cent for individuals if taxable income coincides with economic income. The METR of 39.3 per cent for plant under the Australian tax system, for example, can be interpreted to mean that, at 0 per cent inflation, taxable income from investment in plant comprises around 84 per cent of economic income.[5] In this case, the divergence reflects the generosity of depreciation allowed for tax purposes relative to economic depreciation, at least in the absence of inflation.[6]

7.28   By reading across the rows of Table 7.1, some appreciation is gained of the extent to which each tax system affects the relative attractiveness of investments in different types of asset. The tax systems of all fourteen countries are relatively neutral in their treatment of assets other than R&D and mining assets, in the sense that they are unlikely to markedly distort investors' choices about which types of asset they invest in. Results from Table 7.1 which are of some interest include:

- New Zealand's 'depreciation loading', under which tax depreciation rates are set at 120 per cent of estimated economic depreciation, results in only a modest divergence between taxable income and true income.

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5   Calculated as 39.3 per cent/47 per cent.

6   The calculations do not allow for any clawback of tax concessions as a result of unfranked dividends being paid to shareholders. This reflects the assumption of 100 per cent debt financing (or, in effect, full integration).

- Singapore's generous system of investment tax credits and accelerated write-offs has the same result as explicitly exempting from tax around 26 per cent of income from investment in plant.[7]

- All jurisdictions tax investment in trading stock relatively less favourably than other assets. However, this is unlikely to have much effect on decisions about how much trading stock to carry, since businesses already face significant (non-tax) incentives to minimise the costs associated with carrying stock.

Table 7.1: Marginal effective tax rates — base case[a]

Tax system	Plant[b]	Industrial buildings	Land	Inventory	R&D[c] [d]	Mining[e]
Australia	39.3	45.6	45.7	46.5	-90.3	33.2
Canada — manufacturing[f]	36.7	44.1	45.0	46.5	NA	34.8
Canada — other	37.9	43.0	44.2	46.3	NA	22.2
Chile	43.9	42.9	46.5	46.8	39.2	41.5
France	39.1	37.9	45.6	46.4	-6.7	30.9
Germany	41.4	40.9	43.4	46.6	31.7	35.8
Ireland — manufacturing[f]	45.4	45.9	46.7	46.9	39.3	32.4
Ireland — other	41.1	42.7	45.9	46.5	11.8	8.7
Japan	45.6	38.9	45.2	46.2	NA	35.3
Netherlands	46.0	45.6	45.8	46.5	26.5	38.8
New Zealand	44.7	47.0	42.8	46.5	26.1	-31.1
Singapore	34.7	43.6	46.1	46.6	21.2	31.0
Sweden	41.3	44.8	43.7	46.6	30.3	36.2
Taiwan	44.5	46.5	46.1	46.7	NA	39.7
United Kingdom	42.6	42.6	45.9	46.6	13.5	36.6
United States	38.7	42.6	45.8	46.5	17.6	-1.7

(a) These calculations assume full debt financing and no inflation. See Appendix for details of other assumptions.
(b) METRs on plant are calculated for plant with a 10 year economic life. Under many systems, METRs will vary, sometimes significantly, for plant with different useful lives.
(c) METRs on R&D assets are calculated under the assumption that 50 per cent of R&D expenditure is 'current' and 50 per cent 'capital'.
(d) NA in respect to R&D means the calculated METR is misleading. For example, the estimated METR for R&D under Taiwan's tax system is negative 811 per cent. This arises because the denominator in the effective tax rate formula, the required before-tax rate of return to an investment in R&D, is at 0.6 per cent, close to zero.
(e) METRs on mining assets are calculated under the assumption that 25 per cent of mining expenditure is on exploration and 75 per cent on development.
(f) Canada and Ireland have separate, lower tax rates for manufacturing firms.

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7   Calculated as 100 per cent - (34.7 per cent/47 per cent).

7.29   The results for R&D and mining assets reflect the relatively concessionary tax regimes for these assets in most countries in the survey. Under the business tax systems of two countries — New Zealand and the United States — the marginal effective tax rate on mining assets is negative, indicating a negative tax base: mining companies in these countries would be worse off if they were fully tax exempt on their mining income. Similarly, five of the surveyed countries' systems (Australia, Canada, France, Japan and Taiwan) result in negative tax rates for R&D assets.

Results calculated with country-specific tax rates

7.30   As noted above, the METRs presented in Table 7.1 assume all business income is distributed immediately to individuals on a 47 per cent tax rate. This approach makes it easy to compare the extent to which taxable income diverges from economic income under each system. However, the results do not give much indication of METRs actually faced by firms located in the surveyed countries, since Australia's individual tax rate is of course of no relevance to them. Table 7.2 presents METRs calculated on the same basis as the METRs presented in Table 7.1, but under the assumption that business income is distributed immediately to individuals in the highest income bracket in each jurisdiction.

7.31   The results presented in Table 7.2 exhibit considerably more variation than the results presented in Table 7.1. This reflects the added effect of differences in the relevant personal marginal tax rates. Marginal effective tax rates for countries such as Canada, France, Germany, Japan and the Netherlands are markedly higher than in Table 7.1, while METRs for countries such as New Zealand, Singapore, Sweden, Taiwan and the United Kingdom are significantly lower. Again, this comparison has to be kept in perspective. The comparisons are partial only and it would be wrong to assume that Australia could adopt any other country's company tax base without significant implications for the whole range of government activities. However, the comparison does provide an indication of the relative tax burdens on business income in each country, subject to the assumptions and qualifications set out above.

Table 7.2: Marginal effective tax rates at country-specific personal tax rates

Country	Personal tax rate	Plant	Industrial buildings	Land	Inventory	R&D	Mining
Australia	47	39.3	45.6	45.7	46.5	-90.3	33.2
Canada — manufacturing	54	45.1	51.5	52.3	53.6	NA	43.4
Canada — other	54	46.1	50.5	51.6	53.4	NA	32.5
Chile	45	41.8	40.8	44.5	44.8	36.9	39.3
France	61	55.2	54.3	59.9	60.5	21.5	49.1
Germany	56	51.3	50.8	52.9	55.6	43.2	46.6
Ireland — manufacturing	48	46.4	46.9	47.7	47.9	40.4	33.7
Ireland — other	48	42.3	43.8	46.9	47.6	13.4	10.5
Japan	65	64.1	59.7	63.8	64.5	NA	57.3
Netherlands	60	59.2	59.0	59.1	59.6	44.5	53.8
New Zealand	33	30.1	33.0	27.7	32.4	6.6	-65.7
Singapore	28	11.3	23.4	26.8	27.5	-7.0	6.3
Sweden	30	22.5	27.1	25.7	29.5	7.9	15.7
Taiwan	40	37.2	39.4	39.0	39.6	NA	31.7
UK	40	35.1	35.0	38.8	39.5	2.1	28.2
United States	47	38.3	42.1	45.3	46.1	16.9	-2.5

Notes: All assumptions per Table 7.1, other than personal tax rate. Personal tax rates are the rates applying to dividends received by individual taxpayers in each country's top income bracket. These rates do not include social security contributions or state/provincial taxes at the personal level.

7.32   Table 7.3 provides another perspective on marginal effective tax rates under each country's system. In Table 7.3, it is assumed investment is fully equity financed and that income is retained within the company indefinitely. Under these assumptions, the marginal effective tax rate will equal the company tax rate, rather than the personal tax rate, when taxable income coincides with economic income. A comparison of Tables 7.1 and 7.3 shows how marginal effective tax rates can vary quite substantially, depending on how companies finance their investment (that is, with debt or equity) and on their distribution policy. This issue is discussed below.

Table 7.3: Marginal effective tax rates at country-specific company tax rates

Country	Company tax rate	Plant	Industrial buildings	Land	Inventory	R&D	Mining
Australia	36	34.9	34.7	34.5	35.3	-78.4	19.5
Canada — manufacturing	36	25.0	34.3	35.1	36.4	NA	27.0
Canada — other	43	27.6	33.7	34.7	36.2	NA	8.5
Chile	15	10.4	9.3	14.2	14.7	2.4	6.1
France	40	32.2	32.4	38.5	39.2	-8.9	21.7
Germany	45	36.3	35.9	40.2	44.2	17.0	25.4
Ireland — manufacturing	10	7.4	8.3	9.4	9.8	-3.3	-14.1
Ireland — other	32	25.2	27.7	30.6	31.4	-15.5	-13.0
Japan	48	46.8	42.5	46.4	47.1	NA	35.6
Netherlands	35	34.0	33.8	33.6	34.3	9.5	24.3
New Zealand	33	30.3	33.0	29.2	32.4	6.5	-90.0
Singapore	26	9.4	21.2	24.8	25.5	-11.2	3.6
Sweden	28	20.9	25.6	24.9	27.4	5.2	13.3
Taiwan	25	21.8	24.4	23.8	24.5	NA	14.5
United Kingdom	31	25.9	26.4	29.7	30.4	-14.7	17.4
United States	35	25.9	30.9	33.6	34.3	1.4	-33.3

Inflation and the business income tax base

7.33   Table 7.4 explores the effects of inflation on the extent to which taxable income coincides with true income. None of the 14 countries surveyed explicitly inflation indexes its tax system, though some have features that were originally introduced as ad hoc responses to the effects of high inflation in the 1970s and 1980s.

7.34   Table 7.4 demonstrates that the accuracy with which all fourteen countries' tax systems define taxable income declines markedly in the presence of even modest inflation.[8] Whereas in the absence of inflation taxable income fell short of economic income for all assets, and under all systems (See Table 7.1), all the estimated METRs (other than for R&D and mining) now exceed 47 per cent, the benchmark beyond which taxable

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8   The results also highlight the sensitivity of estimates of METRs to the assumptions made in estimating them: if we assume that the real interest rate in the absence of Australian taxes is 5 per cent (rather than 10 per cent), the average of the METRs set out in Table 7.3 would be 60.2 per cent rather than 51.8 per cent.. The sensitivity of METRs to changes in the underlying assumptions makes it necessary to exercise caution in interpreting these results. Among other things, it means relative differences in METRs across assets and across countries are potentially more significant than the absolute estimates.

income exceeds economic income. Other points of interest in Table 7.4 include the following:

- Countries which allow taxpayers to use LIFO (last in, first out) rules to value inventory for tax purposes have relatively lower METRs on inventory in the presence of inflation. This is because LIFO rules effectively enable taxpayers to defer indefinitely tax on purely inflationary gains. Surveyed countries which allow inventory to be valued on a LIFO basis are Germany, Japan, the Netherlands, Taiwan and the United States.

- Inflation alters the relative difference between METRs on different classes of asset. Whereas METRs on plant increased on average by 16.0 per cent between Tables 7.1 and 7.4, METRs on land increased on average by 15.6 per cent.[9] This occurs because the present value of tax allowances comprises a greater proportion of total returns to shorter-lived assets, with the consequences of not indexing allowances for inflation therefore being more severe.

Table 7.4: Marginal effective tax rates — base case plus 2 per cent inflation

Tax system	Plant	Buildings	Land	Inventory	R&D	Mining
Australia	47.1	51.2	49.3	55.9	NA	40.2
Canada — manufacturing	44.7	50.3	52.1	55.9	NA	39.5
Canada — other	45.1	47.5	50.3	55.7	NA	27.5
Chile	52.7	51.6	55.7	55.9	48.0	50.3
France	46.5	43.6	55.0	55.8	-0.8	37.9
Germany	49.7	48.2	53.4	52.5	39.5	43.9
Ireland — manufacturing	54.5	54.8	56.1	56.3	48.6	42.9
Ireland — other	49.2	49.5	55.3	55.9	16.9	16.8
Japan	51.6	42.1	54.1	47.0	NA	40.8
Netherlands	53.6	51.4	55.2	51.4	33.5	46.4
New Zealand	52.7	53.0	47.3	55.8	33.3	-47.5
Singapore	43.0	50.4	55.2	55.7	28.2	39.0
Sweden	49.7	51.8	53.7	56.0	38.3	44.5
Taiwan	52.5	53.3	55.2	53.1	NA	47.7
United Kingdom	50.7	49.5	55.4	55.9	19.1	44.6
United States	46.7	48.8	55.2	51.4	25.0	-0.7

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9   While the difference in this case is modest, it is more marked at higher inflation rates.

Inflation and nominal effective tax rates

7.35   Another way of looking at the interaction between tax rules and inflation is to examine nominal, rather than real, effective tax rates. As noted above, a comprehensive nominal income base represents a more practical base for a tax system because of the difficulties of achieving comprehensive inflation adjustment. Table 7.5 therefore provides information about the extent to which the definition of income under each system coincides with nominal rather than real income. Analogously to the real METR, the nominal METR will equal the top statutory personal tax rate of 47 per cent if the definition of income for tax purposes coincides with comprehensive nominal income. For example, a nominal METR for plant of 42.9 per cent under the Japanese system means that, with inflation of 2 per cent, taxable income equals around 93 per cent of nominal income. In contrast, the ratio of taxable income to nominal income with no inflation was 97 per cent[10] (see Table 7.1).

Table 7.5: Nominal marginal effective tax rates — base case plus 2 per cent inflation

Tax system	Plant	Buildings	Land	Inventory	R&D	Mining
Australia	37.9	41.8	40.0	46.4	-52.2	31.6
Canada — manufacturing	35.7	41.0	42.7	46.5	NA	31.0
Canada — other	36.1	38.3	40.9	46.3	NA	20.7
Chile	43.6	42.5	46.5	46.8	39.0	41.2
France	37.4	34.6	45.6	46.4	-0.6	29.5
Germany	40.4	38.9	44.0	43.1	31.0	34.9
Ireland — manufacturing	45.1	45.3	46.7	46.9	39.3	34.0
Ireland — other	39.9	40.1	45.9	46.5	12.2	12.2
Japan	42.9	33.9	45.3	38.5	NA	32.7
Netherlands	44.2	42.1	45.8	42.0	25.7	37.2
New Zealand	43.5	43.7	38.2	46.5	25.6	-28.5
Singapore	34.4	41.4	46.1	46.6	21.5	30.8
Sweden	40.4	42.4	44.3	46.6	29.9	35.4
Taiwan	43.5	44.2	46.2	44.1	-186.2	38.9
United Kingdom	41.4	40.2	46.0	46.5	13.9	35.6
United States	37.5	39.5	45.8	42.0	18.6	-0.5

NA   in respect to R&D means the calculated METR is misleading. For example, the estimated METR for R&D under Taiwan's tax system is -811 per cent. This arises because the denominator in the effective tax rate formula, the required before-tax rate of return to an investment in R&D, is at 0.6 per cent, close to zero.

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10 Calculated as 45.6 per cent/47 per cent.

Integration between firms and shareholders

7.36   Figures 7.1 and 7.2 show marginal effective tax rates on investment in (10 year) plant under each tax system, under the polar assumptions that investment is either fully equity financed or fully debt financed. In Figure 7.1, we assume shareholders face the top Australian personal tax rate of 47 per cent. In Figure 7.2, shareholders face the top personal rate actually applying in each surveyed country.

7.37   In the 'full equity financing' case in each figure, two scenarios are examined. Under one, all income is distributed to shareholders in the year it is derived. For countries with a top personal income tax rate higher than the company tax rate and/or countries without full imputation systems, this is a 'worst case' assumption — METRs on fully equity financed investment will be lower if companies defer distributing profits to their shareholders. Under the alternative assumption, income is retained indefinitely in the company. This can be thought of as a 'best case' assumption, in the sense that it depicts the lowest METR that could conceivably apply to equity financed investment.

7.38   The differences in METRs under alternative financing methods indicate the extent to which each tax system is neutral with respect to:

- the choice between debt and equity finance; and
- the choice between retaining income within a company and distributing it to shareholders.

7.39   A comparison of Figures 7.1 and 7.2 shows that the extent to which a tax system is neutral with respect to capital structure and distribution decisions depends on both the degree of integration between the company tax system and the relationship between the company tax rate and personal tax rates. New Zealand, with a full imputation system and a company tax rate equal to the top personal tax rate of 33 per cent, has the most neutral tax system on both dimensions. Similarly, the tax systems of Singapore and Australia are also relatively neutral with respect to financing and distribution decisions. All the other tax systems provide reasonably strong incentives to retain rather than distribute income. However, it is difficult in most cases to reach strong conclusions about the extent and direction in practice of any distortions with respect to capital structure, since the METR on debt financed investment generally falls between the two extremes for equity financed investment.

Figure 7.1: Marginal effective tax rates on 10 year plant, interest and dividends taxed at 47 per cent

Per cent

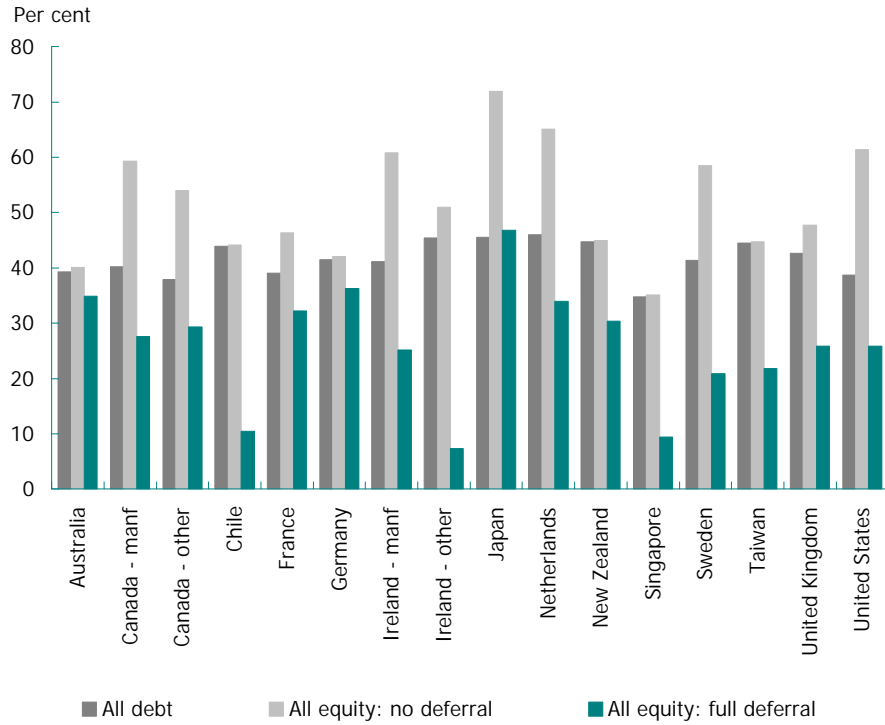■ All debt   ■ All equity: no deferral   ■ All equity: full deferral
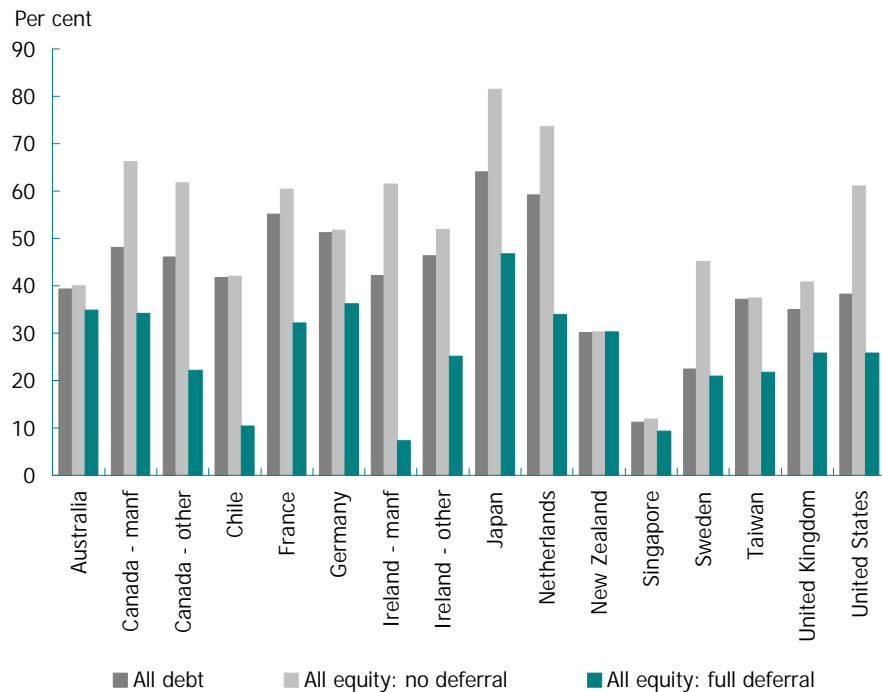
Figure 7.2: Marginal effective tax rates on 10 year plant, interest and dividends taxed at rate applying to individuals in each country's top income bracket

Per cent

■ All debt   ■ All equity: no deferral   ■ All equity: full deferral

Effective tax rate for investment

7.40   This section focuses on the effects of each country's system on incentives to invest, relative to the incentives which would exist in the absence of any taxes on income from capital. It begins by examining the effect of each tax system on the before-tax interest rates at which non-residents will be willing to lend to firms.

The effects of taxes on investment income of non-residents

7.41   In Example 7.3, it is assumed that any taxes levied on non-resident's investment income would lead to a higher interest rate in Australia. In today's open financial markets this assumption will generally, but not always, be correct — Australian firms have to pay the going interest rate to obtain finance on world capital markets. However, foreign investors will not insist on being compensated for Australian taxes where paying tax in Australia means they pay correspondingly less tax at home. Under Australia's network of tax treaties, many foreign jurisdictions have agreed to allow their residents to credit some Australian tax against their domestic tax liabilities.

7.42   The Appendix explains that it is very difficult, however, to determine just how much Australia can tax returns to investment financed by foreigners without inducing an increase in the cost of capital to Australian firms. Among other factors, the extent to which Australian taxes lead to effective reductions in home country tax varies substantially according to the country from which the investment is sourced, the nature of the investment (debt, portfolio equity, or direct investment), the tax status of the investor (tax exempt investors will not pay less tax at home if they pay tax in Australia), the extent to which non-residents can credit taxes paid in other foreign jurisdictions against their home country tax liability on their Australian source income, and the extent to which credits for Australian tax exceed their home country tax liability on Australian source income.

7.43   Despite the large number of factors operating in practice, it is necessary to make some estimate of the average value to non-residents of credits for tax levied under each system to determine how each country's tax system is likely to affect before-tax interest rates in Australia. It must be emphasised, however, that the estimates will provide a more accurate indication of the relative impact of each country's tax system than of the absolute effect. Table 7.5 sets out estimates of before-tax interest rates and dividend yields under each country's tax system. The estimates in Table 7.5 assume no inflation and that the interest rate and dividend yield would be 5 per cent if Australia did not tax income from capital. Table 7.5 is based

on the relevant tax rules of all countries which provide more than one per cent of Australia's capital imports and incorporates estimates of the effective value of credits for Australian tax to investors who are notionally entitled to credits.

Table 7.6: Estimated impact of taxes on interest rates and dividend yields

Tax system	Interest rate %	Dividend yield %
Australia	5.0	7.8
Canada — manufacturing	5.0	7.7
Canada — other	5.0	8.5
Chile	5.1	6.8
France	5.0	8.8
Germany	5.0	7.6
Ireland — manufacturing	5.0	5.6
Ireland — other	5.0	7.4
Japan	5.3	9.9
Netherlands	5.0	8.1
New Zealand	5.1	6.8
Singapore	5.2	6.8
Sweden	5.0	7.0
Taiwan	5.2	6.8
United Kingdom	5.0	7.2
United States	5.0	7.8

7.44   Two aspects of Table 7.6 are of particular interest. The first is that taxes on payments of interest to non-residents have little impact on the before-tax interest rate under all countries' systems. This reflects both the deductibility of interest under all systems (which means no company tax is collected on non-resident debt-financed investment) and the fact that none of the surveyed countries in practice collect material amounts of non-resident withholding tax on interest. The second is the difference between estimated interest rates and dividend yields under all the tax systems. Since the estimated rates of return are risk-adjusted, this difference does not reflect any difference in the relative riskiness of debt and equity. Rather, it reflects universal differences in the treatment of returns to debt and equity. Because dividends are not deductible, Australian company tax will be paid on the income from which dividends are sourced. In addition,

most countries levy lower non-resident withholding taxes on interest than on dividends.

7.45   Table 7.7 provides estimates of the 'effective tax rate for investment' for different asset classes under each system. The effective tax rate for investment reflects the difference between the minimum required rate of return at which an investment will be worth proceeding under each business tax system, compared with the minimum required rate of return if all business income were tax exempt.

Table 7.7: Effective tax rates for investment[a]

Tax system	Plant	Buildings	Land	Inventory	R&D[b]	Mining
Australia	17.8	24.3	22.5	29.6	-128.3	7.0
Canada — manufacturing	39.7	42.8	43.8	46.6	NA	-18.1
Canada — other	49.9	53.2	54.2	56.9	NA	-48.9
Chile	17.3	15.8	22.1	22.5	9.1	12.9
France	32.1	31.1	40.9	41.6	-12.9	20.5
Germany	19.5	18.4	25.6	24.3	3.1	9.9
Ireland — manufacturing	12.1	12.6	14.9	15.2	0.5	-9.3
Ireland — other	41.0	42.5	46.5	47.0	2.2	8.9
Japan	67.3	65.0	68.2	66.7	NA	58.8
Netherlands	52.0	51.3	53.0	51.4	32.6	43.9
New Zealand	17.0	17.8	10.7	21.7	-15.9	-181.9
Singapore	0.9	13.3	21.0	21.7	-25.6	-6.4
Sweden	35.4	38.5	40.4	41.9	20.7	28.1
Taiwan	17.1	18.7	21.4	18.5	NA	8.6
United Kingdom	23.3	22.7	29.5	30.2	-25.6	13.5
United States	44.6	47.7	51.4	49.6	24.6	-16.6

Notes:
(a)   Results assume 2 per cent inflation, assets financed with a mixture of 35 per cent debt and 65 per cent equity. Table assumes income is distributed immediately as interest and dividends to individuals on the top Australian personal tax rate of 47 per cent.
(b)   NA in respect of R&D means the calculated effective tax rate on investment is misleading.
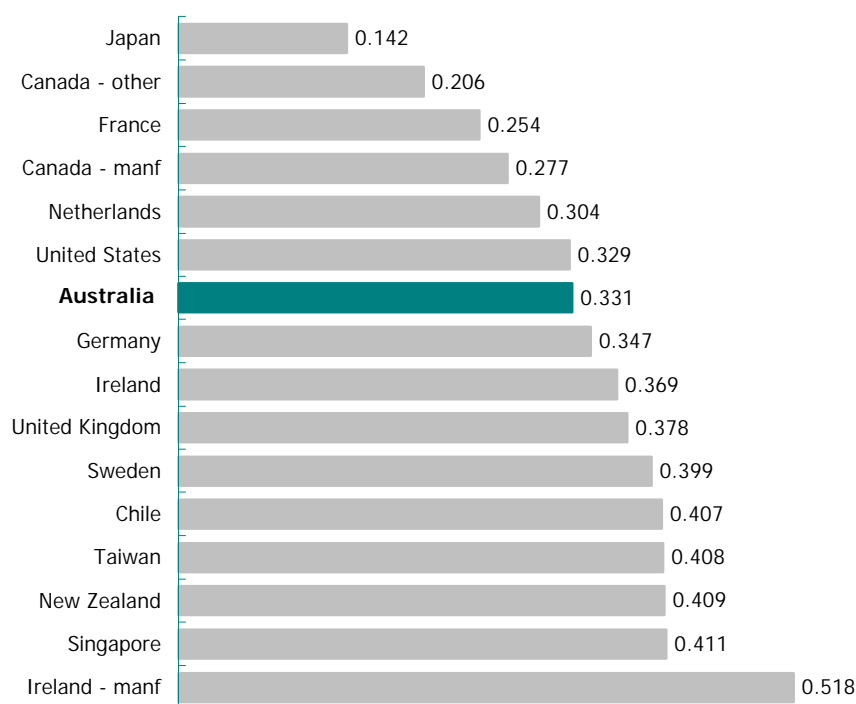
7.46   The estimated effective tax rates for investment differ quite markedly from the estimated marginal effective tax rates. Most significantly, effective tax rates for investment exhibit considerably more variation across the different tax systems — ETRs on investment in plant range from 0.9 per cent under the Singaporean system to 67.3 per cent under the Japanese system, compared to METRs of 43.1 per cent and 71.8 per cent respectively.

7.47   For most assets, all the business tax systems result in positive
effective tax rates for investment. This means that hurdle rates of return
will be higher than they would be in the absence of taxes on business. The
calculated effective tax rates for investment are significantly lower under the
Singaporean system than under any other system. Singapore aside, the
Australian system compares favourably with the other systems, with
effective tax rates for investment under Australian rules close to the
estimated rates under the Irish manufacturing, New Zealand and Taiwan
regimes.

Effective tax rates for savings

7.48   Figure 7.3 shows the estimated effect of each country's tax system
on after-tax returns to saving. As explained above, the effective tax rate for
savings is calculated as the percentage difference between real returns to
savings under each country's business tax system and the real rate of return
to savings in the absence of Australian taxes. The personal tax rate is held
constant at 47 per cent in all cases. The most significant feature of these
results is the inverse relationship between ETRs on investment and
savings — the systems with the lowest effective tax rates for investment
tend to have the highest effective tax rates for savings.

Figure 7.3: Effective tax rates on savings[a]

Country	ETR
Japan	0.142
Canada - other	0.206
France	0.254
Canada - manf	0.277
Netherlands	0.304
United States	0.329
Australia	0.331
Germany	0.347
Ireland	0.369
United Kingdom	0.378
Sweden	0.399
Chile	0.407
Taiwan	0.408
New Zealand	0.409
Singapore	0.411
Ireland - manf	0.518

(a)   Results depict average ETR on savings comprising 35 per cent debt and 65 per cent equity. Calculated for
      2 per cent inflation and a 47 per cent personal tax rate.

Conclusion

7.49   The subject matter of this chapter — the accuracy with which business tax rules measure economic income and the extent to which they distort investment, savings, financing and distribution decisions — has been the object of considerable scrutiny in all the surveyed countries. However, little consensus has been reached, at least on the precise magnitudes of the various effects. Indeed, the complexity of real world business tax systems, coupled with uncertainty about some aspects of how capital markets operate, means these issues will never be fully resolved.

7.50   The difficulties in reaching firm conclusions from the effective tax rates selectively presented in the chapter are further compounded by the partial nature of the analysis. Taxes are just one of the ways in which governments potentially affect business' decisions and profitability. By focusing on taxes, the analysis has not taken account of other government policies that may offset the effects of apparently favourable or unfavourable tax rules.

7.51   Despite these qualifications, some firm conclusions can be drawn. In particular, none of the surveyed countries' tax systems are fully neutral. Every tax system distorts, at least somewhat, relative rates of return to investment in different types of asset. The amount of tax collected on income from capital varies according to the inflation rate under every system. And all the systems potentially distort firms' decisions about capital structure and distribution policy.

7.52   However, the extent of these non-neutralities varies markedly across the various tax systems, making it possible to identify which features of different tax systems potentially have the greatest impact. Not surprisingly, tax systems with few explicit concessions tend to have more uniform effective tax rates across different types of assets. More surprisingly, some concessions, such as generous depreciation rates, appear not to result in significant disparities in effective tax rates, at least for the assets included in the analysis.

7.53   With respect to the effect of taxes on capital structure and distribution decisions, the results suggest that taxes will be relatively non-distortionary only if the company and personal income tax systems are fully integrated *and* the top personal rate is set close to the company rate. If, as is the case in many of the surveyed countries, the top personal rate is significantly higher than the company rate, the tax system will create incentives to retain rather than distribute equity-financed earnings.

7.54   The analysis also demonstrates that for open economies, the tax treatment of non-residents' income from capital is an important determinant of the extent to which business taxes result in higher required

returns to investment or in lower after-tax returns to savers. The systems of countries, such as New Zealand, which tax non-residents' capital income relatively lightly tend to result in smaller increases in required rates of return to investment, but at the expense of lower returns to savings.

7.55   Finally, the analysis suggests that the current Australian system incorporates some significant deviations from the neutral benchmark. This tends to occur mainly with R&D and mining. Some deviation from the benchmark also occurs for investment in plant and equipment but in this area, Australia's treatment is only slightly more favourable than the average. Differences in effective tax rates under different financing mixes and distribution patterns are small relative to most of the other systems.

7.56   The analysis has examined only a limited number of investment types and does not deal with the costs of compliance and complexity. Thus, it is possible that simplifying the tax system at the same time as moving towards greater neutrality could give rise to larger efficiency gains than these variations in effective tax rates might suggest.