Corporate Tax Reform Modelling Scenarios: First Stage Report

Chris Murphy

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Enquiries to: Chris Murphy
Emails: murphy@murphyeconomics.com.au
chris.murphy@anu.edu.au

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1. Introduction and Scope

This report was commissioned by the Productivity Commission. It presents modelling of a suite of policy scenarios for the corporate tax system that were developed by the Productivity Commission. The modelling is being conducted in two stages.

In this first stage the modelling simulates long-run outcomes for each policy scenario using the recently-updated CGETAX2025 model. An earlier version of this model has been used to model corporate tax reform in several studies including Murphy (2016a, 2016b, 2017, 2018a, 2018b).

In the second stage the modelling will be further developed using the new Dynamic CGE Tax Model. This new model will simulate year-by-year outcomes. This will help in designing how to phase out old tax policies and phase in new tax policies.

The second stage of the modelling will also incorporate four other improvements. It will: (a) address equity issues in a broad way; (b) it will more fully model the behavioural effects of our dual rate corporate tax system; (c) it will better model how potential changes in the tax base may affect the extent of international profit shifting; and (d) it will take into account that the existence of corporate tax may bias smaller businesses against incorporation.

The policy scenarios cover three alternative approaches to promoting consumer welfare and productivity by reducing the tax burden on investment. Those approaches are to reduce the corporate tax rate for smaller companies, to reduce the tax rate of all companies and to narrow the tax base so that corporate tax becomes more of a tax on economic rents and less of a tax on normal returns to capital.

This report is organised as follows. Section 2 summarises previous conceptual and empirical work on corporate tax policy. Section 3 describes the CGETAX2025 model, focussing particularly on how it models corporate tax, which is described in full detail in the Modelling Appendix. Section 4 explains the baseline scenario generated using the model and provides model estimates of the relative economic harm from different taxes. Section 5 summarises the results of the modelling scenarios, which are presented in detail in the Tables Appendix, and also assesses the possible policy implications of the results. Section 6 looks ahead to the second stage of the modelling.

2. Previous Work

Factors in taxing corporate income in a small open economy

In an important international study, McKeehan and Zodrow (2017) weigh up the factors that determine how best to tax capital income in a small open economy such as Australia. They define a small open economy as an economy that cannot affect the after-tax return to internationally mobile capital or the prices of tradable goods. They begin with the much-cited analysis by Gordon (1986).

a) Double Disincentive Effect

Murphy (2018a) summarises the findings of the influential Gordon (1986) study, as they apply to Australia, as follows. "As a small open economy, Australia can expect that foreign investors will add our corporate tax burden to the minimum rate of return they require to invest here, rather than absorb it. This discourages foreign investment and leaves local labour to bear the final burden of the local corporate tax, discouraging labour supply." This leads Gordon to find that, when a small open economy taxes corporate income, it has a double disincentive effect of discouraging both investment and labour supply. This is a worse outcome than taxing labour income, which discourages labour supply alone.

Indeed, as McKeehan and Zodrow (2017) note, this double disincentive effect means that "in a small open economy … the optimal capital income tax rate is zero".

Subsequent authors have pointed out that corporate income not only includes normal returns to capital, as assumed by Gordon (1986), but also includes economic rents. McKeehan and Zodrow (2017) point out that it is important to distinguish between firm-specific rents, such as the know-how of multinational corporations, and location-specific rents due to access to land and mineral resources and local oligopoly power.

McKeehan and Zodrow (2017) note that firm-specific rents are likely to be highly mobile internationally. This leads to the same policy conclusion as for normal returns to capital, that it is inefficient to tax firm-specific rents. Doing so is likely to deprive the small open economy of access to productivity-enhancing know-how.

b) Location-specific Economic rents

By definition, location-specific economic rents are immobile, so taxing them does not diminish their local supply. Indeed, while taxing normal returns to capital has the double disincentive effect, taxing economic rents has no disincentive effect. Hence, if we could separate the corporate income tax base into two components, one component for normal returns to capital and for firm-specific rents, and the other component for location-specific economic rents, we would tax the second component but not the first component.

c) IPS

The next factor influencing the best way of taxing capital income is international profit shifting (IPS), which McKeehan and Zodrow (2017, p.3) describe as follows.

> The application of a relatively high corporate tax rate to the income of MNCs encourages them to engage in profit shifting, that is, to use various financial manipulations, including transfer pricing, the relocation of the ownership of intangibles, and the use of loan reallocations that facilitate interest stripping, to shift revenues to relatively low tax countries and deductions to relatively high-tax countries. There is considerable empirical evidence of income shifting (Clausing 2011, 2016; Dowd et al. 2016); in particular, that a relatively high statutory corporate tax rate encourages income shifting, since it is the

statutory tax rate that determines the value to the firm of shifted revenues and deductions. Thus, a desire to avoid creating incentives for income shifting also puts downward pressure on capital income tax rates.

Besides eroding local tax revenue, international profit shifting (IPS) involves unproductive tax avoidance activity that is a drain on national income.

d) Bias against incorporation

The corporate income tax means that profits are taxed differently depending on whether or not a business is incorporated. This can lead to a tax-driven bias against incorporation. Gravelle and Kotlikoff (1992) show how the effects of this bias against incorporation can be modelled.

e) Franking Credits System

Australia is unusual in providing relief from corporate income tax to the extent that Australian-sourced profits are distributed to Australian shareholders in the form of dividends. This scheme of dividend imputation or franking credits erodes the gain in government revenue from corporate tax. Further, under the small open economy assumption, this loss of revenue occurs without reducing the double disincentive effect, because the marginal investor is a foreign investor who cannot use franking credits. Boadway and Bruce (1992) were the first to demonstrate the shortcomings of having a franking credit system in a small open economy.

Because Australian residents can receive franking credits for their onshore investments but not their offshore investments, the franking credits system also artificially increases home country bias in their portfolios. This reduces the benefits obtained from portfolio diversification. Assessing the franking credits system is outside of the scope of this report, but for modelling of its effects see Murphy (2018b).

f) Bias towards Debt

Corporate income tax allows an interest deduction for the cost of debt finance but no deduction for the cost of equity finance. This leads to tax-driven excessive corporate leverage, adding to risk.

Empirical Studies

Against that background on the factors influencing how to best tax corporate income in a small open economy, we now briefly review some empirical studies.

Dixon and Nassios (2018) use a dynamic model to trace the path of the economy towards its long run response to changes in corporate tax policy, whereas most other studies just model the long run response. However, in Dixon and Nassios (2018) consumers do not choose between present and future consumption in an optimising way, so the model does not generate a comprehensive measure of consumer welfare. Instead, Dixon and Nassios (2018) focus on the effects of policy changes on real GNI. We compare our modelling results with those of Dixon and Nassios (2018) in section 5.

Other studies focus on the effects of changes in tax policy on consumer welfare. Consumer welfare is a broad measure that takes into account how the tax system may make consumers worse off by distorting choices between different consumption goods, between work and leisure and between current and future consumption. Further, in optimising models, consumer welfare is also the measure that consumers themselves are seeking to maximise.

Freebairn (2022) argues that investment depends on how tax is applied to four funding streams: (i) Australian investment in Australian unincorporated businesses; (ii) Australian investment in Australian incorporated businesses; (iii) foreign investment in Australian incorporated businesses; and (iv) Australian investment in foreign businesses.

This segmented view of the capital market differs from most studies which emphasise the idea of a world capital market. Under that world view, investment depends mainly on the tax treatment of the third funding stream, while the tax treatments of the other funding streams mainly affect saving rates and portfolio allocations.

Garnaut, Emerson, Finighan and Anthony (2020) propose that Australian company tax is replaced with a cash flow tax (CFT) so that only economic rents are taxed. The proposed CFT uses a real or R base, except in banking where it uses a modified real plus financial or R+F base. The R+F base differs from the R base by including financial flows. We model the introduction of a CFT in section 5.

In contrast to studies that emphasise that Australia is part of a world capital market, Swan (2019) maintains that our company tax rate does not affect the cost of capital or investment in Australia because of the franking credits received by domestic investors. However, his empirical study is dominated by microcaps, and they are likely to be much more insulated from world capital markets than the larger companies that dominate investment. Other studies focus on the ASX300 and find that the availability of franking credits has little effect on the cost of capital. See Murphy (2018b) for further discussion.

Torslov, Wier and Zucman (2023) estimate how IPS affects corporate tax collections in different countries, including Australia. For Australia, they estimate that 7 per cent of the corporate income tax base is lost to profit shifting. However, this estimate is relatively imprecise because more limited data was available for Australia than for some other countries.

Tran and Xu (2023) use company unit record data to estimate how IPS affects corporate tax paid by MNCs in Australia, as foreign investors respond to tax rate differentials between Australia and other countries. Using a range of assumptions, they obtained four main estimates for the semi-elasticity of accounting profits to tax rate differentials between Australia and comparator countries. The average semi-elasticity is -1.6. This semi-elasticity refers to MNCs who can profit shift and needs to be discounted because many companies operate only in Australia and hence cannot profit shift.

Taking into account both Torslov et al. (2023) and the stronger evidence in Tran and Xu (2023), we assume in the modelling in this report that 10 per cent of the Australia company tax base is

lost to profit shifting in the current tax environment. This is down from the estimate of 15 per cent in Murphy (2018a).

Like Dixon and Nassios (2018), Tran and Wende (2021) use a dynamic model to analyse tax reforms. However, in Tran and Wende (2018) consumers also engage in fully optimising behaviour. Further, Tran and Wende (2018) consider equity by modelling effects on individuals with low, middle and high incomes.

The assumptions used in different model-based studies are compared at a high level in Table 1.

Table 1
Assumptions in Model-based studies of Corporate Tax Policy

`	KPMG Econtech (2010)	Kouparitsas et al. (2016)	Murphy (2016a, 2018a)	Dixon & Nassios (2018)	Tran & Wende (2021)	McKeehan & Zodrow (2017)	Murphy (2025), this report
perfect international capital mobility	yes	yes	yes	no	yes	yes	yes
elasticity of substitution between capital and labour	0.75	0.8	0.8	0.4	1.0	1.0	0.8
elasticity of intertemporal substitution	nil	nil	0.25	n/a	0.40	nil	0.25
corporate tax base lost to profit shifting	nil	10%	15%	nil	nil	13%	10%
labour income tax base lost to corporate tax base	nil	nil	nil	nil	nil	7%	nil
fixed factor rents	yes	yes	yes	yes	yes	yes	yes
oligopoly rents	nil	nil	yes	nil	nil	nil	yes
portfolio substitution (modelling home country bias)	nil	nil	nil	unclear	nil	nil	nil
measure of economic gains/losses	welfare	welfare	welfare	GNI	welfare	welfare	welfare
dynamics	nil	nil	nil	yes	yes	nil	nil

3. CGETAX2025 Model

In the previous section, we identified the major factors important in designing a corporate tax policy. Here we explain how those factors are treated in CGETAX. But first we provide some general background on the CGETAX model.

General Background on Model

CGETAX is a Computable General Equilibrium (CGE) model of the Australian economy with a special focus on tax policies. It is a high detailed model of the economy in a long run equilibrium state. There are 278 industries employing workers from 8 different occupations. The industries use eight types of produced capital and receive three types of economic rents.

CGETAX distinguishes the following taxes.

Income taxes:

Company Income Tax
Petroleum Resource Rent Tax
Personal Income Tax: labour income
Personal Income Tax: asset income
Superannuation: contributions tax
Superannuation income tax

Goods and Services Tax:

- Rate
- GST status of each industry

Stamp duty on conveyances:

- residential conveyancing
- non-residential conveyancing

Taxes on Alcoholic Beverages:

- WET: wine
- WET: cider
- Excise: beer
- Excise: spirits

Remaining Product Taxes and Subsidies:

- Excise: petroleum
- Excise: tobacco
- Luxury Car Tax
- Gambling taxes
- Insurance taxes
- Other product taxes
- Petroleum subsidies
- Other product subsidies
- Import Duty

Production Taxes:

- Payroll tax
- Land tax
- Municipal rates
- Other taxes on production NEI
- Other subsidies on production
- Mining Royalties

As explained further in section 4, the model is calibrated using the latest ABS input-output tables, which refer to 2022-23. For the product taxes, those tables can be used to infer the amount of revenue collected from each tax and who it is collected from. The same approach cannot be used for income taxes and production taxes.

For the various income taxes, the amount of revenue is obtained and cross-checked using various sources. These sources include the Federal Budget, the ABS national accounts and the ATO Taxation Statistics.

For production taxes, the input-output tables show total production taxes by industry. The author obtains from the ABS a more detailed breakdown by industry for each of payroll tax, land tax, other production taxes, and other production subsidies.

In the input-output tables, mining royalties are not treated as a tax or identified separately. In CGETAX, the amounts of mining royalties are obtained from Commonwealth Grant Commission publications and are then split out from each mining industry's gross operating surplus.

CGETAX models the behavioural effects of each of these taxes in considerable detail. See Murphy (2016b) for an overview. Here we concentrate on the behavioural effects of corporate tax.

Model Treatment of Corporate Tax

The behavioural effects of corporate tax in CGETAX are explained fully in the Modelling Appendix to this report. Here we provide a high-level summary that references the broad issues identified in section 2.

Double disincentive effect

In modelling the double disincentive effect of corporate tax on investment and labour supply, it is assumed that the marginal investor is foreign and the elasticity of substitution between capital and labour is around 0.8. These assumptions are similar to those made in most other studies, as can be seen from Table 1.

We also assume that the compensated elasticity of the labour supply with respect to the after-tax wage is 0.4. This is based on the widely cited study of Gruber and Saez (2002) who find an "elasticity of taxable income" of 0.4.

Taxing location-specific economic rents

The model allows for three types of location-specific economic rents. The types are oligopoly rents, mineral rents and land rents. The method of estimating oligopoly rents is explained in the Modelling Appendix. Collectively, these three types of rents account accounted for 54 per cent of corporate tax revenue in the baseline scenario, as shown in Table 2. The nature of the baseline scenario is explained in section 4.

Table 2
Baseline Corporate Tax Revenue by Type of Income ($ billion)

	$bn	%
normal returns to capital	58.9	46%
oligopoly rents: financial services	25.1	20%
oligopoly rents: other industries	13.5	11%
mineral rents	17.2	13%
land rents	12.9	10%
total	127.5	100%

These estimates highlight the challenges in designing corporate tax policy. About one-half of revenue is collected from normal returns to capital, doing considerable economic harm through the double disincentive effect. The other half is collected from economic rents. which in principle does no economic harm.

International profit shifting (IPS)

Based on studies for other countries, in using CGETAX, Murphy (2018b) assumed that the semi-elasticity of reported profit with respect to the tax rate differential across countries is -0.73. However, there are now estimates available for Australia.

As explained in section 2, drawing on Torslov et al. (2023) and Tran and Wu (2023), our estimate of the share of the corporate tax base lost to profit shifting has been reduced from 15 per cent to 10 per cent, as seen in Table 1. This in turn reduces our estimate for the semi-elasticity of reported profit with respect to the tax rate differential from -0.73 to -0.44.

In the model, firms engage in profit shifting activities as part of constrained profit maximisation and these tax avoidance activities have a deadweight cost. Under the reduced estimates for IPS, it does less economic harm in the modelling.

Franking credits system

The model allows for dividend imputation. It takes into account ATO data for the decade to 2021-22 that shows claimed franking credits represent only 34% of company tax collections. Leakages occur because: (i) not all profits are distributed as dividends; and (ii) foreign residents are not able to utilise franking credits.

In CGETAX franking credits increase the return to saving. In modelling saving decisions, the assumed elasticity of intertemporal substitution is 0.25, as seen in Table 1. CGETAX does not model how the franking credits system artificially increases home country bias in portfolios.

Other biases

Section 2 identified two other biases caused by the corporate tax system. These are a bias against incorporation and a bias towards debt rather than equity financing. Neither of these biases are taken into account in CGETAX or in other Australian models. However, the bias against incorporation will be taken into account in the stage two modelling using the new Dynamic CGE Tax model.

4. Baseline Scenario and Efficiency of Taxes

For this study, the database for CGETAX was completely updated from 2012-13 to 2022-23, the year of the latest input-output tables. The input-output tables provide a detailed snapshot of the economy. After the updating process, the parameters of the CGETAX2025 model were calibrated to the updated database.

The next steps in the updating process were to establish a new baseline scenario and to update the model's estimates for the economic harm from each tax. Those two steps are now described in turn.

Updated Baseline Scenario

The baseline scenario aims to simulate a long run equilibrium for the economy using representative model inputs and referring to 2025-26. This involves three steps. First, key model inputs are updated from 2022-23 to 2025-26. Second, some model inputs are normalised to the extent that 2025-26 is not a representative year. Third, the model is simulated to generate the baseline scenario.

For present purposes, the two main examples of this normalization process are world commodity prices and the average rate of personal income tax.

World commodity prices were unusually elevated in our base year of 2022-23 and so have been adjusted down for the baseline scenario. Table 3 shows the implications for the terms-of-trade. The baseline scenario terms-of-trade is below the current level but above the long-run level assumed in the latest Intergenerational Report (Australian Government, 2023).

Table 3
Terms of Trade

Terms of Trade	
ABS 2022-23	100.0
ABS 2025Q1	91.1
2023 IGR Long Run	79.7
Baseline Scenario	85.6

There is a structural budget deficit in 2025-26, which is not consistent with long run equilibrium. This is closed in the baseline scenario by adjusting up the average rate of personal income tax. After these adjustments, the model was simulated to generate the baseline scenario.

This led to the foreign ownership outcomes shown in Table 4. Estimated foreign ownership of the business sector was 23.4 per cent in 2022-23 and 18.8 per cent under the normalised, long run outcomes of the baseline scenario. This refers to the foreign share of the total business sector. The foreign share would be higher for larger companies and lower for smaller companies and unincorporated businesses.

Table 4
Foreign Ownership ($ billion)

Business Capital Ownership	2022-23	Baseline
ABS June 2022 Foreign Liabilities Equity	1,697	
Associated debt under normal gearing	299	
Total value of Foreign Capital	1,996	1,428
ABS June 2022 Business Produced Capital	3,698	3,824
Business Land	644	714
Capitalised Mineral Rents	2,258	949
Capitalised Oligopoly Rents	1,935	2,129
Total value of Business Assets	8,535	7,615
Foreign-owned share	23.4%	18.8%

Efficiency of Taxes

The excess burden of a tax measures the economic harm from a tax's disincentive effects. This is over and above the income effect of a tax in transferring purchasing power from the private sector to government.

The Henry Tax Review commissioned KPMG Econtech (2010) to model the excess burdens of the major Australian taxes. The KPMG Econtech study was led by the author of this report. Since that time, the modelling of excess burdens of Australian taxes has developed further. In the case of company tax, we can see some of the improvements from the comparison in Table 1, which compares the modelling assumptions in the KPMG Econtech (2010) report with the assumptions made in subsequent studies.

One of those subsequent studies is Murphy (2018a). It uses CGETAX to estimate marginal excess burdens (MEBs) and average access burdens (AEBs) for the major taxes. The results

are reproduced in Table 5. Table 6 shows the results when a similar exercise is performed for this report using CGETAX2025.

The MEB and AEB estimates are qualitatively similar. They tend to be a bit higher now for labour-based taxes such as personal income tax because the tax burden on labour has gone up. This rise in the tax burden is partly the actual rise over recent years due to bracket creep and partly a further assumed rise to close the current structural budget deficit, as discussed above.

One noticeable difference between Table 5 and Table 6 is that the MEB for company tax has fallen. For example, for an increase in the tax rate from 25 to 30 per cent, it has fallen from 104 per cent to 65 per cent. However, the sensitivity analysis in Table 6 shows this is fully explained by the reduced assumption for the amount of IPS that was discussed earlier.

Importantly, several studies show the same pattern of MEBs for the three major taxes. Per extra dollar of revenue raised, the GST does the least economic harm, followed by personal income tax, followed by company income tax with the most economic harm.

In the original KPMG Econtech (2010) study, the three respective MEBs climb from 8% to 24% to 40%. In Tran and Wende (2021), they climb from 23% to 43% to 69%. In this study, the MEBs rise from 26% to 34% to 65%.

This pattern of MEBs implies that we can substantially increase consumer welfare by shifting the tax mix away from a more harmful tax like company tax towards a less harmful tax. The modelling in section 5 simulates a range of scenarios for that type of tax reform.

At the same time, Table 6 shows that company tax becomes less harmful at the margin as the rate of tax falls. Once the tax rate is reduced to 20 per cent, the case for further reductions is less apparent.

Table 6 also implies that an alternative way of reducing the economic harm from company tax is to maintain the standard rate at 30 per cent and instead narrow the tax base so the company tax becomes more of a tax on economic rents and less of a tax on normal returns to capital. Three alternative ways of converting company tax to a rent-like tax are represented in Table 6. They are introducing an Allowance for Corporate Equity (ACE), introducing an Allowance for Corporate Capital (ACC), and allowing instant asset write-off (IAW), otherwise known as full expensing.

Table 6 shows that the revenue raised by using the existing tax base in preference to one of these rent-like tax bases has a very high MEB of between 64% and 85%. In section 5 we simulate reform options in scenarios with an ACE, full expensing and a cash flow tax (CFT). A CFT has similar properties to an ACC.

Table 5
Marginal and Average Excess Burdens using CGETAX in Murphy (2018a)

Major Taxes		
	MEB	**AEB**
Personal Income Tax		21%
budget repair levy	63%	
tax surcharge	42%	
medicare levy	42%	
income levy	29%	
bracket creep	25%	
labour income levy	31%	
reduce franking credits	13%	
Corporate Income Tax		
new policy environment:	132%	38%
25% to 30%	104%	
20% to 25%	68%	
15% to 20%	45%	
with old Treasury transfer effect:		
25% to 30%	77%	
20% to 25%	48%	
15% to 20%	29%	
GST		21%
raise rate	24%	
broaden base to fresh food	11%	
remove financial services concession	14%	
Other Taxes		
	MEB	**AEB**
Payroll Tax		28%
raise rate	34%	
abolish threshold	20%	
Property taxes:		
municipal rates	0%	-1%
land tax	46%	30%
conveyancing duty: residential	65%	49%
conveyancing duty: commercial	153%	107%
Insurance taxes	61%	40%
Mining taxes:		
PRRT	-9%	-10%
royalties	63%	42%
Financial service taxes:		
major bank levy		78%
rent tax (hypothetical)		-10%

Table 6

Marginal and Average Excess Burdens in this study using CGETAX2025

Major Taxes		
	MEB	**AEB**
Personal Income Tax		34%
top marginal rate	76%	
tax surcharge	48%	
medicare levy	36%	
income levy	34%	
bracket creep	32%	
Corporate Tax rate	80%	24%
27.5% to 30%	71%	
25% to 27.5%	58%	
22.5% to 25%	48%	
20% to 22.5%	39%	
17.5% to 20%	32%	
15% to 17.5%	25%	
Corporate Tax base		
ACE to current base	70%	
ACC to current base	85%	
IAW to current base	64%	
Corporate Tax rate and IPS assumption		
25% to 30% (base case)	65%	
25% to 30% (higher IPS used previously)	103%	
GST		26%
raise rate	30%	
broaden base to fresh food	16%	
remove financial services concession	1%	
Other Taxes		
	MEB	**AEB**
Payroll Tax		34%
raise rate	42%	
abolish threshold	21%	
Property taxes:		
municipal rates	-4%	-4%
land tax	92%	59%
conveyancing duty: residential	74%	60%
conveyancing duty: commercial	225%	155%
Insurance taxes	69%	48%
Mining taxes:		
royalties	57%	30%
PRRT	-8%	-8%
Financial service taxes:		
major bank levy		100%
rent tax (hypothetical)		-8%
Wholesale & retail trade taxes:		
levy (hypothetical)		25%
rent tax (hypothetical)		-8%

5. Modelling Results

We now simulate a wide range of scenarios for corporate tax reform.

In the first group of scenarios, the tax rate for base rate entities is reduced and eligibility for the base rate is extended. These policy changes reduce tax rates for smaller companies but leave the tax rates for larger companies unchanged at 30 per cent.

In the second group of scenarios we consider other options for tax reform. This includes an across-the-board cut in corporate tax rates. It also includes three ways of converting company tax to a rent-like tax.

Each scenario simulates the model after we vary some of the corporate tax policy settings in the Baseline Scenario. In presenting and interpreting the modelling results, we focus on the deviations from baseline in macroeconomic outcomes.

The specifications of the scenarios are shown in Table A1. Table A2 shows the calculation of weighted average rates of corporate tax in different scenarios. Tables A3a to A3d show the main results of each scenario.

We now consider the results for the first group of scenarios, in which we reduce tax rates for smaller companies.

Adjusted Base Rate Entity System

In the first group of scenarios, the tax rate for base rate entities is reduced from 25 per cent to 20 per cent, while the standard rate remains unchanged at 30 per cent. In addition, eligibility for the base rate is extended by raising the existing annual turnover threshold of $50 million, above which the standard rate applies.

$1bn threshold

In this scenario, the reduction in the base rate from 25 per cent to 20 per cent is accompanied by an increase in the annual threshold from $50 million to $1 billion. This is associated with a relatively modest reduction in the corporate tax burden. As seen in Table A2, the weighted average corporate tax rate drops from 28.9 per cent to 26.0 per cent.

This reduction in the average corporate tax rate is modelled under eight alternative funding assumptions. The results for each of the eight funding cases are shown in Table A3a.

This corporate tax cut has positive effects in each case. However, the effects are more positive when the cut is financed by more efficient taxes. This is the case in scenarios PC3 and PC4, where cash flow taxes are used. Under this financing method, the gain in annual consumer welfare is $4.1 billion.

This gain erodes to a gain of $2.0 billion in scenario PC1 when bracket creep is used to fund the corporate tax cut and $1.7 billion in scenario PC2 when a production levy on the mining, finance and retail sectors is used.

As expected, scenarios in which a mix of bracket creep and cash flow taxes are used for funding the corporate tax cut produce intermediate results. There is a gain in consumer welfare of $2.8 billion in scenario PC8 and $3.2 billion in scenario PC9.

The gains in business investment are also larger under funding methods that use more efficient taxes. However, this sensitivity is less pronounced than for consumer welfare. For example, the gain in investment is 1.6 per cent when the corporate tax cut is entirely funded by cash flow taxes, as in scenarios PC3 and PC4, but declines to 1.1 per cent when the production levy is used as the financing method.

$3bn threshold

In this scenario, the reduction in the base rate from 25 per cent to 20 per cent is accompanied by a larger increase in the annual threshold to $3 billion. Hence, there is a larger reduction in the corporate tax burden. As seen in Table A2, the weighted average corporate tax rate drops from 28.9 per cent to 25.0 per cent. The results for each of the eight funding cases are shown in Table A3b. This larger reduction in the corporate tax burden generates commensurately larger gains compared to the previous set of scenarios.

The gains in annual consumer welfare now range from $2.2 billion under production levy financing to $5.4 billion under cash flow tax financing. The gains in investment range from 1.5 per cent to 2.1 per cent.

$5bn threshold

In this scenario, the reduction in the base rate from 25 per cent to 20 per cent is accompanied by a still larger increase in the annual threshold to $5 billion. Hence, there is an even larger reduction in the corporate tax burden. As seen in Table A2, the weighted average corporate tax rate drops from 28.9 per cent to 24.6 per cent. The results for each of the eight funding cases are shown in Table A3c. This still larger reduction in the corporate tax burden generates still larger gains compared to the previous set of scenarios.

The gains in annual consumer welfare now range from $2.4 billion under production levy financing to $5.9 billion under cash flow tax financing. The gains in investment range from 1.7 per cent to 2.4 per cent.

Assessment

On the preliminary assumption that we want to reduce the base rate from 25 per cent to 20 per cent, we now assess how far we should go in increasing the threshold at the same time. Should the threshold be increased to $1 billion, $3 billion or $5 billion? We use the modelling results to assess that question in two alternative ways. First, we take the orthodox approach of examining the gain in consumer welfare relative to the budget cost. Second, given that business

investment is the PC's main focus, we examine the gain in business investment relative to the budget cost.

To make this comparison in a consistent way, we need to use the same funding method in each of the three cases. The funding method we use is the more broadly-based CFT. Hence, we compare the results across scenarios PC4 ($1 billion threshold), PC23 ($3 billion threshold) and PC15 ($5 billion threshold).

Under PC4, there is a gain in annual consumer welfare of $4.1 billion. This involves raising $8.2 billion in CFT revenue. Thus, there is a gain in consumer welfare of 49 cents for every dollar that is raised in CFT revenue. This gain arises because the CFT is an efficient, rent-like tax that is partly replacing an inefficient tax, namely company tax.

This rate of gain in consumer welfare diminishes only slightly as we raise the threshold further. Raising the threshold from $1 billion in PC4 to $3 billion in PC23 produces a further gain of 44 cents in consumer welfare for every further dollar raised in CFT revenue. Similarly, raising the threshold from $3 billion in PC23 to $5 billion in PC15 sees the marginal rate of gain diminish only slightly to 43 cents for each further dollar raised in CFT revenue.

In short, substantial rates of gain in consumer welfare are maintained as we raise the annual threshold to as high as $5 billion. We haven't tested the effects of raising the threshold even higher. A similar pattern emerges when we consider the investment gains relative to the budget costs.

Under PC4, there is a permanent gain in business investment of 1.6 per cent. As noted above, this involves raising $8.2 billion in CFT revenue. Thus, there is a gain in investment of 0.20 percentage points for every $1 billion that is raised in CFT revenue. This gain arises because the CFT does not discourage business investment and it is partly replacing company tax which does discourage investment.

This rate of gain in business investment diminishes only slightly as we raise the threshold further. Raising the threshold from $1 billion in PC4 to $3 billion in PC23 and then raising it again from $3 billion in PC23 to $5 billion in PC15 consistently produces a further gain in investment of 0.18 percentage points for every further $1 billion that is raised in CFT revenue.

Thus, whether we consider gains in consumer welfare or gains in business investment, the rate of gain is largely maintained as we raise the threshold to as high as $5 billion. Thus, the modelling results support the idea of raising the threshold to at least $5 billion.

Other Corporate Tax Reform Scenarios

This second group of scenarios examine a range of alternative approaches to corporate tax reform. There are four scenarios in all. In the first scenario there is an across-the-board cut in corporate tax rates. The remaining three scenarios show alternative ways of narrowing the corporate tax base to convert the corporate tax into a rent-like tax.

Each of these four scenarios reduce the corporate tax burden, but in different ways. However, in each case the reduction is funded by bracket creep. The results are presented in Table A3d.

5% point cut in both the base and standard rates of corporate tax

In this scenario there is an across-the-board reduction in the corporate tax rate of 5 percentage points. This is larger than in any of the preceding scenarios.

However, the economic gains are moderated in this case because the cut is financed by bracket creep rather than a cash flow tax. The gain in annual consumer welfare is $3.0 billion in this scenario PC5, down from $5.9 billion in scenarios PC12 and PC15, where cash flow taxes are used as the financing method. At the same time, the gain in business investment is the same in all three scenarios, at 2.4 per cent.

Allowance for Corporate Equity (ACE)

The idea behind introducing an Allowance for Corporate Equity (ACE) is to convert the corporate tax to be almost a pure tax on economic rents. This narrowing of the tax base has a large budget cost which is assumed to be funded by bracket creep. However, converting the corporate tax to a tax on economic rents generates a large gain in consumer welfare.

In scenario PC6, the ACE leads to a gain in annual consumer welfare of $14.5 billion. This is associated with a gain in business investment of a large 15.5 per cent.

Full expensing

Like the ACE, the idea of modifying the existing corporate tax to allow full expensing or instant asset write-off is to no longer tax normal returns to capital. Again, this results in large gains.

In scenario PC7, full expensing leads to a gain in annual consumer welfare of $15.4 billion. This is associated with a gain in business investment of a large 18.9 per cent.

In fact, both the ACE and full expensing go a little too far by actually subsidising debt-funded investment, with full expensing doing this to a greater degree. Under full expensing, the full cost of investment that is debt funded is expensed immediately, yet further deductions are allowed for interest costs leading to an overall subsidy on investment. Under ACE, the subsidy of debt-funded investment is smaller, being limited to allowing a deduction for borrowing costs based on nominal interest rates rather than inflation-adjusted interest rates. For further analysis of this point, see the Modelling Appendix.

Full expensing with no interest deductibility (across-the-board cash flow tax)

The remaining scenario is designed to neither tax nor subsidise normal returns to capital. It only taxes economic rents. It does this by allowing full expensing while not allowing deductions for net interest expenses. This is similar in effect to an across-the-board Cash Flow Tax with a so-called Real or R Base. There are practical issues in applying such a tax to financial intermediation services that are funded through interest rate margins, but see Murphy (2017).

Removing the debt deduction reduces the budget cost from the full expensing policy from $79.1 billion to $57.9 billion. At the same time, the gain in consumer welfare rises from $15.4 billion to $16.8 billion. Indeed, this scenario PC28 generates higher gains in consumer welfare at lower budget cost than either full expensing with debt deductibility, scenario PC7, or the ACE, PC6. This is because scenario PC28 involves a more pure rent tax than either of the other two scenarios.

Assessment

This group of four scenarios allows us to assess the relative merits of alternative approaches to corporate tax reform. Should we reduce the rate (scenario PC5) or narrow the base to focus better on economic rents with an ACE (scenario PC6) or full expensing (scenario PC7) or a cash flow tax under an R base (scenario PC28). It is valid to compare the results across these four scenarios because they all use the same funding method, which is bracket creep. Reflecting that funding method, we assess the merits of the scenarios by comparing the gains relative to the required increase in personal income tax revenue.

Under PC5, the across-the-board cut in the company tax rate of 5 percentage points results in a gain in annual consumer welfare of $3.0 billion. This involves raising $18.5 billion in additional personal income tax revenue. Thus, there is a gain in consumer welfare of 16 cents for every extra dollar that is raised in personal income tax. This gain arises because personal income tax is a less inefficient tax than the company tax that it is replacing.

Before moving on to the next change in corporate tax, it is worth noting that PC5 involves a similar-sized reduction in the overall corporate tax burden to PC15, which focusses its tax cut on smaller companies. However, PC5 generates a smaller gain in consumer welfare than PC15. This is because of the different funding assumptions, with PC5 using bracket creep which is somewhat inefficient while PC15 uses the efficient CFT.

We now consider whether it would be better to narrow the base of company tax so that it more closely resembles a tax on economic rents, rather than to lower the rate as in PC5. Narrowing the base by introducing an ACE allowance in PC6 generates a gain in consumer welfare of 32 cents for every extra dollar that is raised in personal income tax. This is double the rate of gain from reducing the tax rate in PC5. This is not surprising because introducing an ACE means that corporate tax becomes more of a tax on economic rents, which is an efficient tax base. Thus, the modelling results suggest that it is better to narrow the base than reduce the rate.

But is introducing an ACE the best way of narrowing the base? In PC7 we instead narrow the base by introducing full expensing. This generates a gain in consumer welfare of 28 cents for every extra dollar that is raised in personal income tax. While this is a better result than the 16 cents in the dollar from reducing the rate, it is inferior to the gain of 32 cents in the dollar from instead narrowing the base using an ACE. Full expensing is inferior to an ACE because it goes turn far by converting a tax on normal returns to capital into a subsidy for debt-funded investment.

Next, we consider the final option of narrowing the base by introducing full expensing with no interest deductibility i.e. a CFT on an R base. This generates a gain in consumer welfare of 46 cents for every extra dollar that is raised in personal income tax. This is clearly the best result from all of the corporate tax reform options that have been modelled.

Finally, we consider whether these conclusion still hold if we focus on gains in investment rather than gains in consumer welfare. When we reduce the corporate tax rate in scenario PC 5, there is a gain in investment of 0.13 percentage points for every $1 billion that is raised in CFT revenue. This rises to a rate of investment gain of 0.34 percentage points under either an ACE or full expensing. However, the highest rate of investment gain, of 0.43 percentage points, is achieved by introducing full expensing with no interest deductibility i.e. a CFT on an R base. Of the options considered, this is the only pure tax on economic rents.

Thus, irrespective of whether we focus on gains in consumer welfare or gains in business investment, we reach the same pair of policy conclusions.

First, if we only consider the option of reducing the base rate from 25 per cent to 20 per cent, the modelling results support the idea of raising the threshold to at least $5 billion at the same time.

Second, we can achieve higher rates of gain in both consumer welfare and investment by instead narrowing the company tax base to focus more on taxing economic rents. The best way of doing this is through a cash flow tax on an R base followed by an ACE followed by full expensing.

Such a narrowing of the corporate tax base would need to be funded by a substantial shift in the tax mix towards other taxes. Here we have assumed that bracket creep is used to achieve that shift.

If we wanted to reduce the scale of the shift in the tax mix, we could adopt a hybrid corporate tax system. In the case of the ACE, this can be achieved readily by setting the ACE allowance rate at, say, half the rate that can be justified. In the case of the CFT, we could allow immediate expensive for only one-half of new investment and allow a deduction for one-half of net interest expenses.

Dixon and Nassios (2018)

The Productivity Commission has asked for advice on differences between this study and Dixon and Nassios (2018) in the effects of a corporate tax cut on GNI. We compare our results with Dixon and Nassios (2018) in Table A4. The nearest comparable scenarios are our scenario PC15 and the scenario reported in their Table 2. Our reduction in the company tax rate of 4.3 percentage points is slightly lower than their reduction of 5 percentage points. However, in both cases the company tax cut is funded with a non-distortionary tax.

Dixon and Nassios (2018) report a smaller gain in GDP of 0.3 per cent rather than 0.8 per cent, a gap of 0.5 percentage points, as seen in Table A4. This is mainly because they assume an

elasticity of substitution between labour and capital of 0.4, lower than our estimate of 0.8 and lower than the estimates of all of the other studies referenced in Table 1. A lower substitution elasticity means there is less scope for boosting productivity by applying more capital to the same amount of labour.

Another reason that Dixon and Nassios (2018) obtain a smaller gain in GDP is that they assume that Australia is a less open economy than is assumed in the other studies with respect to both capital and trade.

In Dixon and Nassios (2018) Australia can only attract more investment from the rest of the world by offering higher after-tax rates of return than before, whereas in the other studies the required after-tax rate of return is taken as given, being fixed on world capital markets.

In Dixon and Nassios (2018) the rest-of-the-world are less able to absorb additional exports from Australia. In particular, each 4 per cent increase in Australian export volumes leads to a 1 per cent decline in our terms-of-trade. The corresponding decline in the terms-of-trade is smaller in the other models.

The gap between the two sets of modelling results widens from 0.5 percentage points to 0.7 percentage points when we consider the results for living standards, as very approximately measured by private plus government consumption. Specifically, this measure shows a gain of 0.4 per cent in the CGETAX2025 results but a loss of 0.3 per cent in the Dixon and Nassios (2018) results. This widening of the gap in the results from 0.5 to 0.7 percentage points would be partly due to the greater decline in the terms of trade seen in Dixon and Nassios (2018) that was referred to above. The terms-of-trade is down -0.14 per cent in CGETAX2025 but by -0.33 per cent in Dixon and Nassios (2018).

In short, Dixon and Nassios (2018) have made more conservative assumptions about the values of certain behavioural parameters compared to other studies of corporate tax policy. They also do not model profit shifting.

Equally, the choice of assumptions in Dixon and Nassios (2018) is understandable for a short to medium run analysis. Over that timeframe, there is less economic flexibility, potentially justifying their more conservative assumptions for substitution possibilities. This is consistent with their aim of using a dynamic model to trace the path of the economy following a change to corporate tax policy.

That said, decisions about potential changes in corporate tax policy should largely be based on their lasting or long run effects. Over that horizon, greater economic flexibility can be expected.

6. Stage 2 Modelling

The second stage of the modelling will use the new dynamic CGE Tax model in place of CGETAX2025. The dynamic nature of the new model means that it can do more than simulate

the long run effects of policy changes. It can also trace the year-by-year path of the economy to those long run outcomes. This has two main benefits.

First, a dynamic model is helpful in assessing the extent to which policy changes should be phased in rather than introduced in full at the outset. Second, a dynamic model is also helpful in assessing the merits of grandfathering or gradually phasing out old policies.

The new dynamic CGE Tax model will also provide improvements in four other areas over the analysis with CGETAX2025.

First, the new model will provide a broad analysis of the effects of changes in corporate tax policy on equity. CGETAX uses a representative household. The new model will address equity issues in a broad way by simulating the effects of each policy scenario on low-, middle- and high-income earners.

Second, the new model will improve the modelling of the effects of a dual rate corporate tax system. CGETAX uses a weighted average of the standard tax rate and the base rate to simulate the effects of adjusting corporate tax rates. The new model will also model some of the behavioural effects of having a dual rate system.

On the one hand, oligopoly rents, which are efficient to tax, may be more prevalent for larger companies than for smaller companies, so a dual rate system may help the tax system to target oligopoly rents. On the other hand, a dual rate system can have the negative effect that it may encourage some companies operating not far above the turnover ceiling to shrink their operations sufficiently to access the lower tax rate, even when this reduces efficiency.

Third, the new model will take into account the bias against incorporation of businesses due to the existence of company tax. CGETAX implicitly takes the mix between incorporated and unincorporated businesses as given. The new model will take into account that the corporate tax rate is likely to affect that mix.

Fourth, the new model will allow more refined modelling of the effects of profit shifting. CGETAX assumes that the proportion of the tax base lost to profit shifting depends on the headline tax rate alone. In reality, the nature of the tax base may also affect the proportion of base that is shifted.

There are two reasons that we need to be careful in using the main policy conclusions from this stage 1 modelling. Recall that those conclusions were as follows.

> First, if we only consider the option of reducing the base rate from 25 per cent to 20 per cent, the modelling results support the idea of raising the threshold to at least $5 billion at the same time.
>
> Second, we can achieve higher rates of gain in both consumer welfare and investment by instead narrowing the company tax base to focus more on taxing economic rents. The

best way of doing this is through a cash flow tax on an R base followed by an ACE followed by full expensing.

The first reason for care using these conclusions is that the modelling improvements in stage 2 will inevitably lead to some changes in the modelling results. There would be some possibility that these changes in results are sufficient to alter a policy conclusion.

The second reason for care is that these conclusions are based on modelling of hypothetical changes to the corporate tax system. There is more precedent around the world for some of the policy changes and less precedent for other policy changes. Thus, the practicality of implementing a simulated policy change needs to be accessed before any final commitment to it. Some of the implementation issues are discussed in the Modelling Appendix.

Tables Appendix

Table A1

Scenarios

Description	Code	Funding	Weighted corporate tax rate	Average personal tax rate	Production levy rate	narrow CFT rate	broad CFT rate	Corporate tax base
Baseline			28.9%	27.8%				
Adjusted base rate entity system (20% rate, $1bn threshold, standard rate unchanged at 30%)	PC1	bracket creep	26.0%	28.3%				unchanged
	PC2	production levy on mining retail and banking		27.8%	1.16%			unchanged
	PC3	Cash Flow Tax on mining and retailing		27.8%		8.5%		unchanged
	PC8	3% CFT on mining and retail and bracket creep		28.1%		3.0%		unchanged
	PC9	5% CFT on mining and retail and bracket creep		28.0%		5.0%		unchanged
	PC4	Cash Flow Tax on all sectors except finance		27.8%			7.5%	unchanged
	PC26	3% CFT on all sectors except finance and bracket creep		28.1%			3.0%	
	PC27	5% CFT on all sectors except finance and bracket creep		28.0%			5.0%	
Adjusted base rate entity system with higher threshold (20% rate, $3bn threshold, standard rate unchanged at 30%)	PC18	bracket creep	25.0%	28.5%				
	PC19	production levy on mining retail and banking		27.8%	1.58%			
	PC20	Cash Flow Tax on mining and retailing		27.8%		11.9%		
	PC21	3% CFT on mining and retail and bracket creep		28.3%		3.0%		
	PC22	5% CFT on mining and retail and bracket creep		28.2%		5.0%		
	PC23	Cash Flow Tax on all sectors except finance		27.8%			10.4%	
	PC24	3% CFT on all sectors except finance and bracket creep		28.3%			3.0%	
	PC25	5% CFT on all sectors except finance and bracket creep		28.1%			5.0%	
Adjusted base rate entity system with highest threshold (20% rate, $5bn threshold, standard rate unchanged at 30%)	PC10	bracket creep	24.6%	28.5%				unchanged
	PC11	production levy on mining retail and banking		27.8%	1.76%			unchanged
	PC12	Cash Flow Tax on mining and retailing		27.8%		13.5%		unchanged
	PC13	3% CFT on mining and retail and bracket creep		28.4%		3.0%		unchanged
	PC14	5% CFT on mining and retail and bracket creep		28.3%		5.0%		unchanged
	PC15	Cash Flow Tax on all sectors except finance		27.8%			11.7%	unchanged
	PC16	3% CFT on all sectors except finance and bracket creep		28.3%			3.0%	
	PC17	5% CFT on all sectors except finance and bracket creep		28.2%			5.0%	
5% point cut in company income tax rates (standard rate from 30% to 25%, base rate from 25% to 20%, threshold unchanged at $50m	PC5	bracket creep	23.9%	28.6%				unchanged
Allowance for Corporate equity (ACE introduced with unchanged corporate tax rates)	PC6	bracket creep	28.9%	31.0%				deduction for cost of equity
Full expensing (immediate write-off of all business investment with unchanged corporate tax rates)	PC7	bracket creep	28.9%	31.7%				deduction for investment instead of for depreciation
Full expensing with no debt interest deduction (immediate write-off of all business investment with unchanged corporate tax rates)	PC28	bracket creep	28.9%	30.5%				deduction for investment instead of for depreciation and interest

Table A2

Weighted Average Company Tax Rates

Threshold	Base weight	Base rate	Standard Rate	Average Rate
$50m	21%	25%	30%	28.9%
$1,000m	40%	20%	30%	26.0%
$3,000m	50%	20%	30%	25.0%
$5,000m	54%	20%	30%	24.6%
$10,000m	60%	20%	30%	24.0%
unlimited	90%	20%	30%	21.0%
$50m	21%	20%	25%	23.9%

Table A3a

Results: 20% base rate with $1 billion threshold

bus tax scenario:	PC1	PC2	PC3	PC8	PC9	PC4	PC26	PC27
Consumer welfare (2025/26, $bn)	2.0	1.7	4.1	2.8	3.2	4.1	2.9	3.4
Company tax revenue ($bn, 2025/26)	-13.1	-13.1	-14.8	-13.7	-14.2	-14.8	-13.8	-14.3
Cash Flow Tax revenue ($bn, 2025/26)	0.0	0.0	8.2	3.0	5.0	8.2	3.4	5.6
Personal income tax revenue ($bn, 2025/26)	10.7	4.2	3.7	8.1	6.4	3.7	7.8	5.9
Production levy revenue ($bn, 2025/26)	-0.1	7.1	0.0	-0.1	-0.1	0.0	-0.1	-0.1
Other net revenue ($bn, 2025/26)	2.5	1.8	3.0	2.7	2.8	3.0	2.7	2.8
Business investment (%)	1.4%	1.1%	1.6%	1.5%	1.5%	1.6%	1.5%	1.6%
GDP (%)	0.4%	0.3%	0.5%	0.4%	0.5%	0.5%	0.4%	0.5%
Exports (%)	0.7%	0.3%	0.8%	0.8%	0.8%	0.8%	0.8%	0.8%
Imports (%)	0.6%	0.4%	0.8%	0.7%	0.7%	0.8%	0.7%	0.7%
Terms of trade (%)	-0.1%	0.0%	-0.1%	-0.1%	-0.1%	-0.1%	-0.1%	-0.1%
Foreign Investment in Australia (% of GDP)	3.6	3.0	3.2	3.5	3.4	3.2	3.4	3.4
Employment (%)	-0.1%	0.0%	0.1%	0.0%	0.0%	0.1%	0.0%	0.0%
Business capital stock (%)	1.9%	1.6%	2.1%	2.0%	2.0%	2.1%	2.0%	2.1%
Productivity (%)	0.4%	0.3%	0.4%	0.4%	0.4%	0.4%	0.4%	0.4%
GNI (%)	0.2%	0.2%	0.4%	0.3%	0.4%	0.4%	0.3%	0.4%
Household Consumption (%)	0.2%	0.1%	0.4%	0.3%	0.3%	0.4%	0.3%	0.3%
General Government final demand (%)	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Household consumption + Gen. Govt final demand	0.1%	0.1%	0.3%	0.2%	0.2%	0.3%	0.2%	0.2%
Real after-tax wage (%)	0.0%	0.0%	0.5%	0.2%	0.3%	0.5%	0.2%	0.3%
Real GDP by 1 digit industry								
A Agriculture, Forestry and Fishing	-0.2%	-0.2%	0.0%	-0.1%	-0.1%	0.0%	-0.1%	-0.1%
B Mining	1.8%	1.0%	1.8%	1.8%	1.8%	1.8%	1.8%	1.8%
C Manufacturing	0.3%	0.3%	0.5%	0.4%	0.5%	0.5%	0.4%	0.5%
D Electricity, Gas, Water and Waste Services	0.5%	0.5%	0.7%	0.6%	0.6%	0.7%	0.6%	0.6%
E Construction	0.9%	0.8%	1.1%	1.0%	1.0%	1.1%	1.0%	1.0%
F Wholesale Trade	0.4%	0.1%	0.5%	0.4%	0.5%	0.5%	0.4%	0.5%
G Retail Trade	0.2%	0.0%	0.4%	0.3%	0.3%	0.4%	0.3%	0.4%
H Accommodation and Food Services	0.2%	0.4%	0.4%	0.2%	0.3%	0.4%	0.3%	0.3%
I Transport, Postal and Warehousing	0.4%	0.4%	0.6%	0.5%	0.5%	0.6%	0.5%	0.6%
J Information Media and Telecommunications	0.3%	0.4%	0.5%	0.4%	0.4%	0.5%	0.4%	0.4%
K Financial and Insurance Services	0.2%	-0.1%	0.4%	0.3%	0.3%	0.4%	0.3%	0.4%
L Rental, Hiring and Real Estate Services	0.5%	0.4%	0.6%	0.5%	0.6%	0.6%	0.5%	0.6%
M Professional, Scientific and Technical Services	0.2%	0.2%	0.4%	0.3%	0.3%	0.4%	0.3%	0.4%
N Administrative and Support Services	0.1%	0.1%	0.3%	0.2%	0.3%	0.3%	0.2%	0.3%
O Public Administration and Safety	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%
P Education and Training	-0.1%	0.0%	0.0%	-0.1%	0.0%	0.0%	-0.1%	0.0%
Q Health Care and Social Assistance	0.0%	0.1%	0.1%	0.0%	0.0%	0.1%	0.0%	0.0%
R Arts and Recreation Services	0.2%	0.3%	0.4%	0.2%	0.3%	0.4%	0.3%	0.3%
S Other Services	0.1%	0.2%	0.3%	0.2%	0.2%	0.3%	0.2%	0.2%
T Ownership of dwellings	0.1%	0.2%	0.3%	0.2%	0.2%	0.3%	0.2%	0.3%

Table A3b

Results: 20% base rate with $3 billion threshold

bus tax scenario:	PC18	PC19	PC20	PC21	PC22	PC23	PC24	PC25
Consumer welfare (2025/26, $bn)	2.5	2.2	5.4	3.3	3.8	5.4	3.4	4.0
Company tax revenue ($bn, 2025/26)	-17.5	-17.6	-19.8	-18.2	-18.6	-19.8	-18.3	-18.7
Cash Flow Tax revenue ($bn, 2025/26)	0.0	0.0	11.2	3.0	5.0	11.2	3.4	5.6
Personal income tax revenue ($bn, 2025/26)	14.4	5.6	4.8	11.8	10.1	4.8	11.4	9.5
Production levy revenue ($bn, 2025/26)	-0.1	9.7	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1
Other net revenue ($bn, 2025/26)	3.2	2.3	4.0	3.4	3.6	4.0	3.5	3.6
Business investment (%)	1.9%	1.5%	2.1%	2.0%	2.0%	2.1%	2.0%	2.0%
GDP (%)	0.5%	0.3%	0.7%	0.5%	0.6%	0.7%	0.6%	0.6%
Exports (%)	1.0%	0.4%	1.1%	1.0%	1.0%	1.1%	1.0%	1.1%
Imports (%)	0.8%	0.5%	1.0%	0.8%	0.9%	1.0%	0.9%	0.9%
Terms of trade (%)	-0.1%	0.1%	-0.1%	-0.1%	-0.1%	-0.1%	-0.1%	-0.1%
Foreign Investment in Australia (% of GDP)	4.8	4.0	4.3	4.7	4.6	4.3	4.6	4.5
Employment (%)	-0.1%	-0.1%	0.1%	0.0%	0.0%	0.1%	0.0%	0.0%
Business capital stock (%)	2.6%	2.1%	2.8%	2.7%	2.7%	2.8%	2.7%	2.7%
Productivity (%)	0.6%	0.4%	0.6%	0.6%	0.6%	0.6%	0.6%	0.6%
GNI (%)	0.3%	0.2%	0.6%	0.4%	0.4%	0.6%	0.4%	0.4%
Household Consumption (%)	0.2%	0.2%	0.5%	0.3%	0.3%	0.5%	0.3%	0.4%
General Government final demand (%)	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Household consumption + Gen. Govt final demand	0.1%	0.1%	0.4%	0.2%	0.2%	0.4%	0.2%	0.3%
Real after-tax wage (%)	0.0%	0.0%	0.7%	0.2%	0.3%	0.7%	0.2%	0.3%
Real GDP by 1 digit industry								
A Agriculture, Forestry and Fishing	-0.2%	-0.3%	-0.1%	-0.2%	-0.2%	-0.1%	-0.2%	-0.1%
B Mining	2.4%	1.3%	2.4%	2.4%	2.4%	2.4%	2.4%	2.4%
C Manufacturing	0.4%	0.4%	0.7%	0.5%	0.6%	0.7%	0.5%	0.6%
D Electricity, Gas, Water and Waste Services	0.6%	0.7%	0.9%	0.7%	0.8%	0.9%	0.7%	0.8%
E Construction	1.2%	1.1%	1.4%	1.3%	1.3%	1.4%	1.3%	1.3%
F Wholesale Trade	0.5%	0.1%	0.7%	0.5%	0.6%	0.7%	0.5%	0.6%
G Retail Trade	0.2%	0.0%	0.6%	0.3%	0.4%	0.6%	0.3%	0.4%
H Accommodation and Food Services	0.2%	0.5%	0.5%	0.3%	0.3%	0.5%	0.3%	0.4%
I Transport, Postal and Warehousing	0.6%	0.5%	0.8%	0.7%	0.7%	0.8%	0.7%	0.7%
J Information Media and Telecommunications	0.4%	0.5%	0.7%	0.5%	0.5%	0.7%	0.5%	0.5%
K Financial and Insurance Services	0.3%	-0.1%	0.6%	0.4%	0.4%	0.6%	0.4%	0.4%
L Rental, Hiring and Real Estate Services	0.6%	0.5%	0.8%	0.7%	0.7%	0.8%	0.7%	0.7%
M Professional, Scientific and Technical Services	0.3%	0.2%	0.5%	0.4%	0.4%	0.5%	0.4%	0.4%
N Administrative and Support Services	0.2%	0.2%	0.4%	0.3%	0.3%	0.4%	0.3%	0.3%
O Public Administration and Safety	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%
P Education and Training	-0.1%	0.1%	0.0%	-0.1%	-0.1%	0.0%	-0.1%	-0.1%
Q Health Care and Social Assistance	-0.1%	0.1%	0.1%	0.0%	0.0%	0.1%	0.0%	0.0%
R Arts and Recreation Services	0.2%	0.4%	0.5%	0.3%	0.3%	0.5%	0.3%	0.4%
S Other Services	0.1%	0.3%	0.4%	0.2%	0.2%	0.4%	0.2%	0.3%
T Ownership of dwellings	0.2%	0.3%	0.4%	0.2%	0.3%	0.4%	0.2%	0.3%

Table A3c

Results: 20% base rate with $5 billion threshold

bus tax scenario:	PC10	PC11	PC12	PC13	PC14	PC15	PC16	P17
Consumer welfare (2025/26, $bn)	2.7	2.4	5.9	3.5	4.0	5.9	3.6	4.2
Company tax revenue ($bn, 2025/26)	-19.4	-19.5	-22.0	-20.1	-20.5	-22.0	-20.1	-20.6
Cash Flow Tax revenue ($bn, 2025/26)	0.0	0.0	12.4	3.0	5.0	12.4	3.4	5.6
Personal income tax revenue ($bn, 2025/26)	16.0	6.2	5.2	13.4	11.7	5.2	13.0	11.1
Production levy revenue ($bn, 2025/26)	-0.1	10.8	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1
Other net revenue ($bn, 2025/26)	3.6	2.6	4.4	3.8	3.9	4.4	3.8	4.0
Business investment (%)	2.1%	1.7%	2.4%	2.2%	2.2%	2.4%	2.2%	2.2%
GDP (%)	0.5%	0.4%	0.8%	0.6%	0.6%	0.8%	0.6%	0.6%
Exports (%)	1.1%	0.4%	1.2%	1.1%	1.2%	1.2%	1.1%	1.2%
Imports (%)	0.9%	0.5%	1.1%	0.9%	1.0%	1.1%	0.9%	1.0%
Terms of trade (%)	-0.1%	0.1%	-0.1%	-0.1%	-0.1%	-0.1%	-0.1%	-0.1%
Foreign Investment in Australia (% of GDP)	5.3	4.4	4.7	5.2	5.1	4.7	5.2	5.1
Employment (%)	-0.1%	-0.1%	0.1%	-0.1%	0.0%	0.1%	-0.1%	0.0%
Business capital stock (%)	2.9%	2.4%	3.1%	2.9%	3.0%	3.1%	2.9%	3.0%
Productivity (%)	0.7%	0.5%	0.6%	0.7%	0.7%	0.6%	0.7%	0.7%
GNI (%)	0.3%	0.2%	0.6%	0.4%	0.5%	0.6%	0.4%	0.5%
Household Consumption (%)	0.2%	0.2%	0.6%	0.3%	0.4%	0.6%	0.3%	0.4%
General Government final demand (%)	0.0%	0.0%	0.1%	0.0%	0.0%	0.1%	0.0%	0.0%
Household consumption + Gen. Govt final demand	0.1%	0.1%	0.4%	0.2%	0.3%	0.4%	0.2%	0.3%
Real after-tax wage (%)	-0.1%	0.0%	0.7%	0.1%	0.3%	0.7%	0.2%	0.3%
Real GDP by 1 digit industry								
A Agriculture, Forestry and Fishing	-0.2%	-0.3%	-0.1%	-0.2%	-0.2%	-0.1%	-0.2%	-0.2%
B Mining	2.6%	1.5%	2.7%	2.6%	2.6%	2.7%	2.6%	2.6%
C Manufacturing	0.5%	0.4%	0.8%	0.5%	0.6%	0.8%	0.6%	0.6%
D Electricity, Gas, Water and Waste Services	0.7%	0.8%	1.0%	0.8%	0.8%	1.0%	0.8%	0.9%
E Construction	1.4%	1.2%	1.6%	1.4%	1.5%	1.6%	1.4%	1.5%
F Wholesale Trade	0.5%	0.1%	0.8%	0.6%	0.6%	0.8%	0.6%	0.6%
G Retail Trade	0.2%	0.0%	0.6%	0.3%	0.4%	0.6%	0.4%	0.4%
H Accommodation and Food Services	0.2%	0.5%	0.6%	0.3%	0.4%	0.6%	0.3%	0.4%
I Transport, Postal and Warehousing	0.7%	0.6%	0.9%	0.7%	0.8%	0.9%	0.7%	0.8%
J Information Media and Telecommunications	0.4%	0.5%	0.7%	0.5%	0.6%	0.7%	0.5%	0.6%
K Financial and Insurance Services	0.3%	-0.1%	0.6%	0.4%	0.4%	0.6%	0.4%	0.4%
L Rental, Hiring and Real Estate Services	0.7%	0.6%	0.9%	0.7%	0.8%	0.9%	0.7%	0.8%
M Professional, Scientific and Technical Services	0.3%	0.2%	0.6%	0.4%	0.4%	0.6%	0.4%	0.5%
N Administrative and Support Services	0.2%	0.2%	0.5%	0.3%	0.3%	0.5%	0.3%	0.3%
O Public Administration and Safety	0.1%	0.1%	0.2%	0.1%	0.1%	0.2%	0.1%	0.1%
P Education and Training	-0.2%	0.1%	0.0%	-0.1%	-0.1%	0.0%	-0.1%	-0.1%
Q Health Care and Social Assistance	-0.1%	0.1%	0.1%	0.0%	0.0%	0.1%	0.0%	0.0%
R Arts and Recreation Services	0.2%	0.5%	0.6%	0.3%	0.4%	0.6%	0.3%	0.4%
S Other Services	0.1%	0.4%	0.5%	0.2%	0.3%	0.5%	0.2%	0.3%
T Ownership of dwellings	0.2%	0.3%	0.5%	0.3%	0.3%	0.5%	0.3%	0.3%

Table A3d

Results: Other Reform Scenarios

bus tax scenario:	PC5	PC6	PC7	PC28
Consumer welfare (2025/26, $bn)	3.0	14.5	15.4	16.8
Company tax revenue ($bn, 2025/26)	-22.4	-65.4	-79.1	-57.9
Cash Flow Tax revenue ($bn, 2025/26)	0.0	0.0	0.0	0.0
Personal income tax revenue ($bn, 2025/26)	18.5	45.1	55.1	36.8
Production levy revenue ($bn, 2025/26)	-0.2	-0.6	-0.8	-0.6
Other net revenue ($bn, 2025/26)	4.1	21.0	24.7	21.8
Business investment (%)	2.4%	15.5%	18.9%	15.7%
GDP (%)	0.6%	3.8%	4.6%	4.1%
Exports (%)	1.3%	8.3%	10.2%	8.5%
Imports (%)	1.0%	5.4%	6.6%	5.7%
Terms of trade (%)	-0.2%	-0.9%	-1.1%	-0.9%
Foreign Investment in Australia (% of GDP)	6.1	24.7	30.1	24.0
Employment (%)	-0.1%	-0.2%	-0.2%	0.1%
Business capital stock (%)	3.3%	19.9%	24.5%	20.2%
Productivity (%)	0.8%	4.0%	4.8%	4.0%
GNI (%)	0.4%	2.6%	3.1%	2.9%
Household Consumption (%)	0.2%	1.0%	1.1%	1.3%
General Government final demand (%)	0.0%	0.1%	0.1%	0.2%
Household consumption + Gen. Govt final demand	0.2%	0.7%	0.8%	0.9%
Real after-tax wage (%)	-0.1%	0.7%	0.6%	1.3%
Real GDP by 1 digit industry				
A Agriculture, Forestry and Fishing	-0.3%	-1.5%	-2.3%	-1.4%
B Mining	3.0%	18.2%	22.8%	18.4%
C Manufacturing	0.5%	4.1%	4.7%	4.4%
D Electricity, Gas, Water and Waste Services	0.8%	4.5%	5.3%	4.8%
E Construction	1.6%	9.0%	11.0%	9.3%
F Wholesale Trade	0.6%	3.7%	4.3%	3.9%
G Retail Trade	0.3%	1.3%	1.4%	1.6%
H Accommodation and Food Services	0.2%	1.1%	1.1%	1.4%
I Transport, Postal and Warehousing	0.7%	4.3%	5.1%	4.6%
J Information Media and Telecommunications	0.5%	3.0%	3.5%	3.3%
K Financial and Insurance Services	0.3%	2.4%	2.7%	2.6%
L Rental, Hiring and Real Estate Services	0.7%	4.6%	5.4%	4.8%
M Professional, Scientific and Technical Services	0.4%	4.2%	5.0%	4.4%
N Administrative and Support Services	0.2%	2.0%	2.4%	2.3%
O Public Administration and Safety	0.1%	0.7%	0.8%	0.8%
P Education and Training	-0.2%	-0.9%	-1.1%	-0.7%
Q Health Care and Social Assistance	-0.1%	-0.4%	-0.5%	-0.2%
R Arts and Recreation Services	0.3%	1.4%	1.5%	1.6%
S Other Services	0.1%	0.9%	1.0%	1.2%
T Ownership of dwellings	0.2%	1.0%	1.0%	1.2%

Table A4

Comparison of our results with Dixon and Nassios (2018)

Model	CGETAX2025	VURMTAX
Scenario	PC15	COPS
Consumer welfare (2025/26, $bn)	5.9	
Company tax revenue ($bn, 2025/26)	-22.0	
Cash Flow Tax revenue ($bn, 2025/26)	12.4	
Personal income tax revenue ($bn, 2025/26)	5.2	
Production levy revenue ($bn, 2025/26)	-0.1	
Other net revenue ($bn, 2025/26)	4.4	
Business investment (%)	2.4%	0.5%
GDP (%)	0.8%	0.3%
Exports (%)	1.2%	1.3%
Imports (%)	1.1%	0.0%
Terms of trade (%)	-0.14%	-0.33%
Foreign Investment in Australia (% of GDP)	4.7	2.8
Employment (%)	0.1%	0.1%
Business capital stock (%)	3.1%	0.7%
Productivity (%)	0.6%	0.2%
GNI (%)	0.6%	-0.1%
Household Consumption (%)	0.6%	
General Government final demand (%)	0.1%	
Household consumption + Gen. Govt final demand	0.4%	-0.3%
Real after-tax wage (%)	0.7%	0.5%
Real GDP by 1 digit industry		
A Agriculture, Forestry and Fishing	-0.1%	
B Mining	2.7%	
C Manufacturing	0.8%	
D Electricity, Gas, Water and Waste Services	1.0%	
E Construction	1.6%	
F Wholesale Trade	0.8%	
G Retail Trade	0.6%	
H Accommodation and Food Services	0.6%	
I Transport, Postal and Warehousing	0.9%	
J Information Media and Telecommunications	0.7%	
K Financial and Insurance Services	0.6%	
L Rental, Hiring and Real Estate Services	0.9%	
M Professional, Scientific and Technical Services	0.6%	
N Administrative and Support Services	0.5%	
O Public Administration and Safety	0.2%	
P Education and Training	0.0%	
Q Health Care and Social Assistance	0.1%	
R Arts and Recreation Services	0.6%	
S Other Services	0.5%	
T Ownership of dwellings	0.5%	

Modelling Appendix

This Modelling Appendix describes how the effects of corporate tax are modelled in CGETAX. The modelling allows for different types of profits, international profit shifting (IPS) and alternative corporate tax regimes. These different elements are now explained in turn.

Different Types of Profits

In modelling the effects of corporate tax, it is important to distinguish between different types of profits. This is for two reasons.

First, corporate tax has different behavioural effects depending on the type of profits that are taxed. For example, corporate tax on location-specific economic rents may not affect investment behaviour, whereas corporate tax on 'produced capital' is likely to discourage investment.

Second, corporate tax applies differently to profits from different investments. For example, immediate expensing is available for investment in mineral & petroleum exploration and for research & development.

To take all of this into account, in the CGETAX model the modelling of production distinguishes 11 different sources of corporate profit. The following six types of produced capital are included within the broad category of general business capital:

- transport equipment;
- plant, machinery and equipment;
- mineral and petroleum exploration;
- research and development;
- information and technology; and
- other business capital.

In each industry, the elasticity of substitution between these types of general business capital is assumed to be low at 0.3. The elasticity of substitution between general business capital and labour is assumed to be higher at 0.9, just below the value of 1.0 under a Cobb Douglas production function.

A further two types of produced capital are used in producing services from non-dwelling structures:

- non-dwellings structures; and
- non-dwelling ownership transfer costs.

Non-dwelling structure services are produced by combining these two types of produced capital with non-dwelling land. The total supply of non-dwelling land is assumed to be fixed, but its allocation between industries is flexible. Within each industry, the elasticity of substitution between non-dwelling structures and non-dwelling land is assumed to be 0.5, while

the resulting structure-land composite has an elasticity of substitution of 0.3 with non-dwelling ownership transfer costs.

In each industry, the elasticity of substitution between the general business capital-labour composite and the structure services composite is assumed to be 0.7. Taking this into account alongside the assumed elasticity of substitution between general business capital and labour of 0.9, we can say that the overall elasticity of substitution between labour and capital is about 0.8, where capital includes both general business capital and non-dwelling structures.

The remaining sources of corporate profit are three types of location-specific economic rents:

- rent on land for non-dwelling structures; and
- mineral rents; and
- oligopoly rents.

The values of these rents are determined as follows.

The rent on land for non-dwelling structures adjusts to balance the fixed total supply of non-dwelling land with the combined demand from all industries.

Mineral resources are modelled as an industry-specific fixed factor of production. This fixed factor is present in the following five industries: coal mining (0601Z); crude oil (0701A); LNG (0701B); other gas extraction (0701C); and iron ore mining (0801Z). The rent on each industry's mineral resource adjusts to balance the fixed factor supply with the industry demand.

Oligopoly rents are modelled in those industries that are: (a) identified as earning above normal rates of return on capital; and (b) have other characteristics of an oligopoly. These rents are modelled as a fixed percentage markup on production costs, including a normal rate of return on capital. In all, oligopoly rents are modelled in 29 out of the 278 industries in the model. In practice, 85 per cent of oligopoly rents are received by just five industries which are: bank interest margins (6201A); wholesale margins (3301M); retail margins (3901M); bank fees (6201B); and telecommunications networks (5801A).

A fourth type of economic rent, firm-specific rents, are not represented in CGETAX. Unlike corporate tax on location-specific rents, corporate tax on firm-specific rents may discourage investment. In particular, MNCs may generate economic rents from their know-how and taxing such rents may reduce a country's access to that know-how.

International Profit Shifting

Companies engage in profit shifting to reduce their costs inclusive of tax. If a proportion, θ, of profits is shifted to a tax haven, there is a tax saving equal to the amount of the tax base that is shifted, $\theta.tkcov.BASE$, times the difference between the local tax rate and the tax haven tax rate $tak\text{-}tkh$. Here, *tkcov* refers to the coverage of company profits by company income tax. This coverage factor may differ from unity due to factors such as differences between the national

accounts-based measure of profits used in the modelling, *BASE*, and the tax law measure of profits.

Besides this direct tax saving, profit shifting also involves a tax avoidance cost which includes tax planning advice and the risks of fines and reputational damage. It is standard to assume that this avoidance cost rises with the product of the proportion of profits that is shifted and the amount that is shifted. This captures the idea that profit shifting becomes more risky as the proportion of profits that is shifted rises.

Companies are assumed to maximise their net cost saving, *S*, from profit shifting, defined as the tax saving net of tax avoidance costs. The parameter, *A*, is inversely proportional to the costliness of profit shifting.

$$S = (tak - tkh).\theta.tkcov.BASE - \frac{1}{2.A}.\theta.\theta.tkcov.BASE$$

Choosing the proportion of profits that is shifted to maximise this saving gives the following simple solution. The proportion of profits that are shifted is proportional to the gap between the statutory tax rate and the tax rate in the tax haven.

$$\theta = A.(tak - tkh)$$

The value for θ affects both the effective company tax rate for local revenue collections, *tkr*, and the effective tax rate for investment decisions, *tkc*. The effective tax rate for revenue collections is the statutory tax rate, *tak*, adjusted down for the proportion of profits that is shifted and the profits coverage of company tax.

$$tkr = tkcov.(1 - \theta).tak$$

The effective tax rate for investment decisions is the statutory tax rate less the net cost saving from profit shifting, *S*, expressed as a proportion of the tax base, *BASE*, adjusted for the profits coverage of company tax. In deriving this result, the net cost saving expression is first simplified by using the solution for θ to eliminate *A*. The final formula for the effective tax rate for investment decisions is as follows.

$$tkc = tkcov.\left[tak - \frac{1}{2}\theta.(tak - tkh)\right]$$

The effective tax rate for investment decisions, *tkc*, is higher than the effective tax rate for local revenue collections, *tkr*. This difference reflects tax avoidance-related costs, *AVOID*, that add to the cost of investment.

$$AVOID = (tkc - tkr).BASE = tkh.\theta.tkcov.BASE + \frac{1}{2}.(tak - tkh).\theta.tkcov.BASE$$

These tax avoidance-related costs are seen to have two components. The first component is the tax paid to the tax haven and the second component is the cost of the avoidance activity. All of these tax avoidance-related costs are assumed to be incurred offshore and thus represent a payment of income abroad.

While in practice some costs of avoidance activity may be incurred locally, rather than offshore either in the home country of the MNC or the tax haven, this does not change the outcome for consumer welfare. In the first case there is wastage of GDP on local tax avoidance activity while in the second case there is wastage of national income in paying for the same activity to be conducted offshore. Thus, it is harmless for tax policy purposes to simplify by assuming that all of the tax avoidance costs are incurred offshore.

Alternative Corporate Tax Regimes

CGETAX allows for several alternative corporate tax regimes in modelling the cost of capital and corporate tax revenue. This modelling is performed separately for each of the model's 11 sources of corporate profit.

We start with taxation of investment and produced capital and then consider taxation of economic rents.

Produced capital and Investment

We begin with the general or textbook formula for the real user cost of capital, *uc*.

$$uc = \frac{PI}{P}.\left(\delta + r + \frac{tkc}{1-tkc} \cdot rt\right) \qquad [1]$$

The real user cost (or rental price) of a unit of capital is given by the price of a unit of new investment, *PI*, relative to the price of a unit of output, *P*, times the rate of return calculated in brackets in equation [1]. The rate of return equals the sum of the rate of economic depreciation, δ, plus the required post-tax real rate of return, *r*, plus the cost of corporate tax. This last term for the cost of corporate tax requires some explanation because of two complications.

The first complication is that while investors require a post-tax rate of return, the corporate tax base is the pre-tax return. Hence, to obtain the corporate tax base, we need to gross up the after-tax rate of return, *rt*, by dividing it by unity minus the effective corporate tax rate, *1-tkc*. We then apply the effective corporate tax rate, *tkc*, to obtain the corporate tax burden on the cost of capital. This appears as the last term in the brackets in equation [1].

The second complication is that, depending on the choice of corporate tax regime, the taxed rate of return, *rt*, may differ from the required rate of return, *r*. The two rates of return are only the same in the simple textbook case shown in equation [2].

$$rt = r \qquad [2]$$

Compared to the textbook case, CGETAX allows for alternative corporate tax regimes and various complications in how corporate tax is applied in practice. This leads to the relatively complicated three-part formula for *rt* shown in equation [3]. The formula is derived by using the condition that, under perfect competition, the net present value of the return on an investment is zero.

$$rt = part1 + part2 + part3 \qquad [3]$$

$$part1 = \{[1 - fe] \cdot [\delta + r] \cdot [\pi + r - \rho \cdot (ACC + (1 - dr) \cdot ACE)]\}/\{dtax + \pi + r\} \quad [3a]$$

$$part2 = -dr \cdot Rdebt \cdot (1 - CBIT - ACC) \quad [3b]$$

$$part3 = -(load - 1) \cdot fe \cdot (\delta + r) \quad [3c]$$

Notation:

fe=proportion of new investment that is fully expensed

δ=rate of economic depreciation

r=required post-tax real rate of return

π=expected inflation rate

ρ=allowance rate for ACE or ACC

ACC=proportion of investment that is under an Allowance for Corporate Capital Regime

ACE=proportion of investment that is under an Allowance for Corporate Equity Regime

dr=ratio of debt to value of asset base

Rdebt=nominal rate of interest on debt

load=loading factor applied to fully expensing (greater than unity with loading, otherwise equals unity)

Equation (3) provides for the following complications in the standard corporate tax system:

- The rate of depreciation allowed under tax law, *dtax*, may differ from the economic rate of depreciation, δ, as reflected in *part1* of the formula.
- Tax law allows a depreciation deduction based on the historic cost of an asset rather than its replacement cost and so the real value of the deduction erodes with price inflation at the rate π, as reflected in *part1* of the formula. To fully compensate for this combined effect of historic cost depreciation and inflation, 'fair' rates of tax depreciation would be higher than economic rates of depreciation according to the following formula.

$$dtax = \delta \cdot \frac{r+\pi}{r} \quad [4]$$

- Tax law allows a deduction of the nominal interest cost of debt, as reflected in *part2* of the formula.
- Tax law may allow for full expensing of a proportion, *fe*, of new investment, as reflected in *part1* of the formula.
- In cases where full expensing is allowed, a loading at the rate *load* may also be available such that more than 100 per cent of the cost of the new investment may be immediately expensed, as reflected in *part3* of the formula.

Equation (3) also allows for alternatives to the standard corporate tax regime as follows.

- A Comprehensive Business Income Tax (CBIT) regime denies a deduction for net interest expenses. A CBIT can be modelled by setting *CBIT*=1, which eliminates the interest deduction in *part2* of the formula.

- An Allowance for Corporate Capital (ACC) regime replaces a deduction for net interest expenses with an allowance at the rate ρ applied to the entire capital base. An ACC can be modelled by setting *ACC*=1. If the allowance rate is set equal to the nominal required rate of return on capital, i.e.

  $$\rho = \pi + r$$

  then it can be seen that both *part1* and *part2* in equation [3] will equal zero. *Part3* will also equal zero provided either *load*=1 or *fe*=0. Hence, under those assumptions,

  $$rt = 0$$

  and the ACC then does not tax the required return on capital. It is then purely a tax on economic rents and so does not discourage investment.

- An Allowance for Corporate Equity (ACE) regime retains the deduction for net interest expenses from debt funding and introduces an allowance at the rate ρ for equity funding. An ACE can be modelled by setting *ACE*=1. If the allowance rate is again set equal to the nominal required rate of return on capital, i.e.

  $$\rho = \pi + r$$

  and rates of depreciation under tax law are fair in the sense that they are consistent with equation [4], then it can be shown that the formula for the taxed rate of return under an ACE simplifies to the following. Those are the model settings used in modelling the ACE in scenario PC6.

  $$rt = dr \cdot (r - RDEBT)$$

  Thus, unlike under an ACC, the taxed rate of return is not zero. In fact, it will be negative if the *nominal* rate of interest on debt exceeds the required post-tax *real* rate of return on capital. Thus, an ACE is likely to subsidise investment. To remove this undesirable feature, the existing deduction for nominal interest expenses would need to be replaced with a deduction calculated using real (i.e. inflation-adjusted) interest rates. Then, an ACE could become a pure tax on economic rents.

- A corporate tax regime with full expensing is modelled by setting *fe*=1. In the case where there are no loadings, *load*=1, then the formula for the taxed rate of return simplifies to this negative value.

  $$rt = -dr \cdot RDEBT$$

  This shows that full expensing subsidises debt-funded investment. This is because debt-funded investment is deductible twice, both when the investment expenditure is incurred and again when interest payments are made on the debt.

In modelling full expensing in scenario PC7, *fe*=1 but the existing loading for investment in research and development is retained.

- This problem of double deductibility for debt-funded investment can be eliminated by combining full expensing with no deduction for net interest expenses. This gives a cash flow tax with a real base, also known as a Brown tax. In CGETAX, a Brown Tax can be modelled by setting *fe*=1, to achieve full expensing and then blocking a deduction for net interest expenses by setting *CBIT*=1. That approach is used in scenario PC28. It gives

  $$rt = 0$$

  showing that the Brown tax does not tax the required return on capital. It is purely a tax on economic rents and so does not discourage investment.

From the above discussion, we see that the two tax regimes which avoid taxing normal returns to capital and purely tax economic rents are the ACC and the Brown tax. Unfortunately, they both have drawbacks.

The ACC only achieves that result if we assume that the chosen allowance rate, ρ, matches the required nominal after-tax rate of return on capital. In practice, the correct rate may vary from investment to investment with factors such as risk.

The Brown tax does not have the same problem and so comes closest to a pure tax on economic rents. However, governments have been reluctant to implement it because cash flows can be negative in the early phase on an investment project giving rise to negative tax payments for a period of time.

As explained above, the ACE is a less pure tax on economic rents than either the ACC or Brown tax. However, it involves making a smaller change to the existing corporate tax system, which may explain its greater popularity. As of 2020, countries using an ACE included Belgium, Brazil, Cyprus, Italy, Malta, Poland, Portugal and Turkey.

There is considerable variation from country-to-country in how the ACE has been implemented. In some cases, the allowance rate is plausible as a required normal rate of return on equity while in other cases it is lower. In some cases, the allowance is available for all equity investment, while in other cases it is only available for new equity investment.

If an ACE were under consideration for Australia, a cautious approach would be to confine it to new equity and would begin with a low allowance rate, perhaps the government bond rate. The existing concession of full deductibility of nominal rather than real interest expenses could also be reviewed to fund part of the budget cost.

We now turn to the revenue raised from corporate tax. For produced capital, the formula for corporate tax revenue, *TAXK*, is as follows.

$$TAXK = \frac{tkr}{1-tkc}.rt \cdot PI \cdot K \qquad [5]$$

That is, tax revenue is equal to the effective tax rate for revenue, *tkr*, applied to the taxed part of the rate of return on the value of the capital stock. As seen above, for a pure economic rent tax, *rt*=0 and so no revenue is raised from produced capital in that case.

Economic rents

For the three types of location-specific economic rents, the corporate tax modelling issues are simpler. There is no produced capital or investment involved. This means there is no depreciation or expensing of investment so that,

$$\delta = dtax = fe = 0$$

On the other hand, the corporate tax does allow interest expenses as a deduction for economic rents.

The modelling assumes that the new allowances under an ACE or ACC are only available for produced capital and hence are not available for economic rents. Under those assumptions, the taxed rate of return for economic rents simplifies to the following.

$$rt = r - dr \cdot Rdebt \cdot (1 - CBIT - ACC) \quad [6]$$

This shows that economic rents are almost fully subject to company tax. The only revenue leakage comes from the deduction for interest payments on debt that is available except under a CBIT or ACC.

The associated formula for corporate tax revenue from economic rents is as follows.

$$TAXF = \frac{tkr}{1-tkc}.rt \cdot A\$ \quad [7]$$

In the above, A$ is the value of the asset that earns economic rents. That value is modelled by capitalising after-tax income streams from each of the sources of economic rents, namely business land rents, mineral rents and oligopoly rents. The modelling of the value of these economic rents was explained above.

Finally, CGETAX also allows for an industry-specific tax on economic rents that is separate from the modelling of company tax. This tax can apply to oligopoly rents and mineral rents but not business land rents. In the baseline scenario, the sole example of this type of tax is the petroleum resource rent tax (PRRT). Payments of PRRT are a company tax deduction and this is assumed to also be the case for other hypothetical industry-specific rent taxes that we model.

The cash flow taxes (CFT) that feature in the scenarios identified in Table A1 are modelled as a tax on industry-specific rents. Those are scenarios PC3-PC4, PC8-PC9, PC12-PC17 and PC20-PC27.

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