KPMG Economics

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Modelling the Macroeconomic Impact of Lowering the Company Tax Rate in Australia

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1. Introduction

The Commonwealth Treasury has commissioned KPMG Economics to provide economic modelling support to the Tax Review. As part of this process, KPMG Economics has modelled the economy-wide effects of lowering the company tax rate to 25%.

The scenario was modelled using the KPMG-CGE model: KPMG's dynamic computable general equilibrium model of the Australian economy.[1]

The scenario comprises a lowering of the company income tax (CIT) rate funded via three methods:

(1) an increase in the personal income tax (PIT) rate;

(2) a lump-sum tax on households; and

(3) a reduction in government consumption.

The following sections of this report present the macroeconomic effects of this tax reform scenario by reference to the separate effects of each funding assumption.

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[1] See Appendix 1 for details of KPMG-CGE

2. Scenario ingredients

As we evaluate the scenario using a dynamic model, it is necessary to run the model twice, once for a baseline (or business-as-usual) simulation and again for a policy (or tax scenario) simulation. The baseline simulation is designed to be a plausible forecast of how the economy will evolve in the absence of the policy shock of interest.

In the baseline the economy evolves from its current state to one where the economy converges to an equilibrium characterised by balanced growth. By 2027/28 trade is close to balanced and industry investment-capital ratios and rates of return have converged substantially to their long-run levels.

The policy simulation comprises the baseline simulation plus the changes in policy variables of interest (e.g., tax variables). That is, all exogenous variables in the policy simulation are assigned the values they had in the baseline simulation and variables of interest (e.g., tax rates) are altered in accordance with the tax changes. The differences in the values of variables in the policy and baseline runs quantify the effects of the tax policy.

The tax scenario comprises a staged cut in the CIT rate from 30% to 25% over five years from 2018/19. The timing of the cut is relevant to the distribution of the economic effects in the short-run, while the long-run economic effects are independent of the timing of the cut.

The cut in the CIT rate is imposed under the assumption that the budget balance is unchanged in absolute terms. This assumption is imposed under three conditions.[2]

1. A rise in the PIT rate over two years from 2022/23 is equivalent to $13b. The higher PIT rate could be due to bracket creep or due to an increase in the tax rates applying to each bracket. As KPMG-CGE represents households via single representative agent, there is no distinction between a higher PIT rate due to bracket creep or due to higher tax rates applying to each bracket. After 2024/25 the PIT rate adjusts to maintain a fixed budget balance.

2. A lump-sum tax on households. Such a tax affects household income but does not distort economic behaviour by households, i.e., there are no substitution effects. Thus, this funding method provides a benchmark with which to evaluate other funding methods that typically distort economic behaviour.

3. A reduction in government consumption expenditure. This is imposed as equal proportionate reductions in all categories of government consumption in real terms.

We compare the effects of the CIT cut under these three funding assumptions. Under all funding assumptions we further assume that transfer payments are indexed to the CPI; this is also the case in the baseline.

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[2] Note that the model makes no distinction between levels of government in the budget accounts. Thus, the assumption of a fixed government budget applies to the government sector as a whole.

Besides the above elements of the CIT scenario, we also impose a solvency constraint on the economy from 2022/23 onwards. Household consumption adjusts so that the balance of trade as a share of GDP slowly returns to baseline levels by 2047/48. This puts in place an economy-wide budget constraint to ensure that in the long run there is no addition or reduction to net foreign liabilities due to changes in the trade balance as a share of GDP. Thus, changes to net foreign liabilities will only be due to changes in foreign ownership of the capital stock.

3.   Short-run effects

The CIT reduction occurs over the period 2018/19 to 2022/23, and represents a 2.1 percentage point reduction in the average CIT rate.

The CIT rate reduction increases post-tax rates of return in the short term leading to a strong rise in investment: by 2022/23 investment is up by 2.5%. The increased investment slowly translates into an increase in the capital stock from 2019/20 onwards.

From 2023/24 after-tax rates of return begin to move back toward baseline levels as

(i)   there are no further reductions in the CIT rate after 2022/23; and

(ii)   the slowly increasing supply of capital drives down the rental price of capital.[3]

The convergence of after-tax rates of return back towards their baseline values causes investment to move below the peak observed in 2022/23. It takes until 2047/48 for rates of return to return to baseline levels.

At this point both investment and the capital stock are about 1.5% above baseline levels, that is, capital growth rates have returned to baseline levels and this represents long-run equilibrium in the capital market. Nevertheless, the CIT cut permanently increases the investment-output ratio (about 1%) and thus places the economy on a trajectory of permanently higher capital usage. This is to be expected from a lower tax on capital earnings, i.e., company income.

Figure 1 presents a selection of macroeconomic effects due to the CIT cut funded by a higher PIT rate.

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[3] The after-tax rate of return is defined here as the rentals on capital less depreciation and relevant taxes divided by the cost of creating new capital (i.e., investment).

Figure 1. GDP effects of CIT cut funded by bracket creep
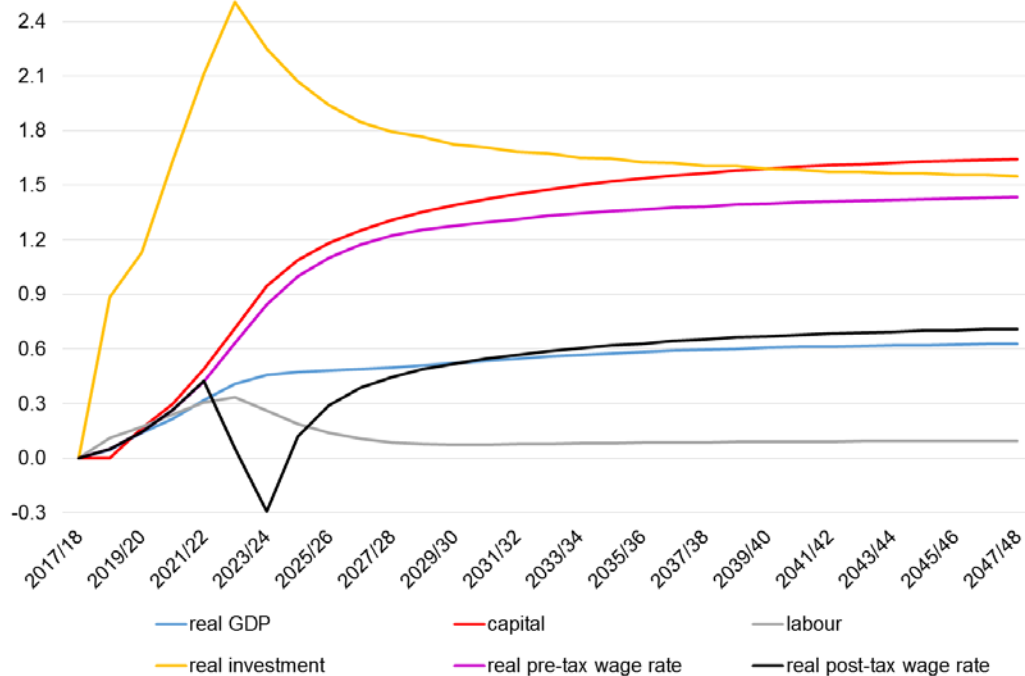
The reduction in the cost of capital results in firms increasing their usage of capital, and to a lesser extent, labour: these are up by 0.70% and 0.34% respectively by 2022/23. The increased use of capital and labour mean real GDP is higher by 0.41%.

Although the CIT cut places the economy on a trajectory of permanently higher capital usage, the effects on labour usage are largely transient. The labour market dynamics in KPMG-CGE assume that wage rates are sticky in the short term and flexible in the medium and longer term; this mechanism is specified in terms of real pre-tax wage rates by occupation. This means that the employment effects of any shock will be greater in the short-run than in the long-run, with the opposite being true for wage rates. Thus, in 2018/19 employment rises by almost 0.11% and the average real pre- and post-tax wage rates rise by 0.05%.

The increase in employment implies there is an increased demand for labour at initial wage rates. The increased demand for labour is a result of the divergence between the real wage rate received by workers (0.05%) and the real cost of labour to firms (-0.03%). In 2019/20 the labour response (0.17%) still exceeds the real wage rate response (0.14%). By 2020/21 the increased tightness in the labour market has created enough pressure for real wage rates to respond more strongly to the tax change than labour usage. This trend continues and in the long-run the increased demand for labour is reflected mostly as an increase in wage rates as opposed to labour usage.

In the short-run, the budget balance moves towards a larger deficit due to the cut in the CIT rate and the reduction in CIT revenue. In 2022/23 the PIT rate begins to rise to bring the budget balance back to its initial level. The increase in the PIT rate amounts to a 0.5 percentage-point increase in the average PIT rate.

Figure 1 shows that the increase in the PIT rate in 2022/23 drives a wedge between the real pre- and post-tax wage rate. The fall in the real post-tax wage rate decreases the return to labour and workers reduce their willingness to supply labour to the market; labour supply falls and the labour market tightens. This creates more pressure for real pre-tax wage rates to rise, a process that continues until the labour market reaches long-run equilibrium whereby labour demand equals labour supply, i.e., the unemployment rate returns to its initial level.

4. Long-run effects

After the economy has returned to long-run equilibrium, i.e., the unemployment rate, rates of return and capital growth rates have returned to baselines levels, economic activity and welfare is higher.[4]

In the long-run investment and capital stock are around 1.6% higher than their baseline values. Although firms increase their demand for labour as their capital stocks expand, this mainly drives up real wage rates (1.42%) as the supply of labour is rather inelastic in the long-run. Thus, the capital-labour ratio (i.e., capital per worker) is now higher (1.5%).

As each unit of labour now has more capital to work with, output per worker (i.e., labour productivity) is also higher (0.51%). Higher labour productivity means firms are now willing to pay higher wage rates (1.45%). As the PIT rate has increased to fund the cut in the CIT rate, after-tax wage rates increase by only 0.79%. As the unemployment rate returns to baseline levels, the increase in employment matches the increase in labour supply (0.11%). Labour supply is a function of real after-tax wage rates; as we assume a labour supply elasticity of 0.14, a 1.45% increase in the after-tax real wage rate increases labour supply by 0.11%.

Comparing the effects of funding the CIT cut via a lump-sum tax on households (Table 1, column 2) as opposed to a higher PIT rate (column1), a lump-sum tax mainly affects the employment response. With no change in the PIT rate, the before- and after-tax real wage rates both increase by 1.42%; this compares to an increase in the after-tax real wage rate of only 0.79% in the case of a higher PIT rate. Thus, labour supply, and therefore employment, increase by 0.2% versus 0.11% in the case of a higher PIT rate. With labour slightly more elastic in supply, capital stocks (1.71% versus 1.61%) and real GDP (0.71% versus 0.62%) also increase by more.

Funding the CIT cut via a lower government consumption (Table 1, column 3) rather than a higher PIT rate (column1) also gives a larger employment response. With no change in the PIT rate, the before- and after-tax real wage rates both increase by 1.33%. Thus, labour supply and employment increase by 0.18% versus 0.11% in the case of a higher PIT rate. In contrast to funding the CIT cut via a lump-sum tax, the larger increase in labour is associated with a larger rise in the capital stock (1.87% versus 1.71%) and real GDP (0.78% versus 0.71%). This is because lower government expenditure reduces the overall demand for labour, other things constant, as government consumption (e.g., government administration, education) is much more labour intensive than total expenditure in the economy. With labour being rather inelastic in supply in the long-run, lower government consumption causes nominal and therefore real wage rates to rise by less than under the CIT cut. Smaller increases in nominal wage rates mean the cost of labour to firms rises by less than under other funding arrangements.

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[4] See Table 1

A lower cost of labour means lower production costs and a larger output expansion. These differences mean that the composition of GDP across expenditure components is very different when the CIT cut is financed by lower government consumption compared to other funding arrangements. We elaborate on this below.

Table 1. Long-run effects of lowering the company income tax rate funded by various methods

	(1) Lower CIT rate funded by higher PIT rate	**(2)** Lower CIT rate funded by lump-sum tax	**(3)** Lower CIT rate funded by lower government consumption
(%-change)			
Real GDP	0.62	0.71	0.78
Capital	1.61	1.71	1.87
Labour	0.11	0.20	0.18
Real indirect tax base	0.52	0.62	0.90
Real before-tax wage rate	1.45	1.42	1.33
Real after-tax wage rate	0.79	1.42	1.33
CPI	0.21	0.19	0.17
Change in net foreign income ($m)	-1,392	-1,444	-1,555
Real GNP	0.55	0.64	0.70
(%-change)			
Real household consumption	0.34	0.45	0.84
Real investment	1.58	1.66	1.76
Real government consumption	0.00	0.00	-1.00
Real exports	1.04	1.13	1.26
Real imports	0.83	0.90	1.00
(change in $m)	Government receipts		
GST revenue	457	515	730
PIT revenue – labour income	9,055	3,726	3,426
CIT revenue	-13,140	-13,094	-13,020
PIT revenue – franking credits	6,428	5,347	5,346
Other tax revenue	1,232	1,320	1,500
Other receipts	1,110	1,175	1,191
	Government outlays		
Government consumption	2,782	2,592	-1,242
Other operating expenses	871	812	-389
Government benefit payments	270	257	219
Lump sum transfer	0	-5,879	0
Other transfers	448	418	-200
Capital expenditure	772	791	785
Budget balance	0	0	0

The decrease in the CIT rate creates incentives for increased investment by both domestic residents and foreigners.

Domestic residents increase their saving rate and increase the size of the domestically-owned capital stock. The saving rate must rise to prevent the trade balance from moving into deficit in response to the CIT cut.

Foreigners increase investment in Australia in response to the rise in the after-tax rate of return. They continue to increase their investment until the after-tax rate of return returns to initial levels: we assume that in the long run the after-tax rate of return is determined on global capital markets and is independent of Australian tax policy. The increase in foreign investment increases the after-tax dividend payments to foreigners as the value of the Australian capital stock that they own has increased.

Increased dividend payments to foreigners reduces net foreign income by $1,392m when the CIT cut is funded via a higher PIT rate. Therefore, real GNP rises by less than real GDP: 0.55% versus 0.62%. This means welfare, as measured by real GNP, also rises because the increase in economic activity from the CIT cut far outweighs the increased after-tax capital rental payments to foreigners.

Under the PIT and lump-sum tax funding arrangements, the increase in real GDP is mainly driven by higher real investment. Real exports grow by slightly more than real imports in order to maintain a fixed trade balance relative to GDP. As we assume that Australia faces downward-sloping demand curves in its export markets, the foreign currency price of exports is endogenous; foreign currency import prices are assumed to be exogenous. To maintain a fixed trade balance relative to GDP in the presence of endogenous export prices requires that real exports must rise by more than real imports. This is because export prices will fall as exports rise due to downward-sloping demand curves.

Real household consumption expands by around 0.4% under both funding arrangements. The smaller increase in real consumption relative to real GDP reflects the increase in the saving rate mentioned earlier. The saving rate must rise to prevent the trade balance from moving into deficit in response to the CIT cut. A higher saving rate means that real consumption rises by less and real exports by more.

Funding the CIT cut via lower government consumption necessitates that real government consumption falls by 1% relative to baseline. Lower government consumption translates into higher household consumption: real household consumption now rises by 0.84% versus around 0.4% under other funding arrangements. This reflects the absence of lower household disposable income due to either a higher PIT rate or a lump-sum tax on households. Higher household disposable income means higher household consumption all other things being equal.

It was explained earlier that lower government consumption lowers the cost of labour to firms. A lower cost of labour to firms raises after-tax rates of return on capital and induces higher investment than under other funding arrangements: 1.76% versus 1.58 % under a higher PIT rate and 1.66% under a lump-sum tax. A lower cost of labour to firms also lowers production costs and increases output, particularly on price sensitive export markets. Thus, real exports rise by 1.26% versus 1.04 % under a higher PIT rate and 1.13% under a lump-sum tax.

Regardless of how the CIT cut is funded, company tax revenue falls by about $13b or about 18% of initial revenue. A lower CIT rate implies lower franking credits for investors; we observe franking credits falling by about $6b; franking credits fall by more when the PIT rate increases. Funding the CIT cut via a higher PIT rate means that total PIT revenue (from labour income and franking credits) rises by the fall in CIT revenue plus about $2.3b. Other tax revenue and other receipts rise by $2.8b. The increase in total receipts is $5.1b; this matches the increase in total government outlays so as to keep the budget balance unchanged. Holding the PIT rate fixed and using a lump-sum tax on households to maintain budget balance means that PIT revenue rises by only $9b. The difference between this amount and the $15b raised via a higher PIT rate represents the lump-sum tax on households.

Funding the CIT cut via lower government consumption gives similar effects on the composition of government receipts to those observed under a lump-sum tax. Nevertheless, we observe very different effects on the composition of government expenditure when the CIT cut is funded via lower government consumption. Government consumption is $3.5b lower with a 1% fall in real government consumption expenditure. Other operating expenses and other transfers move in line with government consumption and thus fall by around $0.5b.

The results presented in Table 1 also give us a picture of the incidence of the CIT rate over the range of 30% to 25%. There are various ways that the incidence of CIT can be measured when the rate is altered: Cao et al. (2015), Section 3, discusses one method. Here we focus on the effects of the real after-tax returns to capital and labour.

The real after-tax rate of return to capital is unchanged when the CIT rate is reduced as we assume that this rate of return is determined on global capital markets. Thus, capital owners only gain via an increase in their real holdings of capital, which is akin to an increase in real wealth; there is no gain in the after-tax rate of return on that wealth. By contrast, workers experience a significant rise in their real after-tax return to working. This ranges from 0.79% when the CIT cut is financed by a higher PIT rate to 1.33% when the CIT cut is financed by lower government consumption.

These results suggest that the effect of CIT over the range analysed here is mainly to reduce the after-tax real return for workers. That is, the incidence of the CIT is mainly borne by workers. These results reflect the assumption that for a capital-importing country such as Australia, after-tax rates of return are determined in global capital markets. Under these conditions, investment is very responsive to changes in the after-tax rate of return on capital and therefore bears little of the cost of company income tax.

Appendix 1: Brief description of KPMG-CGE

KPMG-CGE is a multi-sectoral model of the Australian economy that has been specifically designed for policy analysis. KPMG-CGE belongs to the computable general equilibrium (CGE) class of models exemplified by the world-leading ORANI (Dixon et. al., 1982) and MONASH (Dixon and Rimmer, 2002) models created at the Centre of Policy Studies. KPMG-CGE builds on the ORANI and MONASH traditions by incorporating a number of theoretical and empirical advancements. We briefly describe these features below.

KPMG-CGE distinguishes 114 sectors and commodities, based on the 2009/10 input-output tables published by the ABS (Australian Bureau of Statistics) (2013). Primary factors are distinguished by 114 types of capital (one type per industry), nine occupations, two types of land, and natural resource endowments (one per industry).

There is a profit-maximising representative firm in each sector that produces a single commodity. Commodities are distinguished between those destined for export markets and those destined for domestic markets. Production technology is represented by nested CRESH functions (Hanoch, 1971) allowing a high degree of flexibility in the parameterisation of substitution and technology parameters. Energy goods are treated separately to other intermediate goods and services in production, and are complementary to primary factors.

The supply of labour is determined by a labour-leisure trade-off that allows workers in each occupation to respond to changes in after-tax wage rates thus determining the hours of work they offer to the labour market. The overall supply of labour is normalised on working-age population.

There is a single representative household that determines consumption decisions based on a linear expenditure system (Stone, 1954). The expenditure system distinguishes between subsistence (necessity) and discretionary (luxury) consumption. Total household spending moves with household disposable income.

KPMG-CGE includes detailed government fiscal accounts including the accumulation of public assets and liabilities; these are based on the ABS's *Government Finance Statistics* (ABS, 2015). On the revenue side, detailed modelling of over 20 direct and indirect taxes and income from government enterprises is included. On the expenditure side, government consumption, investment and payments of various types of transfers (such as pensions and unemployment benefits) are modelled. The government accounts represent all levels of government in Australia.

Investment behaviour is industry specific and is positively related to the expected rate of return on capital. This rate takes into account company taxation for different capital owners, a variety of capital allowances, and the structure of the imputation system.

Foreign asset and liability accumulation is explicitly modelled, as are the cross-border income flows they generate and that contribute to the evolution of the current account. Along with other foreign income flows like labour payments and unrequited transfers, KPMG-CGE takes account of primary and secondary income flows in Australia's current account; these are particularly important for Australia as they typically comprise a significant share of the balance on the current account.

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