The Effectiveness of Investment Stimulus Policies in Australia

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Janine Dixon

And

Jason Nassios

Centre of Policy Studies, Victoria University

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Address: Centre of Policy Studies, Victoria University, PO Box 14428, Melbourne, Victoria, 8001
home page: www.vu.edu.au/CoPS/ email: copsinfo@vu.edu.au Telephone +61 3 9919 1877

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April 11, 2018

Abstract

We present the results of three economic modelling simulations of changes to tax policy intended to stimulate investment in Australia. We begin with a comparison of a company tax cut and an investment subsidy, both unfunded and calibrated to yield equivalent Federal Government budget impacts. Our key findings (summarised below) illustrate that an investment subsidy is a more effective policy instrument for stimulating investment and improving domestic welfare:

1. With both policies calibrated to the same budgetary cost, the investment subsidy is more effective in raising the volume of investment;
2. The investment response to a company tax cut is skewed towards foreign investors, while the investment response to an investment subsidy is equitably proportioned across foreign and local investors;
3. The company tax cut induces an increase in net foreign liabilities and associated servicing costs while the investment subsidy has little long-term effect on net foreign liabilities;
4. Both policies lead to increases in gross domestic product (GDP), employment and real pre-tax wages; and
5. The impact on gross national income (GNI), an indicator of domestic material welfare, is positive for the investment subsidy but not for the company tax rate cut.

In a final simulation, we revisit the investment subsidy to assess the net impact when the policy is fully funded. While many potential funding models exist, herein we assume partial funding via the denial of cash refunds of franking credits, with the remainder of the funding sourced via a small increase in economy-wide average personal income tax. We find that the investment subsidy still leads to a long-term gain in domestic welfare. When fully funded in this manner:

6. The investment response remains positive but skewed toward foreign investors;
7. Net foreign liabilities fall as a proportion of GNI;
8. The investment subsidy still returns positive results for employment, GDP and the real pre-tax wage;
9. The long-term gain in real post-tax wages is lower than in the unfunded case, but it remains positive; and
10. Fully funded, the investment subsidy still leads to a long-term gain in GNI.

Based on these results, we strongly recommend that policy-makers consider an investment subsidy instead of a cut to company tax as a better value-for-money policy initiative to increase both investment and domestic material welfare.

JEL: H2, O16, E22, C68

Key words: Company tax, investment subsidy, CGE modelling

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1 Background and introduction

After growing strongly through the mining boom period, private business investment in gross fixed capital formation (GFCF) peaked at $274 billion in FY2013 (2016 prices). In the four years since, private GFCF has failed to return to this level, instead falling by more than 25 per cent and declining markedly as a share of GDP.

Minifie *et al.*(2017) identify several structural causes of the decline in investment. Yet the weak performance of investment and reductions in corporate tax rates in several of Australia's major trading partners, including the UK and US, has enabled the coalition government to mount a case for a cut to Australia's company tax rate. Presently at 30 per cent for businesses with turnover above $50m[1], the government has sought to legislate a cut to 25 per cent, gradually phased in to reach full implementation by 2026-27. This would complete the implementation of the government's Enterprise Tax Plan no. 2, moving all Australian companies to a flat 25 per cent rate of company tax.

The Commonwealth Treasury (Kouparitsas et al.2016) and others (Murphy 2018, Tran and Wende 2017, KPMG 2010) have argued that a cut to the company tax rate will reinvigorate investment, via a higher post-tax rate of return that will attract investment, leading to capital growth and higher wages. However, Dixon and Nassios (2016), with a detailed model taking into account dynamic effects, find that a cut to company taxes will in fact lead to a reduction in real per capita domestic income.

The government has offered no decisive proposal to fund the tax cut. Bracket creep – an effective increase in the personal income tax rate – appears to be the most likely source of funding.

In this paper, we explore an alternative policy aimed at stimulating investment. As we shall discuss, compared to a company tax cut, an investment subsidy delivers a stronger investment response and addresses two major shortcomings of a company tax cut: (1) with all investment agents treated equally, it does not favour foreign over domestic investors; and (2) it enables the tax revenue flow from legacy capital to be maintained.

We present three simulations. We begin with a comparison of an unfunded stimulus to investment via two instruments: a company tax cut, and an investment subsidy. We find that the investment subsidy is the more effective method of stimulating investment and economic activity. Our third simulation is a reprise of the investment subsidy, this time funded by the denial of franking credit cash refunds and an increase in the rate of personal income tax. The investment subsidy loses some of its effectiveness when fully funded, but still leads to long-term gains in gross national income, the most suitable measure of material welfare.

2 Model

We undertake our analysis of the efficiency and economic effects of company tax cuts, investment subsidies and a change in Australia's dividend imputation system with a version of the Centre of Policy Studies flagship Victoria University Regional computable general equilibrium (CGE) model (denoted VURM here). For a detailed description of the theoretical structure of the standard VURM

[1] See https://www.ato.gov.au/Rates/Changes-to-company-tax-rates/

model, see Adams *et al.* (2015). The version of the model applied herein is called VURMTAX. In what follows, we provide a short description of the key features of VURMTAX.

VURMTAX is a 76-industry two-region model of Australia, with the regions being NSW and the Rest of Australia.[2] All but three of the industries produce a single commodity. The exceptions are Low-density dwellings and High-density dwellings (which each produce two commodities: Owner-occupied and Rental dwellings), and Insurance (which produces five commodities: General Insurance, Health Insurance, Life Insurance, Fire and Emergency Services, and Third Party Insurance). Investment is allocated across regional industries to maximise rates of return to investors. VURMTAX recognises two distinct classes of investor: local investors, i.e., households/firms, and foreign investors. Effective tax rates on each class of investor differ, with foreign investors not liable to pay Australian personal income tax on their capital income, while they are also unable to claim back Australian franking credits. Capital creators assemble, in a cost-minimizing manner, units of industry-specific capital for each regional industry. Each region has a single representative household and a state government. The federal government agent operates in each region. Finally, there are foreigners, whose behaviour is summarised by export demand curves for the products of each region and by supply curves for international imports to each region.

As is standard in CGE models, VURMTAX determines the supply and demand for each regionally produced commodity as the outcome of optimising behaviour of economic agents. Regional industries are assumed to choose labour, capital and land so as to maximise their profits while operating in a competitive market. In each region a representative household purchases a particular bundle of goods in accordance with the household's preferences, relative prices and its amount of disposable income.

Regions are linked via interregional trade, interregional migration and capital movements and governments operate within a fiscal federal framework.

Like its predecessors MONASH and VURM, VURMTAX is a static-expectations model, where movements in expected rates of return are based on movements in current rates of return. As such, investors are not forward-looking and will not react to an announced change in policy until the year in which it takes place. A model with forward-looking behaviour could capture a situation in which investors responded ahead of time to an anticipated policy change. However, we do not anticipate that these effects would be large, particularly given the uncertainty surrounding many policy announcements.

VURMTAX provides results for economic variables on a year-on-year basis. The results for a particular year are used to update the database for the commencement of the next year. More specifically, the model contains a series of equations that connect capital stocks to past-year capital stocks and net investment. Similarly, debt is linked to past and present borrowing/saving and regional population is related to natural growth and international and interstate migration.

Whereas VURM's standard database is calibrated to fully reflect ABS national accounts data, VURMTAX contains a Government Finance module, which provides a comprehensive treatment of revenues, expenditures and budget balances at two levels of Government: Federal and State/Territory. The model contains a number of innovations relating to the treatment of insurance

[2] Rest of Australia is an aggregation of the other five Australian states and the two territories.

taxes levied at the state level, as well as the three key national taxes, the GST, personal income tax, and company tax. In the case of certain taxes, such as payroll taxes and transfer duties, it is difficult to include all features of the taxes (e.g. the impact of thresholds on output relative to efficient scale of production by monopolistically competitive firms) within VURMTAX. In these cases, we undertake detailed analysis outside the model in order to capture the productivity impacts of these features of the tax system in our baseline simulations.

The model is solved with the GEMPACK economic modelling software (Harrison and Pearson, 1996).

2.1 Modelling long-run region-specific labour supply

VURMTAX does not explicitly model a consumption/leisure trade-off. Instead, we allow regional participation rates to respond to movements in regional real consumer wages. Households therefore face a labour/leisure trade-off, which we account for when calculating the welfare impacts of changes in regional or national taxes. Workers in each region increase their labour supply $L_s(q)$ in response to deviations (in per cent) of region-specific post-tax real consumer wage rates from their baseline forecast, *rwage_ct(q)*, where region $q \in$ REG spans the set of VURMTAX regions, i.e., NSW and RoA:

$$L_S(q) = \gamma \cdot rwage\_ct(q). \tag{1}$$

Herein, we set the labour supply elasticity at $\gamma = 0.15$ in each region. This choice is predicated on a detailed survey of CGE literature, which we summarise here. Bento and Jacobsen (2007) and Taheripour et al. (2008) employ an uncompensated labour supply elasticity equal to 0.15, whilst Takeda (2007) employs 0.19. Babiker et al. (2003) and Fischer and Fox (2007) calibrate their models to labour supply elasticities of 0.25 and 0.10, respectively. To address uncertainty over the value of the labour supply elasticity, Fraser and Waschik (2013) conduct a sensitivity analysis around the central case value of the labour supply elasticity +0.15, re-calibrating the model to a low value of 0.075 and high value equal to 0.30. In a review of the literature (specifically with regard to the U.S. labour market), Borjas (2015) finds that income effects generally dominate substitution effects for US males, driving a negative labour supply elasticity of -0.1. In contrast, substitution effects dominate for US females, driving a small positive labour supply elasticity of +0.2. Evers *et al.* (2008) also examine empirical estimates of labour supply elasticities by gender and across countries. The authors identify a median (uncompensated) labour supply elasticity for men of 0.08, while for women the figure is both higher and exhibits greater variability, with a median of 0.35. In VURMTAX, we do not distinguish labour supply effects by gender or marital status, and adopt an aggregate labour supply elasticity equal to the central case examined by Fraser and Waschik (2013). Using the labour/leisure trade-off specification described here, VURMTAX calculates the region-specific welfare impact of changes in region-specific labour supply, by valuing any additional labour supplied at the marginal (post-tax) value of labour in the baseline forecast.

A lagged-interregional-migration module, developed by Giesecke and Madden (2013), has also been incorporated in VURMTAX. Under a standard closure, workers across regions migrate depending on differences in cross-regional real (CPI-deflated) wages.

VURMTAX therefore provides two avenues for an expansion in region-specific labour supply: (1) via increases in region-specific participation rates, i.e., the region-specific ratio of labour supply to working population increases relative to the baseline forecast; and (2) via regional migration, which increases the region-specific working population and thus labour supply at the expense of the labour supply in other regions. In distinguishing the impact of inter-regional migration on region-specific labour supply from the impact of changes in region-specific participation rates, VURMTAX carries an equation system with sufficient detail to value additional (foregone) region-specific leisure time. In a VURMTAX policy experiment, the real marginal value of leisure time to households is equal to the real marginal value of labour in the baseline. If the marginal value of leisure were higher than this, then workers would have supplied less labour under the baseline. Under this framework, the value of additional (foregone) leisure, $\Delta VLEIS(q,t)$, in region $q \in$ REG and year t, is therefore equal to:

$$\Delta VLEIS(q,t) = -\left(1 - TPERINC_B(t)\right) \cdot \frac{VLABINC_B(q,t)}{CPI(q,t)} \cdot r_{LS-WPOP}(q,t). \tag{2}$$

In equation (2), we have defined the deviation in the ratio of region-specific labour supply $L_s(q,t)$ to the region-specific working population $WPOP(q,t)$ from the baseline forecast as $r_{LS\text{-}WPOP}(q,t)$, while $VLABINC_B(q,t)$ is the baseline region-specific nominal labour income, $TPERINC_B(q,t)$ is the average personal income tax rate in the baseline, and $CPI(q,t)$ is the region-specific consumer price index. When the region-specific participation rate increases, this materialises via an expansion in labour supply relative to the working population, i.e., $r_{LS-WPOP}(q,t) > 0$. From equation (2), this reduces the value of leisure derived by households, because some leisure time has been forsaken to increase region-specific labour supply at a new (higher) policy simulation real post-tax consumer wage.

2.2 Closure

In solving VURMTAX, we undertake two parallel model runs: a baseline simulation, and a policy simulation. The baseline simulation is a business-as-usual forecast for the period 2017 to 2036. The policy simulation is identical to the baseline simulation in all respects other than the addition of the exogenous shocks describing the policy under investigation. We report model results as percentage (and in some cases, $m) deviations in the values of variables in each year of the policy simulation away from their baseline values.[3]

The evolution of the impacts of the policies modelled over the simulation period reflect transition costs, as the economy adapts to new taxation settings. The medium- to long-term results also reflect gradual structural change in the baseline path of the economy, driven by population growth and productivity growth. The baseline reflects the growth in incomes, changes in the composition of consumption expenditure, and changes in returns to fixed factors. Beyond the horizon of these simulations, if policies implemented in 2018 are no longer effective, we trust that policy-makers of the future will make appropriate adjustments.

All policy simulations conducted herein explicitly assume the following model closure:

(1) A labour market characterised by short-run real pre-tax wage stickiness with an endogenous unemployment rate, transitioning to a long-run environment of wage flexibility with an exogenous unemployment rate. Regional labour supply also adjusts to deviations in region-specific real consumer wages, as specified in equation (1);
(2) National private consumption spending is the sum across regions of regional private consumption. Within each region, private consumption spending is a given proportion of regional disposable income: this proportion that is consumed adjusts by a uniform

[3] See Dixon and Rimmer (2002) for a thorough review of the construction of baseline and policy simulations with a detailed CGE model.

percentage across all regions, to ensure that the ratio of net foreign liabilities to GNI stabilizes over a seven-to-ten year time period following the policy shock; and

(3) Public consumption spending undertaken by federal, state and local governments is assumed to remain on the base case trajectory.

2.3 Endogenous savings response in VURMTAX

Our endogenous national savings response is predicated on work by the OECD (2012), which studied the cross-country relationship between the strength of financial agent balance sheets and macroeconomic stability and growth. This study highlights that indebtedness enhances the pro-cyclical properties of a number of macroeconomic vulnerabilities. With high debt levels, these vulnerabilities are more likely to cascade and migrate throughout the financial system. Sutherland et al. (2012) propose three avenues in particular via which high levels of debt impact macroeconomic stability:

(1) **Augmented exposure to income shocks:** High debt levels create a number of mismatches and related problems, which include *maturity mismatches*, e.g., debt rolls can become problematic with a high level of short-duration liabilities (such as deposits) and long-duration assets (such as loans), *currency mismatches*, e.g., liability dollarization, *capital structure problems*, e.g., higher levels of debt-to-equity impact an individual or organisations capacity to weather revenue or income shocks via a heightened real debt burden. In combination, these effects impact solvency, thus enhancing the economic impact of market stress periods.

(2) **Greater exposure to asset price movements:** Higher levels of debt enhance real consumption volatility and increase the probability of a recession (OECD, 2012), which can amplify the impact of shocks, enhance macroeconomic instability, and increase the output gap during market stress periods. This materialises via two mechanisms: (1) higher indebtedness can drive real consumption volatility via its impact on the real debt burden, which increases in periods of market stress as equity valuations fall. In particular, with regard to household equity, this limits mortgage redraws which impact households' capacity to smooth consumption; and (2) by reducing the value of loan collateral and thus exacerbating the impact of margin calls. These two effects are inherently pro-cyclical.

(3) **Higher financial sector debt levels diminish its effectiveness:** Highly leveraged banks are less able to dampen economic shocks (Yang and Tsatsaronis, 2012). With insufficient capital buffers contagion risk grows, and this can enhance the possibility of strongly pro-cyclical events such as sudden-stops (Calvo and Talvi, 2005), which lead to falls in domestic investment and thus employment and consumption. More broadly, the OECD studied how higher economy-wide debt levels impact the severity of the business cycle empirically, and showed that countries with higher debt levels tend to experience longer below-trend periods of growth following economic downturns, relative to countries with lower aggregate debt levels. Prolonged below-trend growth occurs (in part) because commercial bank and non-bank financial sector counterparty risks also grow proportionately with heightened concerns regarding the health of domestic balance sheets. For example, sovereign solvency fears were a key driver behind Euro-area bank runs and the concerns these runs generated during the Greek debt crisis in 2010 (OECD, 2012).

The OECD (2012) highlight two ratios that can act as warning signals with regard to diminished macroeconomic stability, namely the level of debt to income, and debt to GDP. Other measures of leverage, such as debt-to-equity ratios, tend to deteriorate post the onset of recession due to asset price movements. With regard to mitigating or managing the risk of excessive indebtedness on stability and growth, Sutherland et al. (2012) suggest policymakers focus on the development of automatic stabilisers to these warning signals, and macro-prudential policies aimed at guarding against excessive credit growth.

For the reasons described here, in VURMTAX we use the ratio of foreign-debt-to-income as a measure of macroeconomic stability, and allow the national savings rate to adjust to ensure this ratio does not exhibit unbounded year-on-year expansion or contraction. This follows the original long-run comparative static closure proposed in ORANI (Dixon et al. 1982), in which the trade account balance was exogenous as a proportion of GDP, allowing endogenous determination of gross national expenditure. The original justification for this closure was that debt could not be allowed to accumulate to unsustainable levels. A stable debt-to-GDP ratio requires the current account balance to be stable as a proportion of GDP. This was often approximated in long-run comparative static simulations, via an exogenous trade account balance.

Even with the NFL stabiliser in place, the results do not converge to a long-run steady state in which every year is a carbon copy of the preceding year. While this type of balanced growth is an attractive theoretical concept, not least because it enables some results to be characterised as “permanent”, it is nonetheless theoretical. This is discussed by Dixon and Rimmer (2002), who argue that deviations from base case “depend critically on the details of the realistic (unbalanced) base case forecasts.”

2.4 Modelling personal income and company tax in VURMTAX

Australia’s franking credit system was implemented in July 1987 (Peirson et al. 2009) to avoid double taxation of company profits paid out as dividends to Australian-resident investors in Australian-listed companies. Essentially, when resident shareholders receive a franked dividend from an Australian company, they are provided a tax credit by this company in addition to the dollar value of the dividend they receive. This credit reflects the fact that the company has already paid tax (at the company tax rate) on the profits from which the dividend has been paid, i.e., the dividend is paid out of post-Australian-company-tax profits. In receiving a fully-franked dividend, capital income received by Australian residents is effectively taxed at the personal income tax rate.

Dividend imputation systems are rare internationally, with most countries undertaking some form of 'double taxation' whereby corporate income taxes are paid on profits and personal income taxes are paid on dividends (with some countries levying lower personal tax rates on dividends compared to earned income) [The Senate, 2015]. Australia, New Zealand, Chile and Mexico are the only OECD countries to operate a dividend imputation system [Australian Government, 2015].

Because of the role played by franking credits in offsetting personal income tax liabilities in Australia’s tax system, VURMTAX distinguishes capital ownership along two dimensions:

- **By investor type:** Capital is identified as being either foreign-owned or locally owned. Income from locally owned capital accrues to households. Where that capital income is not personal income tax exempt, e.g., as is the case for imputed rents from owner occupied dwellings, the income is subject to personal income tax;

- **By income type:** Capital income is identified as being either franked or unfranked, with the ratio of franked dividends paid relative to aggregate company tax liabilities in the model calibrated to 33 per cent initially, which matches the average claim ratio in ATO Taxation Statistics for Australian companies over the time period spanning 2013-14 to 2014-15.

Via a detailed study of Australia's double taxation treaties (DTT) with all DTT partners, we account for the impact treaty agreements have in reducing withholding tax liabilities of foreign investors who receive unfranked dividend payments. This provides the necessary framework to study the regional, industry and economic welfare impacts of changes in Australia's corporate tax rate.

In order to model the personal income tax system in Australia and its interaction with Australia's system of dividend imputation, we allow franked dividends paid by companies to local capital owners to then be claimed by those owners as an offset on their personal income tax liabilities. This yields the following expression for personal income tax collections (*PITTAX*) in VURMTAX, in terms of the flat-rate personal income tax rate T_{PIT}:

$$PITTAX = T_{PIT} \cdot PITBASE \quad - PI \cdot FCRED \tag{3}$$

where

$$PITBASE \quad = DEDPIT \cdot (LABIN + NOTRET \cdot CAPIN[1 - T_{CAP} \cdot DEDCIT] + PI \cdot FCRED) \tag{4}$$

In equation (4), *LABIN* and *CAPIN* are labour and capital income earned by households, while *FCRED* is the aggregate dollar value of franking credits claimed by households in their tax returns. *PI* captures the degree to which franking credits paid to households can be claimed back to offset personal income tax liabilities; this variable takes the default value of 1. *DEDPIT*, *DEDCIT* and *NOTRET* capture the impacts of (respectively):

(i) Tax-free thresholds and tax deductions on the personal income tax base, calibrated to ensure the average tax rate in VURMTAX equals the Australian average personal income tax rate set out in the Parliamentary Budget Office (2017) report of 23.9 per cent. This yields a value for *DEDPIT* of 82.7 per cent;

(ii) The impact of interest expense deductibility on Australia's corporate income tax base. We calibrate the share of interest expense deductions claimed by industries in VURMTAX to the share Australian corporates claimed in ATO Taxation statistics, relative to corporate earnings before interest and tax (EBIT). This reduces the corporate income tax base in VURMTAX, relative to the equal the full capital income tax base, by 38.3 per cent. Reflecting this, we set the value of DEDCIT to 0.617, which yields an economy-wide average company tax rate of 17.9 per cent that is of similar order to the US Congressional Budget Office (2017) estimate for Australia of 17.0 per cent;

(iii) The impact of retained corporate profits, which reduces personal income tax liabilities on corporate income earned by households. In VURMTAX, the share of retained profit is set to 20 per cent by setting NOTRET equal to 0.8, which yields a payout ratio of 80 per cent that is similar to the economy-wide payout ratio in Australia in 2015 (Bergmann 2016).

Together with VURMTAX's upward-sloping labour supply specification, the framework outlined herein provides sufficient detail to study the impact of adjustment in a flat-rate personal income tax in Australia; changes in corporate interest deductibility; changes in foreign taxation treaty agreements; long-run trends in dividend payout ratios; and partial (or complete) scale back in Australia's dividend imputation system.

2.5 Modelling the investment subsidy in VURMTAX

We model an investment subsidy as an indirect negative tax (subsidy) on investment. This puts upward pressure on the rate of return on capital, because the economy-wide price of investment falls (due to the subsidy), which reduces the replacement cost of capital. This drives up the rate of return on capital for both local and foreign investors.

In practice, an investment subsidy is more likely to be implemented via accelerated depreciation of capital expenditure, reducing a company's liability for company tax [as proposed, for example, in the Labor Party's Investment Guarantee (ALP, 2018)]. In this case, some of the impact on the final rate of return to domestic investors may be muted because of an associated reduction in the value of franking credits. However, if investment is largely funded from retained earnings (which is generally supported by capital gains discounts that prevail in Australia), accelerated depreciation provides an effective mechanism for increasing the post-tax rate of return.[4]

3 Results

3.1 Comparison of an investment subsidy and a company tax rate cut

We begin with an illustration of two policies designed to boost investment: a company tax cut of 3.8 percentage points and an investment subsidy of 1.6 per cent. Both of these hypothetical policies are unfunded and calibrated to cost the Commonwealth budget $5 billion in the year of implementation, 2018-19. As a proportion of GNI, the budgetary impact remains fairly steady at around 0.3 percent throughout the simulation period (Figure 1).

[4] Further, if an accelerated depreciation policy also allowed for accelerated distribution of franking credits, i.e., if companies were permitted to frank distributions at a rate in excess of 100%, the effect on post-tax rates of return for local investors would be greater. Franking credits distributed in excess of company tax paid could be drawn, for example, from the existing stock of accumulated credits on many Australian corporations' franking registers, which at present exist as implicit liabilities in perpetuity on the Federal Government balance sheet.

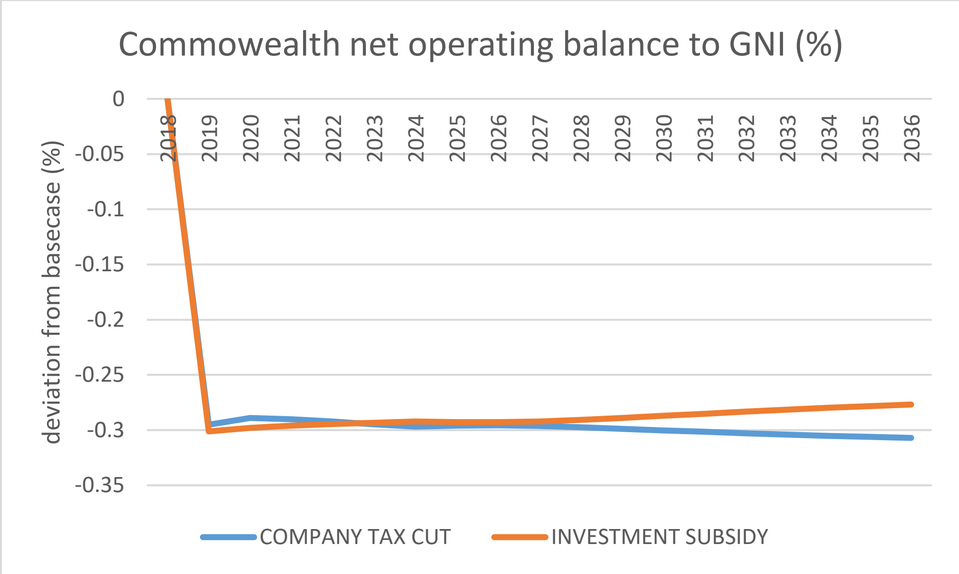


Figure 1: Ratio of commonwealth net operating balance to GNI , company tax cut and investment subsidy. Source: VURMTAX

Key result 1: With both policies calibrated to the same budgetary cost, the investment subsidy is more effective.

Both instruments work by increasing the rate of return on capital. A simple definition of the rate of return is given by

$$ROR_j = \frac{(1-T_c)(Q_j-D_j)K_j}{\pi_j(1+T_I)K_j} \tag{5}$$

In equation (5), the rate of return in industry *j* (ROR_j) is equal to the post-tax, post depreciation income derived from capital stock K_j, where the rate of company tax is given by T_c (e.g. $T_c = 0.3$), the rental rate on capital in industry *j* is given by Q_j (e.g. $Q_{retail} = 0.2$)[5] and the rate of depreciation is given by D_j (e.g. $D_j = 0.07$); divided by the replacement cost of the capital stock, given by the post-tax investment price index for industry j, where π_j indicates the pre-tax price and T_I indicates the rate of the tax. In this paper, we are generally concerned with a subsidy on investment, in which case T_I is less than zero.

Investment in industry *j* is a positive function of the rate of return in industry *j*, so a higher-than-base case rate of return will induce a higher-than-base case level of investment. Both policies induce an increase in rates of return: a company tax cut increases the numerator, while an investment subsidy reduces the denominator.

However, the company tax cut is far less effective as an instrument for raising investment for a given budgetary cost. This is because, ignoring second round effects, the investment subsidy enables the full $5 billion package to be deployed on increasing post-tax rates of return on capital and inducing a relatively large investment response. The company tax cut, on the other hand, has limited effectiveness in changing the post-tax rate of return for domestic investors, because of the impact of dividend imputation.

[5] The primary purpose of providing numerical examples here is an indication of the units of measure. These examples are not derived directly from the VURMTAX database.

Figure 2 shows that the investment subsidy is between two and three times more effective as a stimulus to investment.

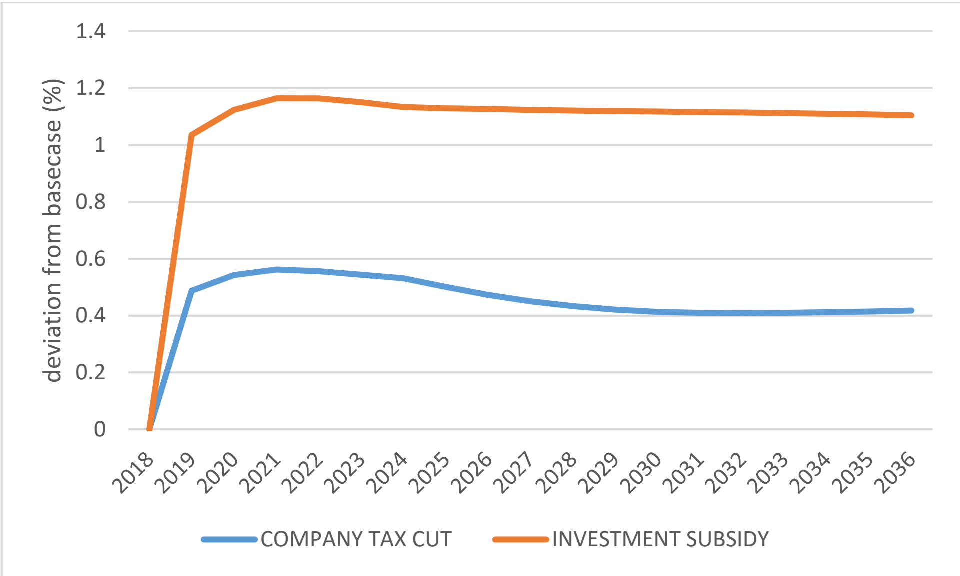


Figure 2: Volume of investment, deviation from base case under company tax cut and investment subsidy. Source: VURMTAX

Key result 2: The investment response to a company tax cut is skewed towards foreign investors; the investment response to an investment subsidy is relatively evenly spread between foreign and local investors.

Australia's system of dividend imputation means that the effective corporate tax rate to local investors is, on average, close to zero. For investors taking full advantage of dividend imputation and if all profits were distributed, the effective corporate tax rate to locals is equal to zero.

In VURMTAX, the rate of return is defined separately for foreign and local investors, with the tax rate faced by local owners of capital trimmed to take account of both the share of franked dividends and the share of franking credits claimed. As a result, any *change* to the tax rate is muted for local investors, and consequently, the investment response is also muted (see Figure 3).

The investment subsidy, on the other hand, is available to all investors, local and foreign alike. As a result, the impact of the investment subsidy on rates of return is similar for local and foreign investors, as is the investment response.

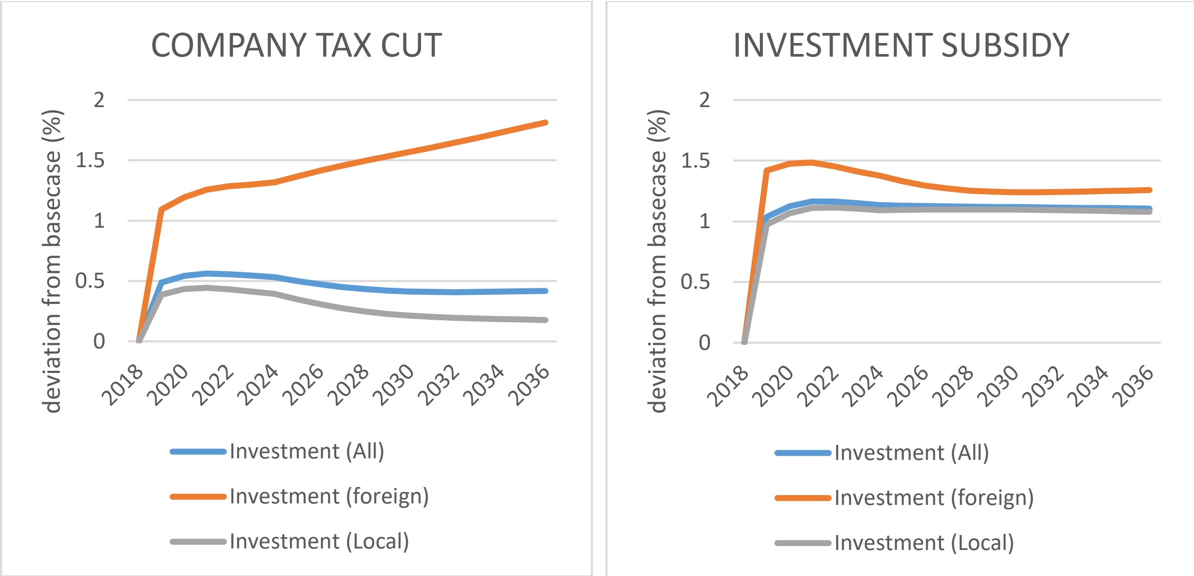


Figure 3: Volume of investment by foreign and local investors, deviation from base case under company tax cut and investment subsidy. Source: VURMTAX

Key result 3: The company tax cut induces an increase in net foreign liabilities and associated servicing costs while the investment subsidy has little long-term effect on net foreign liabilities.

All other things equal, an investment stimulus tends to move the current account towards deficit. At the margin, investment in Australia is financed by the current account deficit, as either debt or equity. In VURMTAX, foreign investment is equity-financed and earns the going rate of return on capital, while domestic investment is debt financed, with the foreign financier earning a fixed rate of interest on the debt.

This difference in the ownership composition of the induced investment partly explains the differing impacts on net foreign liabilities. The investment subsidy induces a larger response from domestic investors, who are assumed to be finance investment using foreign debt. Because debt is serviced at a fixed rate of interest, the increase in the post-tax rate of return net of interest accrues to the domestic investor. On the other hand, the increase in the rate of return on investment funded by foreign equity accrues entirely to the foreign investor.

Furthermore, the company tax rate cut leads to a larger increase in net foreign liabilities (see Figure 4), because the loss of taxation revenue on legacy capital is equivalent to an increase in income debits on the current account. Over several years as the legacy capital depreciates, this effect diminishes. On the other hand, the investment subsidy protects the stream of taxation revenue on legacy capital.

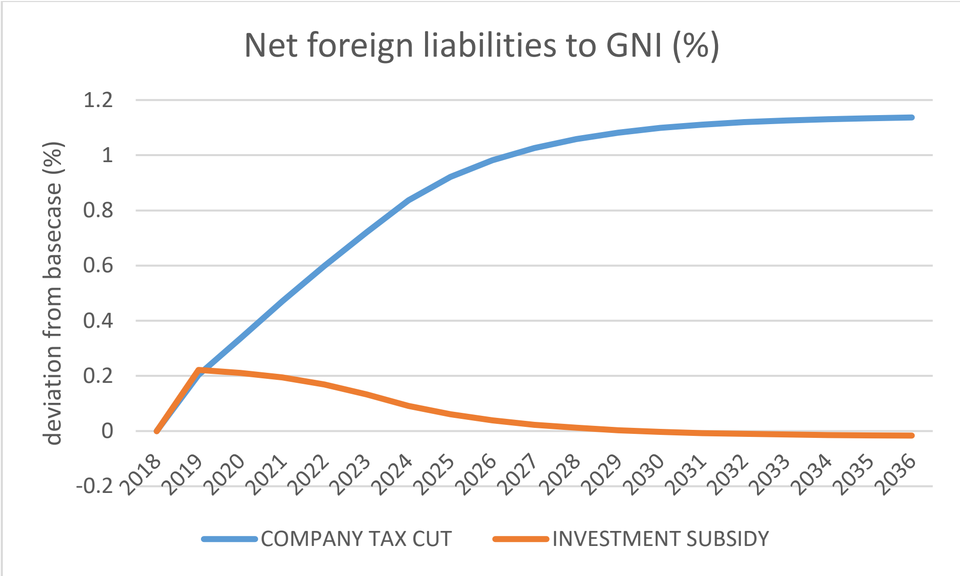
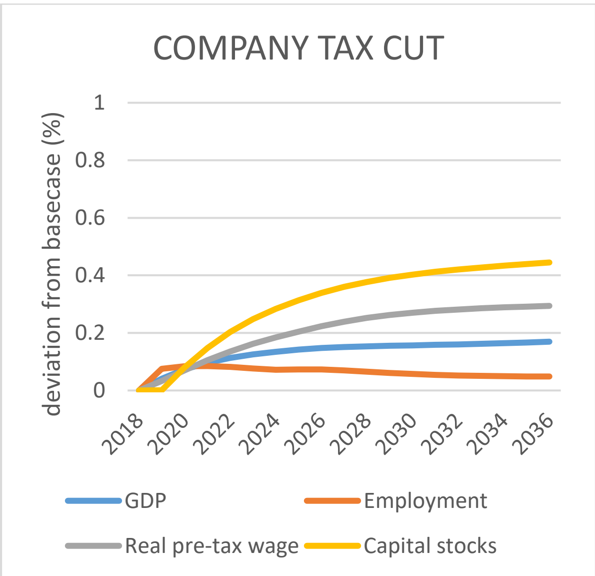


Figure 4: Ratio of net foreign liabilities to GNI, deviation from base case under company tax cut and investment subsidy. Source: VURMTAX

Key result 4: Both policies lead to increases in GDP, employment and real pre-tax wages.

In both simulations, the investment stimulus leads to improved growth in capital stocks, with the result about twice as large under the investment subsidy (see Figure 5). The capital growth is relatively slow, however. The initial response to both forms of investment stimulus is an increase in employment. In the long-run, the increase in employment persists, due to the positive labour supply response to higher real consumer wages.

The result for GDP is a weighted average of labour and capital inputs, with the weights reflecting factor shares.



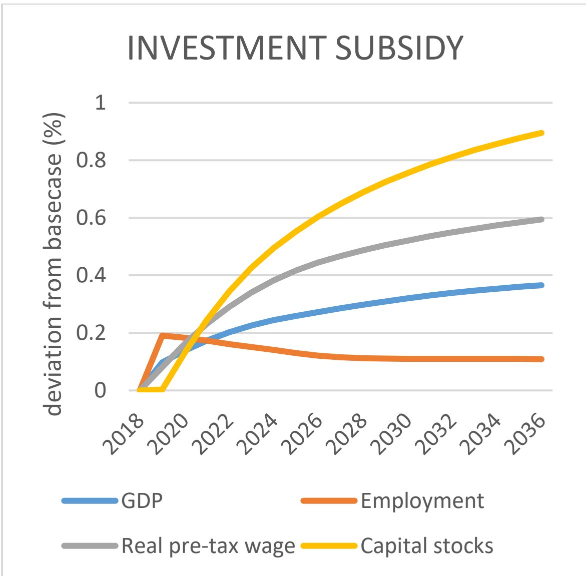


Figure 5: Economic activity indicators, deviation from base case under company tax cut and investment subsidy. Source: VURMTAX

Key result 5: The impact on gross national income is positive for the investment subsidy but not for the company tax rate cut.

Gross national income (GNI) does not include income that accrues to foreign residents, which is mainly capital income. Because of the nature of the simulations – investment stimulus funded at the margin by foreign equity or debt – the difference between gross domestic product and gross national income is important. As the most suitable measure of the material welfare of the domestic population, gross national income is used to assess the effectiveness of the policy.

The company tax cut leads to a larger impact on the income account balance for two reasons. Firstly, there is the loss of government revenue on the existing stock of foreign-owned capital due to the lower tax rate. Secondly, the investment response to the company tax rate cut is strongly skewed toward foreign investment, leading to a larger income account deficit throughout the simulation period.

Given that the investment subsidy has a larger impact on GDP and a lower impact on the income account deficit, it clearly leads to a better result for GNI, which is shown in Figure 6.

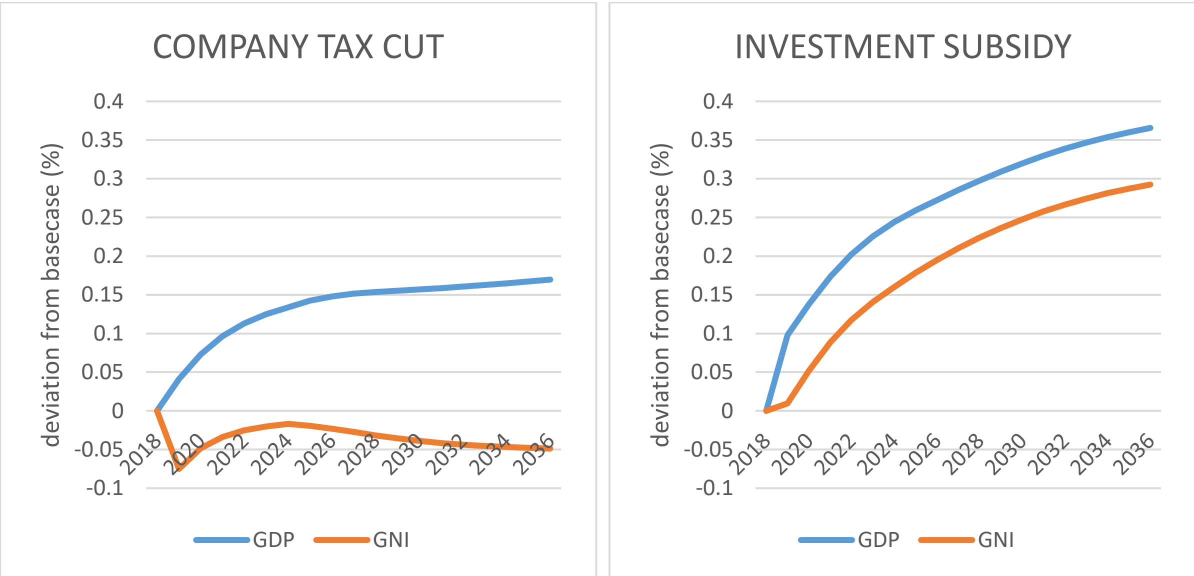


Figure 6: GDP and GNI, deviation from base case under company tax cut and investment subsidy. Source: VURMTAX

3.2 A package to fund the policy

We now turn to the funding of the investment subsidy. In a recent announcement, Opposition Leader Bill Shorten indicated that if elected, the Labor Party would reduce the cost to government of dividend imputation by denying cash refunds to people on zero or low marginal tax rates, typically self-funded retirees.

We hypothesise that the revenue recovered under this policy could be used to partially fund the investment subsidy described above. In a third simulation, we implement a hypothetical investment subsidy of 1.6 per cent and a fall of 15 percentage points in the proportion of franking credits claimed, which funds around two-thirds of the package.

The remainder of the subsidy is funded by a one-off permanent increase in personal income tax of 0.2 percentage points. This is well within the range of bracket creep, which we conservatively estimate adds 0.7 percentage points to the average rate of personal income tax every year.[6]

Key result 6: the investment response remains positive but skewed toward foreign investors

As part of broader reforms to retirement income policy, denial of cash refunds for franking credits goes some way to collecting more tax from retirees, by ensuring that at least some part of their income is taxed. However, the disincentive effects cannot be ignored, and it is likely that many retirees will seek alternative vehicles to generate income in retirement, such as fixed-term deposits or housing.

Denial of cash refunds reduces the effective post-tax rate of return on investment for these investors, thereby dampening the impact of the investment subsidy, which increases the post-tax rate of return. Overall, the investment response by domestic residents remains positive (see Figure 7). Investment is around 0.75 per cent above its base case level throughout the simulation period, relative to 1.1 per cent in the unfunded case. The investment response is strongly skewed toward foreign investors, because cash refunds apply to domestic investors only.

It is not surprising that the denial of cash refunds leads to lower investment by domestic residents. However, the result for foreign investors is less intuitive. Foreign investment is actually stronger under denial of cash refunds. Foreign investors receive no direct benefit from the denial of cash refunds, but weakness in domestic investment reduces the relative cost of labour and also leads to a lower investment price index, both of which improve the pre- and post-tax return on Australian investment by non-residents. Hence, while investment is weaker overall, the negative impact on investment by residents is partially offset by a positive impact on investment by non-residents.

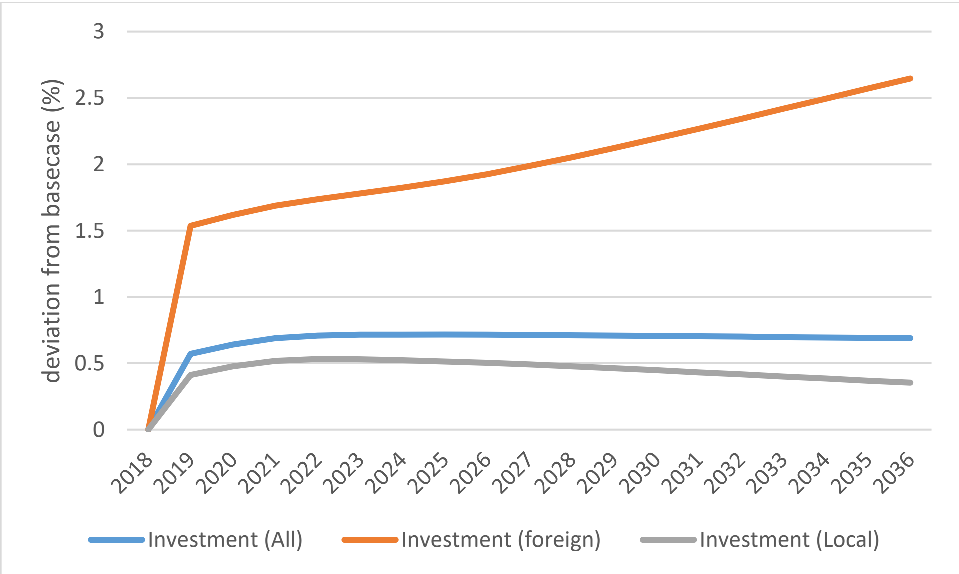


Figure 7: Volume of investment by local and foreign investors, deviation from base case with funded investment subsidy. Source: VURMTAX

[6] This estimate is based on nominal income growth of 3 per cent and an assumed uniform distribution of individuals in each tax bracket.

Key result 7: Net foreign liabilities fall as a proportion of GNI.

In the unfunded case described earlier, the investment subsidy had no long-term effect on net foreign liabilities as a percentage of GNI (Figure 4). With the policy funded by denial of cash refunds and bracket creep, there is a long-term reduction in net foreign liabilities, of around 0.14 per cent of GNI (see Figure 8).

Net foreign liabilities fall throughout the simulation period (Figure 8, RH axis). The initial increase in net foreign liabilities as a percentage of GNI is due to a fall in GNI, not an increase in net foreign liabilities. The reduction in net foreign liabilities is mainly attributed to the increase in personal income tax, which, other things equal, dampens household expenditure and moves the trade balance toward surplus.

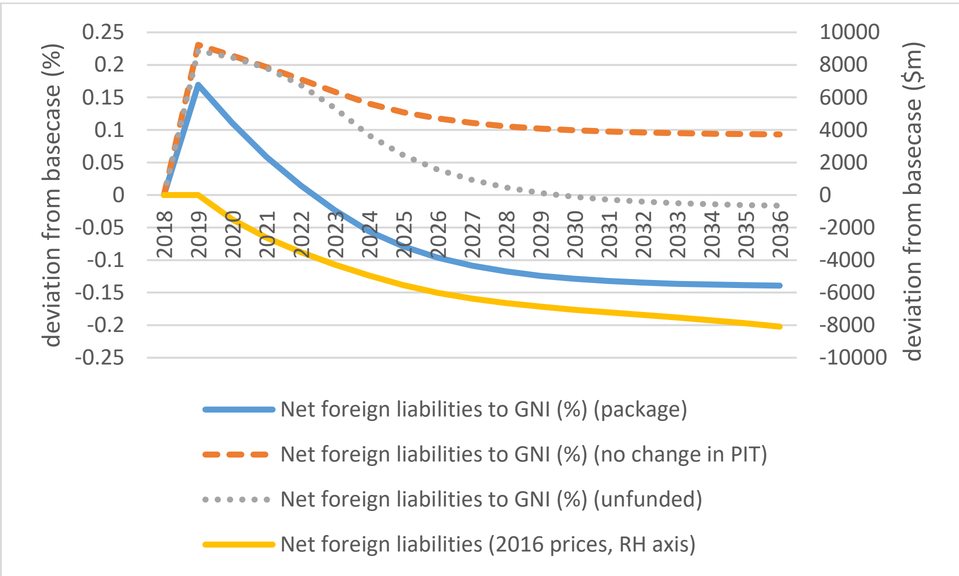


Figure 8: Net foreign liabilities, deviation from base case with funded investment subsidy. Source: VURMTAX

Key result 8: The investment subsidy still returns positive results for employment, GDP and the real pre-tax wage.

Despite the denial of cash refunds and the increase in personal income tax, the investment stimulus still has a positive impact on investment, leading to a positive impact on employment and real pre-tax wages (see Figure 9, Figure 10 and Figure 11).

The increase in the personal income tax rate has a small negative effect on labour supply. Nevertheless, we find that employment increases via a drop in the unemployment rate, as the investment stimulus strengthens the demand for labour (Figure 9). Over time, the unemployment rate returns to its base case level as the real wage adjusts upward. By the third year following policy reform, the real pre-tax wage has grown sufficiently to outweigh the tax increase, such that the real post-tax wage is also above base case. Consequently, labour supply also increases above base case (Figure 9). The increase in labour supply underpins the long run increase in employment.

GDP is above base case throughout the simulation period (Figure 10). In the early years, the increase is attributed to stronger employment. As the capital stock gradually adjusts upward, and employment gradually adjusts downward, GDP continues to increase, reaching around 0.2 per cent above base case by 2036.

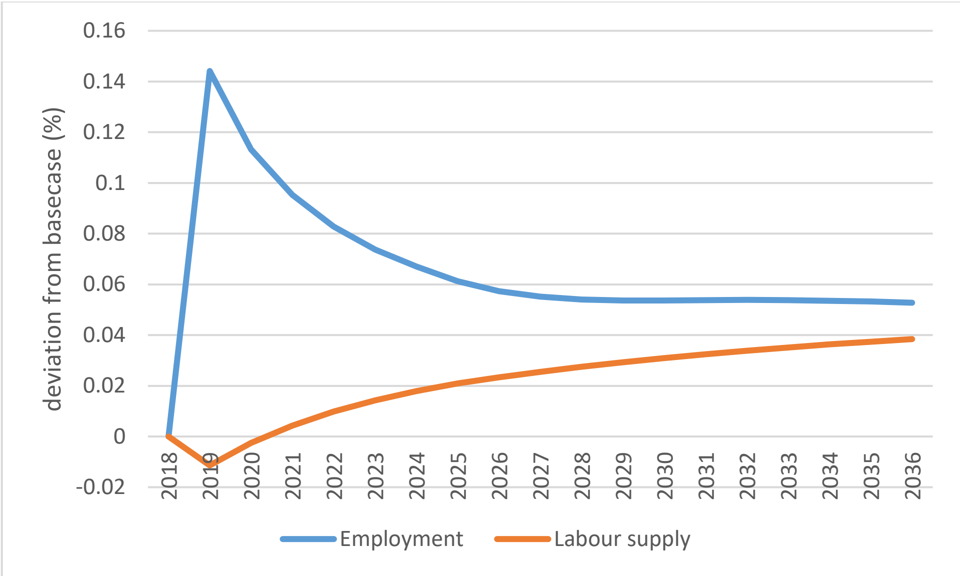


Figure 9: Employment and labour supply, deviation from base case, with funded investment subsidy. Source: VURMTAX

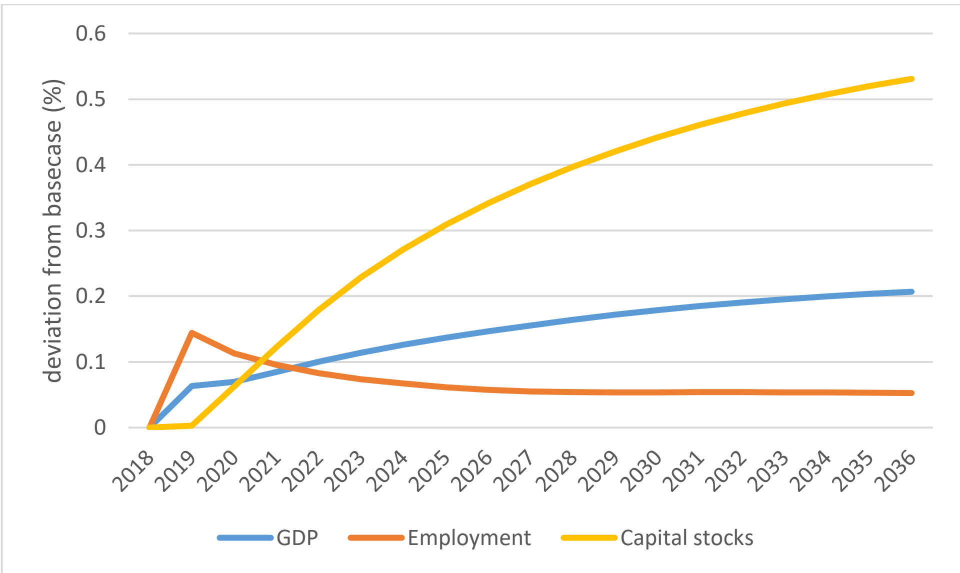


Figure 10: Volume of output, employment and capital stocks, deviation from base case, with funded investment subsidy. Source: VURMTAX

Key result 9: Funding the investment subsidy significantly reduces the long-term gain in real post-tax wages, but it remains positive.

Figure 11 illustrates the misleading nature of using the real pre-tax wage as a performance indicator for an unfunded policy proposal. We find that the unfunded investment stimulus leads to an increase in the real pre-tax wage of up to 0.6 per cent above base case. However, the increase in the real pre-tax wage in the funded package is much lower, as shown in Figure 11. This is because the denial of franking credits dampens the investment response, leading to less growth in the capital stock and consequently less growth in the marginal product of labour.

The real post-tax wage, which accounts for the increase in personal income tax, is the most suitable measure of the impact of the package on workers. This puts a wedge of 0.18 percentage points between the post-tax and pre-tax wages. By the end of the simulation, the real post-tax wage is 0.26 percentage points above base case, less than half the increase in the real pre-tax wage in the unfunded simulation.

Figure 11: measures of wage, deviation from base case, with funded and unfunded investment subsidy. Source: VURMTAX

Key result 10: When funded by the denial of cash refunds and bracket creep, the investment subsidy still leads to a long-term gain in GNI.

The gap between GDP and GNI opens up at the beginning of the simulation period, as shown in Figure 12, because the income account balance moves toward deficit. This occurs despite the fall in net foreign liabilities, because returns on foreign investment increase. The investment subsidy means that foreign investors can earn a relatively large return on a relatively small investment. The "small" investment has only a small (positive) impact on net foreign liabilities, while the "large" return feeds into the income account balance.

While the investment stimulus puts upward pressure on net foreign liabilities, the increase in personal income tax dampens household expenditure, moving the trade balance toward surplus. The net effect of this is a reduction in net foreign liabilities. This fall in net foreign liabilities drives down the national savings rate, reducing net foreign debt, while the investment stimulus increases net foreign equity.[7] The rate of return on equity temporarily increases as a result of the investment subsidy, so the increase in returns to equity outweigh the reduction in interest payments on debt. The income account balance moves to deficit despite the reduction in net foreign liabilities.

A second explanation for the gap between GNI and GDP is the relative changes in the relevant deflators. Real GDP is deflated by the GDP deflator, while real GNI is deflated by a domestic consumption deflator,[8] reflecting the purchasing power of domestic incomes. Given that the consumption deflator includes imports but not exports, while the GDP deflator includes exports but not imports, relative movements in the two deflators are affected by changes in the terms of trade. We find that a small positive impact on the trade balance, required to offset the increase in the income account deficit, causes the terms of trade to decline slightly. This weakens domestic purchasing power, effectively increasing the gap between real GDP and real GNI.

Despite the gap between GDP and GNI, the investment subsidy provides sufficient stimulus to GDP that GNI moves above the base case four years following implementation of the policy reform package. To ease the initial negative impact of the package, introduction of the funding measures could be delayed for three or four years. We leave this as a future modelling exercise.

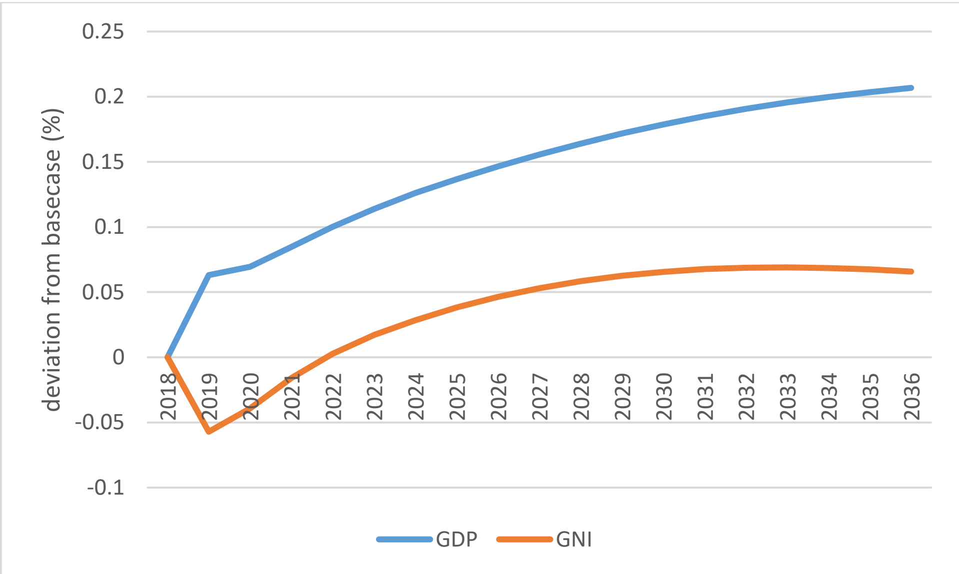


Figure 12: GDP and GNI, deviation from base case under funded investment subsidy. Source: VURMTAX

4 Conclusions

We have explored two methods by which changes to tax policy may be used to stimulate investment. A cut in the company tax rate creates an incentive to invest by improving after-tax returns to investment, while an investment subsidy reduces the cost of installing new capital. We find that, for a fixed budgetary cost of $5 billion, governments could offer a company tax cut of 3.8 percentage points, or an investment subsidy of 1.6 per cent.

We find that the investment subsidy is more effective in raising rates of return, and hence more effective in stimulating investment. Furthermore, the investment subsidy leads to a response from

[7] We define net foreign liabilities as the sum of net foreign debt and net foreign equity. Net foreign debt is subject to a fixed rate of interest, while net foreign equity earns the going post-tax rate of return.

[8] Weighted average of prices of household and government consumption and domestic investment.

both local and foreign investors, whereas the response to the company tax cut is strongly skewed toward foreign investors as a result of Australia's system of dividend imputation. The investment subsidy is between two and three times more effective as a stimulus to investment than the company tax rate cut.

In terms of improving the material welfare of the Australian population, the impact on gross national income is positive for the investment subsidy but not for the company tax rate cut. The investment subsidy is more effective for three broad reasons: firstly because it induces a greater investment response, and consequently a greater response in GDP, wages and employment; secondly, by improving returns for both domestic and foreign investors; and thirdly, by protecting the revenue stream on legacy capital, the investment subsidy is not a drain on national income.

We go on to investigate the consequences of funding the investment subsidy by a combination of reduced dividend imputation (the denial of cash refunds of franking credits) and bracket creep. We find that, fully funded, the investment subsidy is still an effective means by which to raise investment, employment, GDP and the real pre-tax wage. Following a temporary dip in GNI, the investment subsidy leads to a long-term improvement in gross national income relative to our base case scenario.

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6 Appendix

This appendix gives a very simple back-of-the-envelope illustration of the differing impacts on the rate of return of a revenue-equivalent company tax cut and investment subsidy.

Assuming just one industry, and company taxes paid by foreign investors only, a simple formula for the average rate of return is given by

$$ROR = \frac{(1-S_F T_C)(Q-D)K}{\pi(1+T_I)K}, \quad \text{(A1)}$$

where S_F indicates the share of foreign owned capital, which is taxed at the rate T_C (and domestically-owned capital is untaxed) and all other variables are as defined earlier.

The impact of a change to the rate of company tax, all other things equal, is:

$$dROR|_{dT_I=0} = \frac{-S_F}{(1+T_I)} \frac{(Q-D)}{\pi} dT_C. \quad \text{(A2)}$$

Similarly, the impact of a change to the rate of the investment tax is:

$$dROR|_{dT_C=0} = \frac{-ROR}{(1+T_I)} dT_I. \quad \text{(A3)}$$

Revenue R_{CT} from company tax is given by:

$$R_{CT} = S_F T_C (Q-D)K. \quad \text{(A4)}$$

Revenue R_{IT} from an investment "tax" (note that negative revenue is subsidy cost) is given by:

$$R_{IT} = T_I \pi I, \quad \text{(A5)}$$

where I indicates investment and all other variables are as defined earlier.

A cut to company tax calibrated to have the same cost as an investment subsidy (ignoring second round effects) is approximated by equating dR_{CT} to dR_{IT}. That is,

$$dT_C = dT_I \frac{\pi}{(Q-D)} \frac{I}{S_F K}. \quad \text{(A6)}$$

Therefore the impact on the rate of return of a change to the company tax rate (from A2), in terms of the change to the investment subsidy (from A6), is given by:

$$dROR = \frac{-(I/K)}{(1+T_I)} dT_I. \quad \text{(A7)}$$

This can be compared to the impact of an investment subsidy on the rate of return, which is given by equation A3 above.

At a time of low investment, the ratio I/K (the gross investment growth rate) is typically lower than the rate of return, meaning that a company tax cut has less impact on the rate of return than a revenue-equivalent investment subsidy. However, this back of the envelope exposition illustrates that it is not always true that an investment subsidy will have a greater impact on the rate of return.