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# Modelling the Impacts of a Cut to Company Tax in Australia

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Abstract

We investigate the impact of a cut to the company tax rate using a miniature version of the Vic-Uni computable general equilibrium model of the Australian economy with additional detail on ownership of physical capital. Because of Australia's system of dividend imputation, a change to the company tax rate only affects the final post-tax rate of return for foreign investors. Therefore a cut to the company tax rate would transfer government revenue to foreigners, and add to pressure on government to reduce spending or to raise personal taxes.

We concur with the Treasury's finding that a cut to the company tax rate would attract more foreign investment to Australia, making workers more productive and increasing wages and output. However, there is a lag between new investment activity and capital growth, and a large share of future company profits will accrue to foreign investors.

We also find that increased wages will reduce returns to domestically owned capital.

While the impact on national *production*, as measured by GDP, will be positive, this is not a suitable measure of national benefit. The right indicator of national benefit is the impact of a company tax rate cut on national *income* and we find that this will fall.

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# 1 Introduction

Since 2001-02, Australia's company tax rate has been 30 per cent. The 2010 Henry review[1] included a recommendation that

> *The company income tax rate should be reduced to 25 per cent over the short to medium term with the timing subject to economic and fiscal circumstances. Improved arrangements for charging for the use of non-renewable resources should be introduced at the same time.*

In the years since the Henry review, the Minerals Resource Rent Tax has been and gone, but the proposed cut to company tax remains a live issue. The Business Tax Working Group (BTWG), established in 2011 by then treasurer Wayne Swan, came to the tentatively worded conclusion that it "believes there could be economic benefits associated with a cut in the company tax rate" (BTWG 2012). In their submission to the BTWG, the Business Council of Australia argued more strongly in favour of a cut, recommending "that the government commit to a 25 per cent company tax rate as a long-term direction for lowering the corporate tax burden" (BCA 2012). This was supported by the arguments that Australia's rate of company tax is high relative to that of similar countries, and that there is a body of evidence suggesting that foreign investment would respond positively to a cut in company tax.

The Treasury's own modelling (X. Rimmer et al 2014), conducted by Independent Economics, also finds in favour of a cut to company tax, demonstrating under a range of assumptions that GDP would increase.

Modelling conducted at the Centre of Policy Studies using the Vic-Uni model of the Australian economy concurs with the finding that a cut in company tax would have a positive impact on the rate of growth of GDP. However, recognising that GDP is not the most suitable indicator of our living standards, we come to the conclusion that a cut to company tax is not in the national interest.

The cut in company tax stimulates GDP by increasing the post-tax return to investment, which leads to a long term increase in the capital stock. With more capital stock in place, there will be an increase in both output and real wages. So far, a cut in the company tax rate looks like a winner. However, we have three concerns. The first is that foregone taxation revenue will add to government deficits, creating pressure for spending to be cut or alternative taxes to be raised. The second is that the cost of additional capital stock will add to the current account deficit, and should not be treated as manna from heaven. This leads to our final concern, which is our finding that despite the expected increase in GDP, real national income will fall under a cut to company tax.

Company tax accounted for $70 billion in taxation revenue for the government in 2013-14, around one-fifth of all tax collected. A large proportion of this revenue was collected from domestic investors, and offset against personal income tax through Australia's system of franking credits. For these investors, investment income is effectively taxed at the personal marginal rate of income tax, and the rate of company tax does not directly affect their incentive to invest. Nor does it change the

[1] Formally known as Australia's Future Tax System Review (Treasury, 2010)

bottom line for government, as any reduction in company tax will be offset by an increase in personal income tax.

By cutting the company tax rate, it is an increase in the post-tax rate of return to non-resident investors that will underpin the increase in foreign investment that will boost GDP. The tax office estimates that $12 billion in franking credits were issued to non-resident investors in 2013-14. Unlike franking credits issued to domestic investors, this is revenue to the government that is not offset against anything else. Given the large amount of foreign-owned capital already in place in Australia, the government budget will suffer a loss in tax revenue on the capital that was willingly installed by non-resident investors when the rate of company tax was 30 per cent.

Furthermore, post-tax income generated by the new capital will accrue to its non-resident owners, adding to GDP, which is a measure of domestic production. Critically, this post-tax income will not to add to GNP, which is a measure of domestic incomes.

Proponents of a company tax cut argue that in the long run, the benefit of a cut to company tax will flow to workers through an increase in the real wage. Our modelling concurs with this finding. However, while the Henry review's recommendation on company tax went hand-in-hand with a mechanism to replace lost revenue (the MRRT), the government may now need to cover lost revenue with an increase in income tax. This means that not all of the wage increase will necessarily find its way to workers.

We also note that an increase in wages is not good for everybody. Domestic investors, including shareholders in listed companies as well as many small and medium business owners, will face higher wage costs and consequently lower returns to investment, while receiving no direct gain from the cut to company tax.

It is national income, and not production, that provides an indicator on living standards. Overall we conclude that while a cut to company tax will boost domestic production, it will lead to a fall in real incomes (Figure 1). In present value terms, this loss is in the order of $800 to $2000 per person.

Rather than using company tax cuts to bolster foreign investment, let's not forget that Australia offers many other qualities to investors: an educated, English-speaking workforce, proximity to the Asia-Pacific region, and stable democracy. If we can retain on this list good infrastructure and public service delivery, and a strong social safety net thanks to well considered government policy, we may continue to enjoy the benefits of foreign capital inflows without sacrificing a valuable source of government revenue.

In the remainder of this paper we describe in more detail the model simulations, and present some detailed results. We conclude with an agenda for further work on this topic.

## 2 Simulations

In this paper we use a miniature version of the Vic-Uni model (Dixon and Rimmer 2002) of the Australian economy with enhanced physical capital market detail to estimate the impact of a cut in company tax in Australia. It is a miniature version by virtue of its database, which identifies 20 industries (equivalent to the 19 ANZSIC divisions plus ownership of dwellings) instead of the usual 115, and the omission of some aspects of the model theory. It retains the dynamic structure of the

full model, including the mechanisms for the accumulation of physical capital and net foreign liabilities.

While the simulation illustrates many interesting points capturing the key impacts of proposed changes to company tax, results are only intended as preliminary. We hope that we will be provided with the opportunity to fully resource this project and properly investigate the impacts of company tax using the full Vic-Uni model.

## 2.1 Company tax

The key issue in modelling company tax is to recognise that a large proportion of capital in Australia is foreign-owned, and Australia's franking credit system effectively imposes different rates of tax on capital income, depending on whether it accrues to resident or non-resident investors. In this section, we describe what franking credits are, and how the tax liabilities for foreign investors who receive franked versus unfranked dividends from Australian-listed companies differ. This provides a suitable platform from which to outline and discuss our choice for the tax rate on foreign owned capital in sections 2.1.3 and 2.2.

### 2.1.1 The Franking Credit System for Dividends

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-listed 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. 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[2]). Australia, New Zealand, Chile and Mexico are the only OECD countries to operate a dividend imputation system (Australian Government, 2015[3]). The majority of Commonwealth revenue in Australia is sourced from personal and corporate income taxes, collectively representing over 70 per cent of total revenue in 2012–13 (Australian Government, 2015[4]). As a result, Commonwealth revenue is highly susceptible to base erosion if the integrity of the income tax regime is compromised.

### 2.1.2 Example: Classical versus Franking Credit Systems

To illustrate the difference between a classical and imputation credit system, assume a company earns profit on its operations of $100; they are liable to pay $30 of Australian company tax on this profit, leaving a post-tax profit of $70. Under a classical taxation system, e.g., the system currently in place in the US, and assuming a complete payout policy, i.e., all $70 of post-tax profit is paid out as a dividend, the shareholder (assumed to be an Australian resident) is liable to include the $70 in their Australian tax return as taxable income. Assuming a personal tax rate of 30%, the shareholder would

[2] See Chapter 2
[3] p 85.
[4] p. 21.

then be liable to pay a further $21 in tax. The effective tax rate on the $100 of company profits is therefore 51%.

Under an imputation credit system, the company could pay a *fully franked* dividend of $70 to its shareholder. The use of the term *fully franked* implies that the dividend has been paid out of post-Australian-company-tax profits, i.e., the $30 tax paid was Australian company tax. Being fully franked, the dividend carries a tax credit of 70*0.3/(1-0.3)=$30. If we again assume the shareholders personal tax rate is 30%, then the shareholders' tax liability is equal to their personal income tax liability on the *pre-tax profits* paid out as dividends by the company they own shares in, *less* the franking credit, i.e., at a personal tax rate of 30% this means the shareholder has a personal tax liability of 30%*$100-$30=0. Because the shareholder has the same personal income tax rate as the company, the company has pre-paid the shareholders personal tax liability. Relative to a classical tax system, the imputation credit system induces a bias towards the payment of profits as dividends relative to the retention of profits to generate capital gains; this is because the effective tax rate on profits paid as dividends is the personal tax rate of the shareholder, as opposed to a (higher) combination of the personal and company tax rates.

Non-residents shareholders, e.g., offshore companies or foreign individuals who hold shares in Australian companies, are liable to pay tax on *unfranked dividends* paid by Australian companies at a rate of 30 cents in the dollar. This is referred to as *withholding tax*. While it is not explicitly stated as such in the Australian Government's recent tax review paper, it is implied that the withholding tax rate of 30% on unfranked dividends paid to non-resident investors, mirrors what would be the applicable tax rate had that unfranked income been distributed to an Australian-listed company (Australian Government, 2015[5]).

Importantly, non-resident investors are not permitted to claim franking credits as withholding tax offsets (Peirson et al 2009); as such, should the foreign investors have withholding tax liabilities generated through other shareholdings, they cannot use franking credits they earn from franked shareholdings to offset these withholding tax liabilities. To illustrate the situation, consider our previous example where a company earns $100 in profits and pays $30 in company tax; in this case, let us also assume the shareholder is a non-resident investor. Because the dividend is fully franked, i.e., resident shareholders would receive a franking credit of 30%, the non-resident investor is not liable to pay any withholding tax. They receive an after-tax disposable income of $70, however they are not able to claim back the franking credit. This remains as tax revenue of the Australian Government.

Next, assume that the dividend was *unfranked*, e.g., the company has not paid Australian company tax in the present financial year, perhaps because their current-year tax liability has been offset with carried-forward losses incurred in previous financial years. In this case, their before-tax profits of $100 are also their post-tax profits of $100. Because this dividend carries no franking credit (because no company tax was paid in the current financial year) and is paid to a non-resident, the non-resident has a withholding tax liability of 0.3*$100=$30. Generally, withholding tax is withheld by the company paying the unfranked dividend, at the time the dividend is paid, and is calculated based on information in the company's own share registry. In summary, the repatriated income of the non-

[5] p. 92.

resident shareholder is $70, being the value of the unfranked dividend *less* their withholding tax liability.

The situation described in the previous paragraph is an accurate representation of the tax liability for a non-resident investor receiving an unfranked dividend from an Australian-listed company, when the non-resident lives in a country with which Australia has no negotiated double taxation treaty (DTT). Critically, if the non-residential investor is a resident of a country with which Australia has a DTT, then the withholding tax liability of the non-resident investor on *unfranked* dividends may be reduced. Importantly, investors who are residents of countries with a DTT remain unable to claim franking credits as withholding tax offsets however; as such, if a DTT non-resident is paid a fully franked dividend of $70, the value of their repatriated income is $70 (as before), and they cannot claim the $30 franking credit as a withholding tax liability offset (as before). However, if the dividend paid is unfranked, and the DTT stated that the effective withholding tax rate on dividends was 15%, then the tax liability of the non-resident would be reduced to $15 from $30, increasing the repatriated income to $85. For example, if we assume the non-resident is a French national and they do not own more than 10% of the equity or capital of the Australian company paying the dividend, then the applicable tax rate on unfranked dividends is 15%.

### 2.1.3 Modelling Australian Company Tax

To account for the Australian company tax system in the model, we define two types of capital ownership. For simplicity, these are referred to as *foreign* and *local*. We also define a post-tax rate of return for every industry and capital owner. The taxes levied on capital income are also assumed to be net of depreciation. There is an upward-sloping capital supply curve for each industry and owner; that is, investors respond positively to increases in the post-tax rate of return. As in all recursive dynamic models in the MONASH tradition, capital stocks are updated in each period to reflect depreciation and investment in the previous period. In this model, we also update the ownership shares of industry capital stocks in each simulation period following changes in investment by owners in the previous period.

## 2.2 Data

Some additions to the core Vic-Uni database are necessary to support the modelling of the company tax system.

We set the tax rate on capital income to 30 per cent[6] for foreign-owned capital and to 18 per cent (the average personal income tax rate) for domestic-owned capital. The setting of the tax rate on domestic-owned capital is intended to reflect the actual tax paid on capital after franking credits have been taken into account.[7]

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[6] In applying a 30% tax rate on foreign-owned capital, we have assumed 100% of the dividends foreign capital owners receive are franked. Using Foreign Direct and Portfolio Investment data from the ABS, we found the effective tax rate would fall to 28.5% using a 90% Franked/10% Unfranked assumption. We intend to explore the implications of modifying this assumption in future research.

[7] Although the average rate of income tax may not necessarily reflect the average rate of income tax paid by capital owners, and the marginal rate of income tax would more appropriately reflect changes in the post-tax rate of return that would influence investment decisions, the setting is sufficient for this modelling exercise. A

The foreign ownership shares of both the capital stock and new investment are recorded in the model database. The foreign ownership share of capital stock is calibrated to Balance of Payments data on foreign ownership of equity, averaging around 20 per cent. From here, a simple approach would be to allocate foreign ownership of 20 per cent to every industry. However, evidence from the Reserve Bank (Connolly and Orsmond, 2011) suggests that foreign ownership in the mining sector is much higher, at around 80 per cent. We allocate relatively small percentages of foreign ownership to the agriculture and ownership of dwellings sectors, and use the remaining seventeen sectors as a single balancing item.

In the initial simulation year, we attribute the same percentages by industry to the ownership of new investment. This has the effect that if there is no change to company taxes, the ownership shares of capital by industry remain stable over time.

## 2.3 Model shocks, closures and parameters

The key argument for reducing company tax is that it will stimulate GDP by increasing foreign investment. Over time, the benefit of a larger capital stock will flow to workers, increasing wages. We are probably safe to assume that supply of capital is very elastic, particularly for foreign investors. Thus the size of the increase in the capital stock in response to a cut in company tax will depend mainly on the elasticity of demand for capital.

The immediate impact of a cut to company tax is to increase the post-tax rate of return. At the margin, investments with a lower pre-tax rate of return become viable. Over time, as these investments are made and the capital stock grows relative to labour, the pre- and post-tax rates of return will fall until the post-tax rate of return falls back to the level at which the growth rate of capital is commensurate with the growth of employment adjusted for productivity. The elasticity of demand governs the rate at which the rates of return fall in response to growth in capital, or the amount of capital that is installed by the time the rate of return falls to this level.

Given that the cut in the tax rate is only effective on foreign-owned capital, we can assume that the supply of capital is very elastic; that is, after a temporary spike following the tax cut, the post-tax rate of return falls almost back to its initial level.

The supply of capital from domestic investors is somewhat less elastic. The fall in the pre-tax rate of return will apply to the post-tax rate of return for domestic investors, as the effective tax rate for these investors is unchanged. This leads to a negative impact on domestic investment; nonetheless, we do not expect that the increase in foreign investment will completely crowd out domestic investment.

The demand for capital is equivalent to the marginal revenue product of capital, which depends on the form and parameters of the production function, and the elasticity of aggregate demand. We assume producers are cost-minimisers, subject to a Constant Elasticity of Substitution (CES) production function. In the long run, we assume that aggregate employment is unchanged from its

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more thorough investigation of average and marginal tax rates on domestic capital income could be incorporated at a later date.

baseline level. If we also assume that aggregate demand is perfectly elastic, we find a simplified expression for the demand curve for capital (equation 1).

$$k = \frac{\sigma}{s_L} p_K \quad (1)$$

where $k$ is percentage change in the capital stock, $p_K$ is the producer cost of capital, $S_L$ is the share of labour in value added, and σ is the CES elasticity of substitution.

The parameter σ is clearly very important in determining the response to a cut in tax. In most CoPS models, σ lies in the range of 0.3 to 0.5, however company tax modelling commissioned by the Treasury was based on a labour to capital substitution elasticity of 0.8.

We have chosen to run two sets of simulations, based on σ=0.4 and σ=0.8, to illustrate a potential range of results.

## 2.4 The presence of economic rents

Variation in rental returns across industries may indicate the presence of economic rents in some industries. Economic rents arise from barriers to entry for capital. If no barriers to entry existed, then ignoring inter-industry variation in risk premia, rates of return would equalise across all industries. We model economic rents by including a fixed factor of production in each industry. In principle, the fixed factor is analogous to agricultural land in the Vic-Uni model – it is a factor of production that cannot be increased through investment. For industries in which economic rents are high, the fixed factor has greater significance.

The size of the fixed factor is estimated as a function of observed industry rates of return. For industries in which the rate of return (based on ABS statistics) is very high, we assume that some of the return accrues not to ordinary capital, but to fixed capital. On this basis, fixed factors are assumed to exist in the ANZSIC divisions Mining (B), Financial and Insurance services (K), Professional, Scientific and Technical Services (M) and Other Services (S).

## 2.5 Current account deficit

The cut to the company tax rate will stimulate investment, which, if domestic expenditure is not curtailed, will push the trade balance towards deficit. In later years, as growth in the capital stock leads to higher output, the trade account may move towards surplus. However, our simulations show that with no change in domestic savings behaviour, net foreign liabilities will accumulate. Any gain in welfare due to a cut in company tax would need to be evaluated in this light.

To explicitly record the impact on welfare of a cut in company tax, we run a set of simulations in which the current account deficit is fixed. This is achieved by endogenising the average propensity to consume; that is, funding additional investment out of household saving. The funding is indirect: while investment is funded by foreign funds, the trade balance is kept in check by diverting expenditure away from the household sector (and hence imports) and towards exports.

## 2.6 Summary of closures

In summary, the model is run with eight closures representing two values of σ (the CES parameter), the presence and absence of economic rents, and the accumulation and non-accumulation of current account deficits. Code names for these simulations are summarised in Table 1.

| *closure assumption* | | | | |
|---|---|---|---|---|
| current account deficit | fixed | endogenous | fixed | endogenous |
| economic rents | yes | yes | no | no |
| *CES elasticity σ* | | *scenario identifier* | | |
| 0.4 | sf4 | df4 | so4 | do4 |
| 0.8 | sf8 | df8 | so8 | do8 |

**Table 1: scenarios modelled**

The scenarios differ in the degree of restriction imposed on economic activity in response to a cut in company tax. With a higher value of σ, demand for capital is more elastic, enabling more capital to enter the economy before the rate of return falls to a level where it is no longer attractive. If there is no fixed capital, and the current account deficit is allowed to grow, the restrictions on economic activity are low. For these reasons, *do8* is our least restricted scenario, while *sf4* is the most restricted. The scenario we consider most likely is *df4*. This scenario reflects the preferred setting for σ in most Vic-Uni modelling applications, and the impact of economic rents in many sectors of the economy. However, because this scenario is debt financed, we exercise caution in interpreting income results as indicators of welfare.

We note that in the Treasury modelling, consumption and investment (assuming it is linked to capital stock) both increase, suggesting that the trade balance does not move to surplus by as much as it would need to, to keep the current account deficit from increasing.

## 2.7 Model shocks

In all simulations, the shocks are based on the Business Council of Australia's recommendation to the Business Tax Working Group, that the rate of company tax is cut to 28.5 per cent immediately, to 25 per cent in 2020, and to 22 per cent in 2025.

# 3 Findings

The model simulations, with their various parameter and closure settings, reveal results of varying magnitude, but similar direction.

In general we find that the capital response is positive; that is, the increase in the after-tax rate of return on capital will induce investment, boosting the capital stock. This leads to a long-run increase in GDP of between 0.1 and 0.4 per cent (Figure 2).

The increase in capital stock leads to an increase in labour productivity, boosting real wages by 0.16 to 0.66 per cent (Figure 3). The wage response diminishes as we increase the value of σ, if we either fix the current account deficit, or if we assume that fixed capital is in place (Figure 4). While we have not modelled any attempt to recoup lost taxation revenue through income tax, we recognise that this may be a possibility, and could account for most or all of the increase in wages.

GDP grows but foreign remittances increase, and the net impact is that gross national income (GNI) falls (Figure 5). Furthermore, the net present value of the GDP gain is fairly modest, as much of the gain occurs well into the future. However, the fall in GNI is immediate; thus the present value of the fall in GNI is more significant. For savings-financed scenarios (sf4, so4, sf8 and so8), the present value of the fall in GNI can be interpreted as a measure of the loss of welfare. This loss is estimated to be $1600 per capita.

The increase in real wages leads to a fall in the rate of return to domestic owners of capital, who do not benefit from the cut in company tax. An example of the disparity in the change of the post-tax rate of return between resident and non-resident investors is given in Figure 6.

Turning now to the expenditure components of real GDP, under a cut to company tax, investment will increase. The initial increase is in response to the need to create more capital. In subsequent years, with more capital installed in the economy, investment expenditure remains elevated to cover depreciation and maintenance costs (Figure 7).

While investment grows faster than GDP, either consumption or the trade balance must fall. These results are scenario-dependent, with the trade balance growing less in the "deficit financed" scenarios (df4, do4, df8, do8) and consumption falling in the "savings financed" scenarios (sf4, so4, sf8, so8) (Figure 8). In the deficit financed scenarios, the trade balance moves towards deficit in the "investment boom" years immediately following the company tax cut (Figure 9).

The reason that the trade balance moves towards surplus is that the cut in company tax favours sectors with a high proportion of foreign capital ownership, such as the mining sector. It is the expansion of the very export-intensive mining sector that underlies the move towards surplus in the long-run.

Turning next to sectoral change, long-run expansion in the mining sector – capital intensive with a high proportion of foreign ownership – is by far the largest in terms of industry output. Imposing the assumption of a fixed factor has a large impact on mining output.

Results for other sectors are mostly attributable to changes in the composition of expenditure on GDP. The construction sector benefits from increased investment activity. Sectors that are exposed to the household sector decline in all scenarios. Output will decline in Retail, Accommodation and Food Services, Health Care, Arts and Recreation, and Education and Training. These sectors are some of our biggest employers, particularly of low-skilled workers.

In the savings-funded scenarios, the size of the ownership of dwellings sector, with its high proportion of local ownership and exposure to a weakened household sector and rising construction costs, declines.

In conclusion, this preliminary modelling-based investigation of the impact of a cut in company tax finds it to be a policy that stimulates output but dampens growth in gross national income. While it does result in higher real wages, this should be recognised as a distributional impact that works in favour of workers, but against domestic owners of capital. The policy is likely to instigate more activity in the mining and construction sectors, and less activity in many services sectors.

The direction of change in the long-run for all key macroeconomic indicators is invariant to the parameter settings and closure assumptions that underlie the model. However, the magnitude of the impacts is dependent on these settings.

# 4 Further work

As a preliminary modelling exercise, this study has already identified many of the key macroeconomic and distributional impacts of a cut to company tax. Our agenda for further work has identified the following focus areas:

- the implementation of the simulation in the full 115-industry Vic-Uni model;
- a more detailed study of the impact of taxation treaties and effective rates of tax paid on foreign investment; and
- refinement of parameter values.

## 4.1 Implementation in the full Vic-Uni model

An analysis of company tax conducted in the framework of the full Vic-Uni model would provide a rich source of detailed information on which an informed decision on the future rate of company tax could be based. While the macroeconomic impacts are fairly clear, the distributional effects need to be further investigated. Effects that are worthy of further investigation include:

- the impact on domestic owners of capital, such as superannuation funds, small and medium business owners, and shareholders in listed companies;
- the impact on industry sectors including many service industries, which are some of the main employers in the economy;
- the impact on employment classified by occupation and demographic status;
- the impact on regional economies; and
- an explicit analysis of options to recoup lost taxation revenue.

To conduct such an analysis, the features introduced to the miniature model, including foreign ownership shares by industry and estimates of fixed capital, would need to be deployed across the 115-industry database.

To convincingly model the impacts on domestic owners of capital, it may also be necessary to refine the relationship between saving and investment (following Dixon et al 2015). This approach could better capture changes to investment incentives as the investment of each agent (e.g. households, government, etc.) is classified by financial instrument.

## 4.2 Impact of taxation treaties

In some cases, taxation treaties allow a non-resident investor that incurs an Australian withholding tax liability to claim a foreign income tax offset in their country of residence.[8] In such cases, the non-resident's effective tax rate on Australian dividends/interest income is their personal tax rate in their country of residence. In these circumstances, a cut in the Australian company tax rate (and thus the

[8] This is true for Australian residents investing overseas, as outlined by the ATO: https://www.ato.gov.au/printfriendly.aspx?url=/Individuals/Tax-return/2014/In-detail/Publications/Guide-to-foreign-income-tax-offset-rules-2013-14/

rate of withholding tax levied on unfranked dividend payments by Australian-listed companies) would have the effect of reducing revenue collected by the Australian Government; from the non-resident investors' perspective, the rate of return (net of taxes and credits) on Australian capital would however remain unchanged. Effectively, in these circumstances a cut in the Australian company tax rate is a transfer from Australian Government revenue, to foreign Government revenue. In the case of proportional credit, a cut in company tax would have a muted impact on the non-resident investor's take-home rate of return, with a similarly muted investment-response.

To accurately model foreign withholding tax crediting, one would require a detailed account of foreign taxation laws, particularly with regards to any allowance for foreign income tax crediting. In addition, foreign direct investors would need to be identified on a by-country basis, as opposed to the current "foreign" designation. A suitable starting point would be Australia's International Investment Position by-country, collated by the ABS[9]. The relative shares implied by the ABS data, coupled with the country-specific foreign-tax-credit implied tax rate, would subsequently be reflected in the Vic-Uni model as an adjustment in the rate of return on foreign-owned capital; in general, this is expected to dampen the incentive of non-residents to fund Australian capital formation, in response to a cut in the company tax rate.

## 4.3 Parameter settings

Parameter estimation for CGE modelling is an issue that transcends this analysis. The labour-capital substitution elasticity has been shown in this paper to have an impact on the magnitude, but not the direction, of the main macroeconomic indicators. However, values of σ could have been chosen to make the impact on the real wage positive or negative, particularly if the rate of personal taxation was increased. The impact on output at the industry level, where distributional impacts will be determined, is also sensitive to the value chosen for σ.

The setting of appropriate values for the elasticities determining the capital supply response also requires more attention. In a recursive dynamic model such as Vic-Uni, an informal "steady-state" is reached when the rate of capital growth is commensurate with the rate of labour growth adjusted for productivity, so that there is no impetus for any further change to either the rate of capital growth or the rate of return on capital. The short-run elasticity of supply of capital in response to the rate of return determines the capital supply response in each individual year of the simulation, influencing how quickly the transition to the final "steady-state" is made. With the added complication of multiple owners facing differing tax rates on capital, the setting of the capital supply elasticity for domestic and foreign investors will also affect the extent to which foreign investment crowds out domestic investment.

[9] See ABS catalogue number 5352.0, http://www.abs.gov.au/ausstats/abs@.nsf/mf/5352.0

# 5 Charts

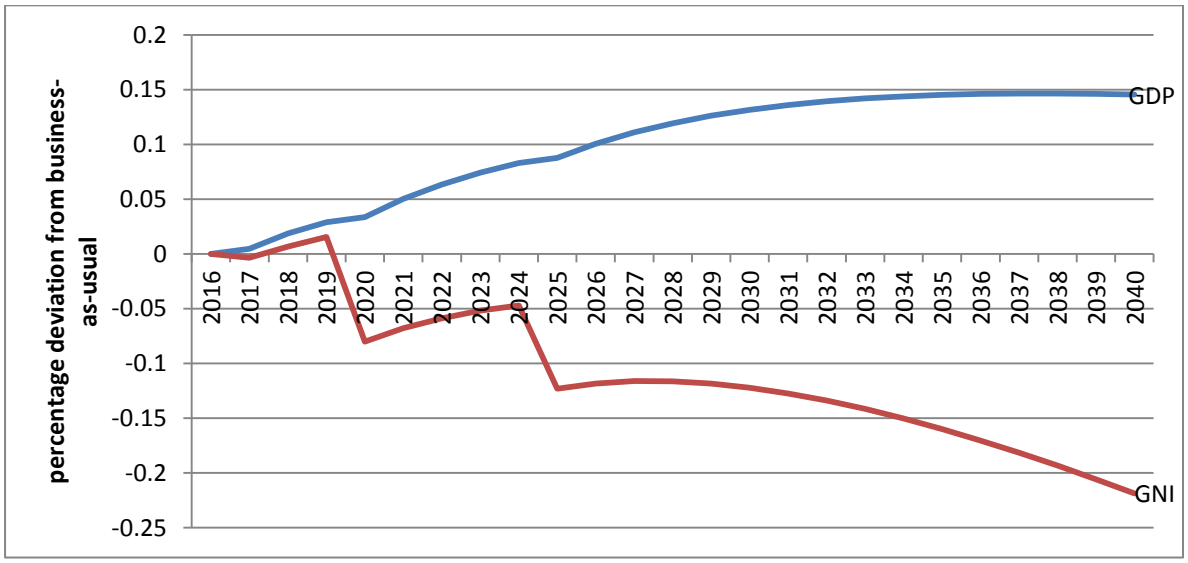


Figure 1: Impact on domestic output (GDP) and income (GNI), main scenario (df4). Source: Vic-Uni model

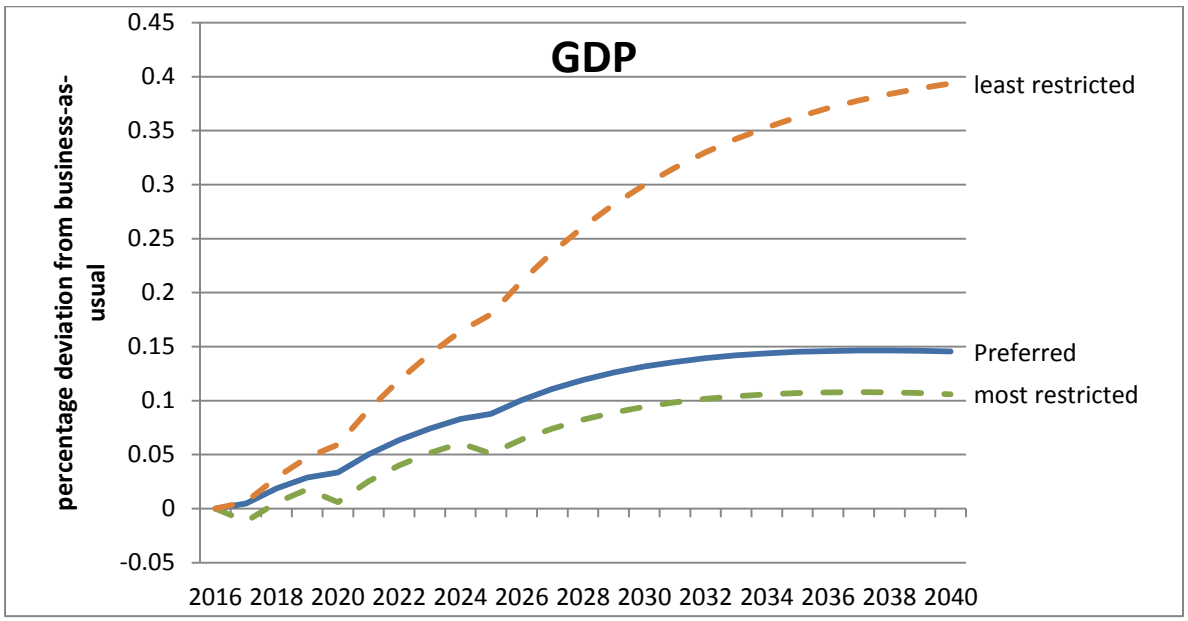


Figure 2: Impact on GDP, selected scenarios. Source: Vic-Uni model

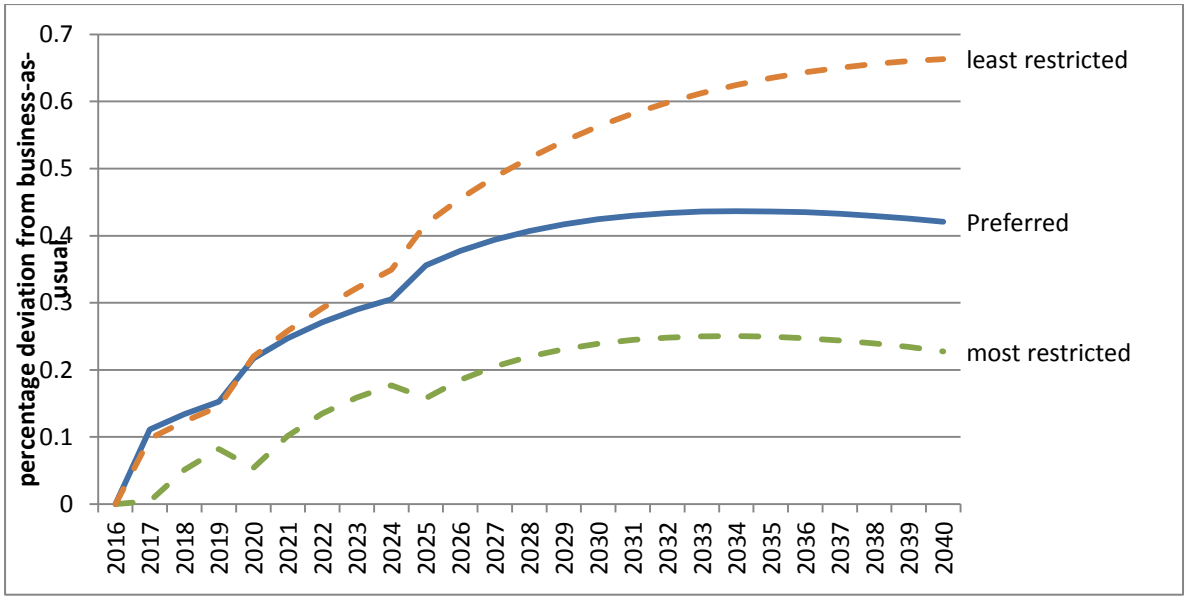


Figure 3: Impact on gross real wage, selected scenarios. Source: Vic-Uni model

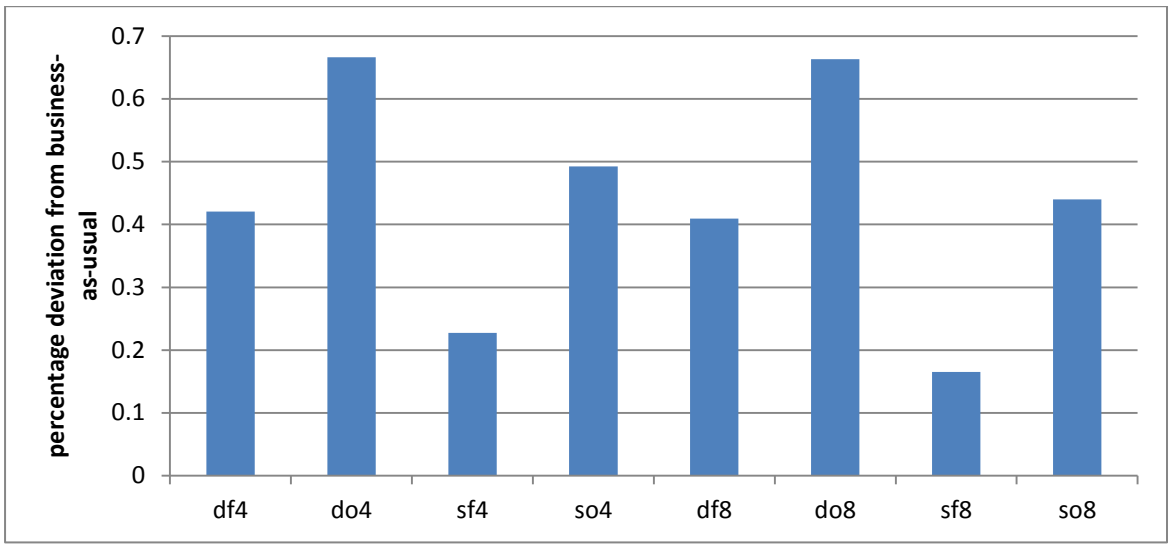


Figure 4: Long run impact on gross real wage, all scenarios. Source: Vic-Uni model

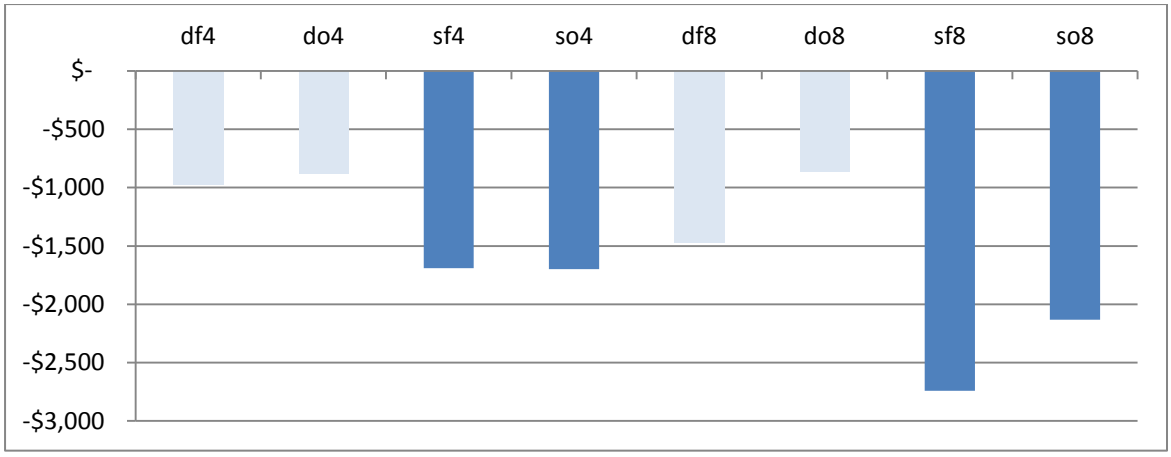


Figure 5: Impact on Gross National Income per capita ($), present value, all scenarios. Source: Vic-Uni model.

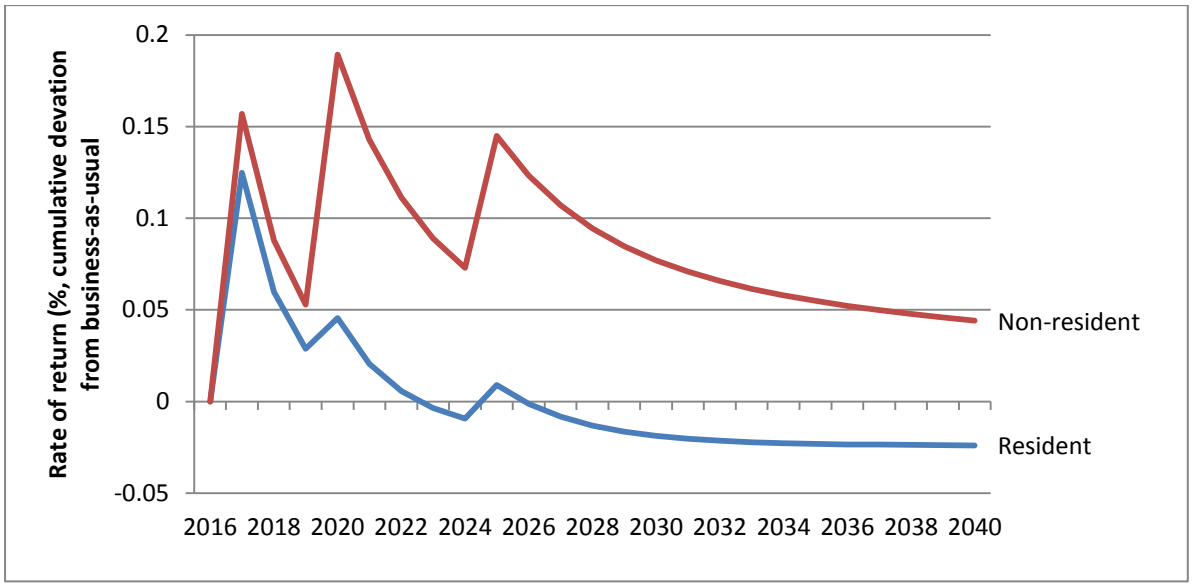


Figure 6: Rate of return, Professional, scientific and technical services, Scenario df4. Source: Vic-Uni model.

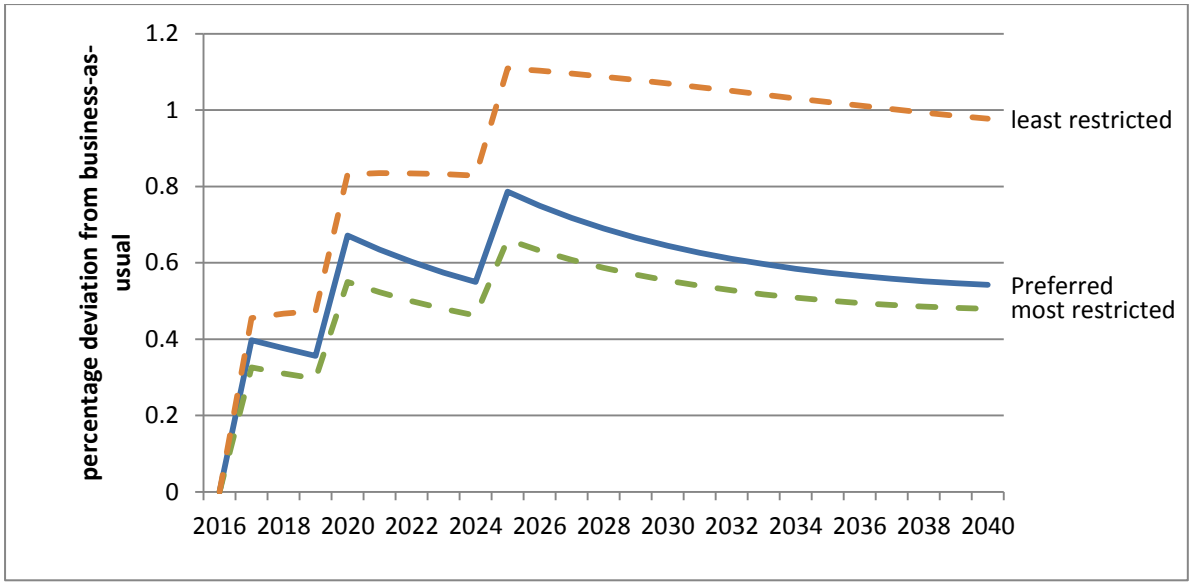


Figure 7: Impact on aggregate investment, selected scenarios. Source: Vic-Uni model

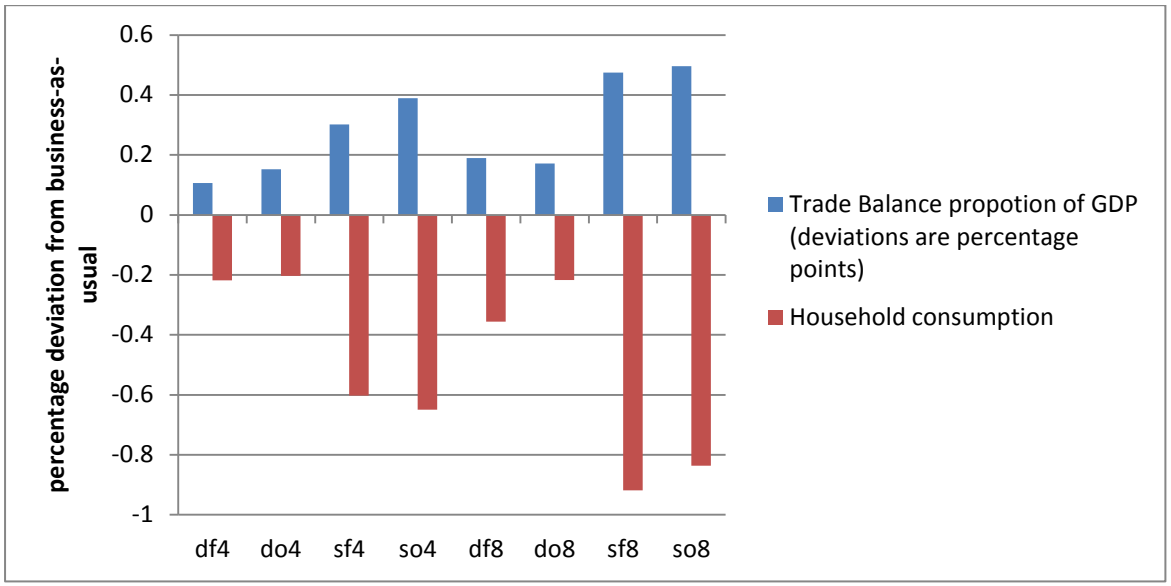


Figure 8: Long run impact on trade balance and household consumption, all scenarios. Source: Vic-Uni model

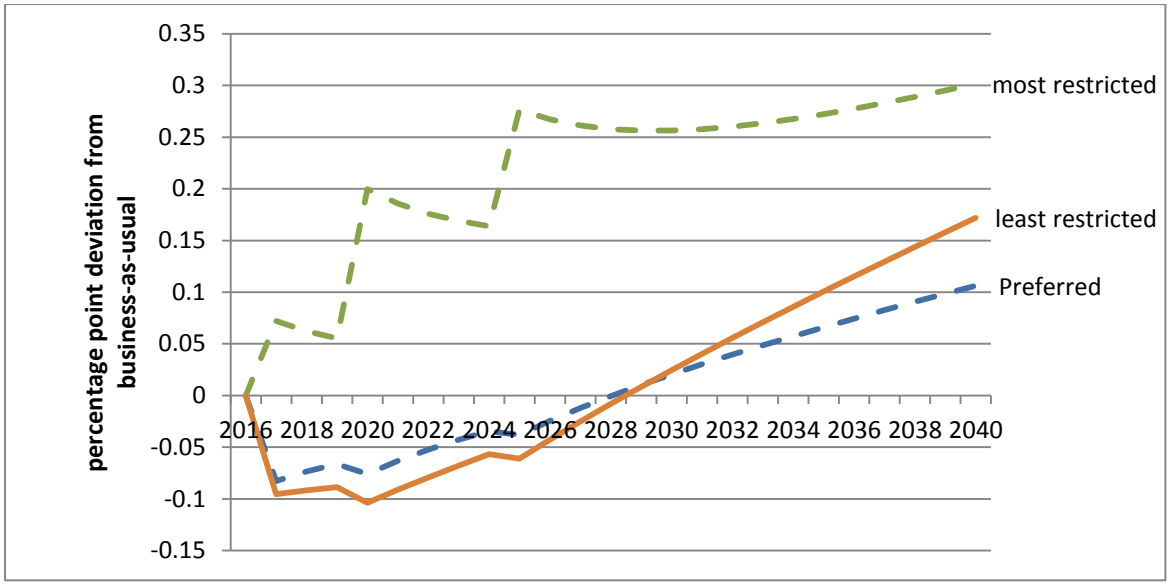


Figure 9: Impact on trade balance as a percentage of GDP, selected scenarios. Source: Vic-Uni model.

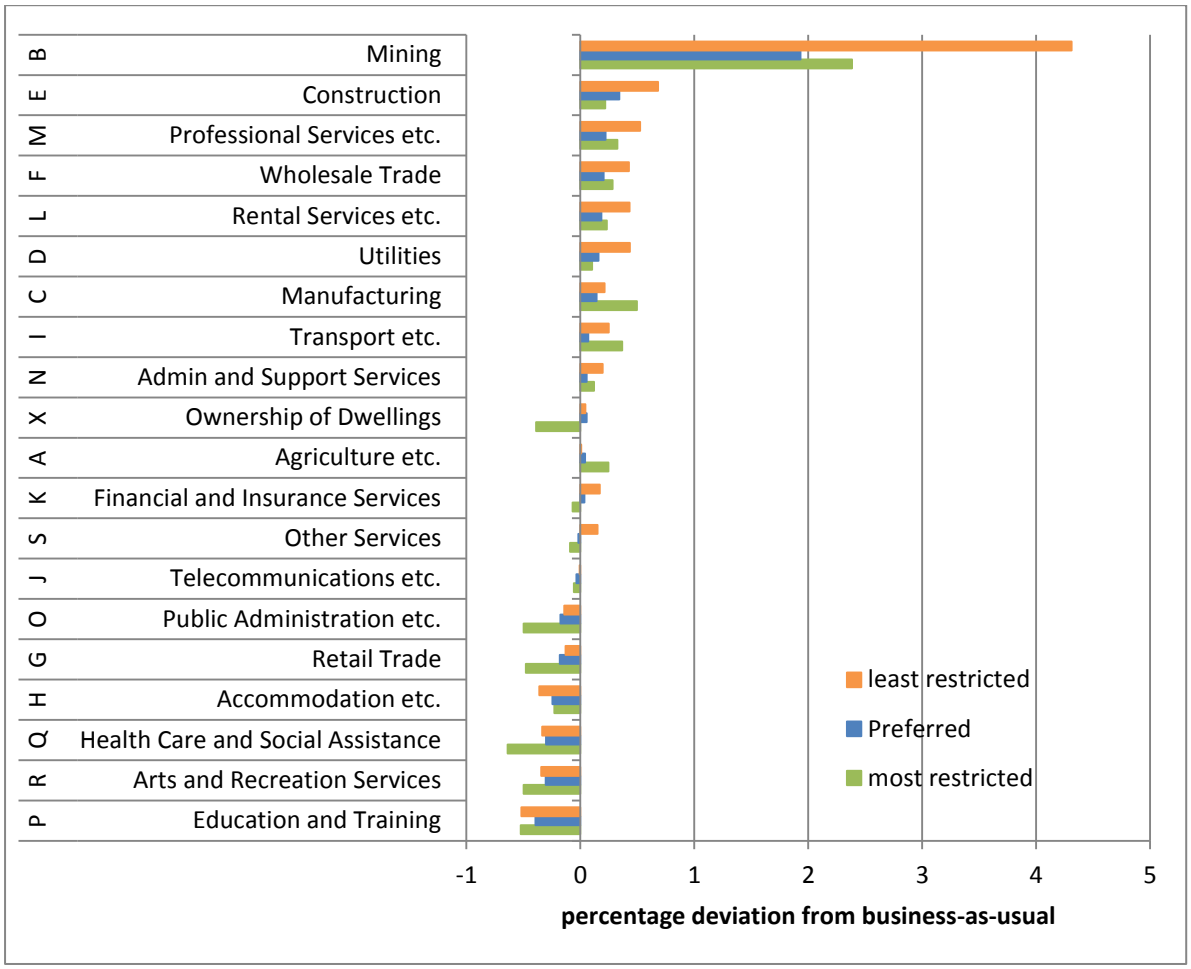


Figure 10: Impact on output by industry division, selected scenarios, ranked by result for preferred scenario. Source: Vic-Uni model.

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