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How do statutory and effective corporate tax rates affect location decisions of firms and a country's industry structure?

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Executive summary

The broad range of policies that make up a country's corporate tax system can affect location decisions of firms. Firm location decisions can affect the industry structure of a country. We examine the effect of corporate tax rates, both statutory and effective, on firm location decisions and industry structure. We briefly consider options for reforming Australia's corporate tax system.

The main findings from the international literature can be summarised as follows:

- The literature consistently finds large and negative effects on investment of both statutory and effective corporate tax rates. A one percentage point increase in the corporate tax rate leads to a 3.3 per cent decrease in Foreign Direct Investment (FDI).
- Statutory and effective average corporate tax rates have negative impacts on both location decisions and FDI.
- The inward foreign investment response to corporate taxes is more important than the effect of corporate taxes on pushing companies to leave a country.
- Discrete location decisions of international firms are of larger consequence when compared to marginal investment decisions.
- The effect of high corporate tax rates in deterring investment is larger than the effect of low corporate tax rates in encouraging investment. Both effects are larger when the gap between a country's corporate tax rate and its peers is larger.
- The effect of high corporate tax rates on investment is particularly large in financial services and smaller in manufacturing.
- The effect of corporate tax rates is larger in deterring greenfield investment than in deterring mergers and acquisition-type investment.

We draw the following lessons for Australia:

- A lower statutory corporate tax rate in Australia would lead to increased investment in Australia and to overseas firms relocating in Australia. Increased investment will happen through a variety of channels including overseas firms located in Australia choosing to retain and re-invest earnings rather than taking earnings out of Australia.
- Not lowering the corporate tax rate has an influence, at the margin, on the decision of companies to relocate outside of Australia. While large-scale departures are unlikely, the high statutory corporate tax rate leads to some departures.
- The high statutory corporate tax rate deters firms from locating in Australia.
- Not lowering the corporate tax rate will likely lead to existing firms in Australia investing outside of Australia rather than in their Australia operations.
- The push factor for companies to leave Australia and investment to leave Australia grows as the gap between Australia's corporate tax rate and those of its neighbours increases. This is of concern for Australia as the gap between its corporate tax rate and that of its peers has grown over the last 30 years.
- Despite its high corporate tax rate, Australia continues to attract large amounts of foreign investment. This investment, however, is increasingly volatile and is concentrated in a small number of highly profitable sectors. Much of it is due to the mining and resources boom.

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- Australia's industry structure is highly concentrated and levels of innovation and economic complexity are low; this is consistent with its high corporate tax rate.

Corporate tax reform in Australia has often been discussed in terms of changes to the statutory rate. Such a reform is associated with clear benefits and some costs. Reducing the corporate rate does not address deeper problems with the overall system such as the negative impact which corporate taxation has on marginal investment and the bias which favours debt over equity in the current system. While Australia should consider cutting the corporate rate, it should also consider more comprehensive reforms. Of these, the Allowance for Corporate Equity (ACE) is promising because the transition from the current system is relatively easy and other countries have successfully introduced an ACE.

Introduction

In this paper, we assess how statutory and effective corporate tax rates affect the location decisions of firms and a country's industry structure, especially with regard to Australia. We also discuss the effect of corporate tax rates on investment. While it is widely believed that capital is highly mobile, and therefore statutory or effective corporate tax rate settings should redirect some portion of international investment elsewhere, we address this question directly by assembling and analysing the available evidence. We begin by synthesising the theoretical and empirical literature, noting that there is a shortage of Australia-specific studies from which to draw. Secondly, we set up descriptive comparisons of Australia to other countries with the aim of applying empirical findings from other countries to the Australian setting. Finally, we discuss the implications of the evidence base gathered thus far and other insights to assess whether businesses are incentivised by Australia's corporate tax system to locate or invest outside of Australia, and the extent to which Australia's industry structure appears to be affected by this phenomenon.

We note upfront that the distinction between statutory and effective tax rates is an important one. Effective tax rates are tax rates that take into account differences in countries' tax legislations that reduce or increase the size of the corporate income tax base – for example in Australia, exemptions through treatment of depreciation, investment allowances, differentiated rates by firm size, and tax credits for research and development (R&D) (Tax and Transfer Policy Institute (TPI) 2021a). Effective tax rates may be calculated on an average or marginal basis. While the headline statutory corporate tax rate will influence both the average and marginal effective tax rates, these measures are clearly different, and conclusions regarding the effects of each of them on firm behaviour are not automatically comparable and will have different implications for policy. Therefore, throughout this paper, we aim to be as precise as possible about which measure we are referring to when discussing tax rates. However, in a few instances, we present the results of studies which themselves were not explicit about this.

A further introductory point is that statutory and effective corporate tax rates are not the only dimensions of the system of corporate taxation as a whole that might be expected to influence firms' investment decisions. TPI (2021a) notes some of these other factors as: interactions between the corporate and personal income tax systems, bias towards debt finance, variation in effective corporate tax rates between different investments, differences in the treatment of economic and tax schedule depreciation, and the dividend

imputation system. While many of these considerations influence effective tax rates, they are in themselves beyond the scope of this report – see TTPI (2021a) for a more comprehensive discussion of these issues, including from a policy perspective.

Overview of international evidence

In a small open economy such as Australia, capital is thought to be mobile, implying, among other things, that firms already located within the economy are incentivised by corporate taxation to consider relocating, and prospective international investors may decide to invest elsewhere. This idea is not only assumed in most of the theoretical literature, but is also broadly supported by international evidence. In this section, we introduce and briefly summarise the relevant literature – a detailed literature review is provided in Appendix A. There are few studies which focus on Australia, but we can use the international literature as an evidence base from which to make inferences about the Australian setting. We additionally note, though it is beyond the focus of this paper, that corporate taxation is found to reduce investment even in the absence of international considerations, as it makes it optimal for firms to use less capital – this observation stems from the theory of Hall and Jorgenson (1967).

Theory regarding the incidence of corporate taxation traditionally assumed that capital is perfectly internationally mobile (Bradford 1978) – however, as macroeconomic, firm-level and administrative data have been collected in increasing volumes, and as advancements in econometric methodology and computing have occurred, a literature has developed around testing this assumption. Findings from this literature in the form of tax elasticities or sensitivities have then been utilised in the empirical incidence literature to better inform its capital mobility assumptions. Even as methods have evolved since the inception of the empirical literature on capital mobility, researchers have consistently found a significant and substantial effect of corporate taxation on firm location decisions (for example, see Egger & Stimmelmayer 2017 for a survey of this evidence). The overall consensus from the empirical literature on corporate tax effects on FDI is that the tax elasticity of FDI is around -0.7, corresponding to a semi-elasticity of -3.3 (with respect to statutory and effective tax rates) (Egger & Stimmelmayer 2017, de Mooij & Ederveen 2003). This implies that a one percentage point change in the corporate tax rate leads to a 3.3 per cent change in the opposite direction in FDI.

Recent studies have also investigated the effects of statutory or effective corporate tax rates on firm location in greater detail over several dimensions. Studies vary in terms of

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the type of tax rate considered – i.e. statutory tax rates, effective marginal tax rates or effective average tax rates. It is generally agreed that average effective tax rates are the most important with regard to companies' discrete decisions such as where to locate (de Mooij & Ederveen 2003), as this measure relates to the wedge between the pre- and post-tax return on a typical investment project on which firms may earn an economic rent. Average effective tax rates are most likely to influence companies' discrete decisions, such as where to make a long-term investment. By contrast, marginal effective tax rates inform company decisions regarding expansions of pre-existing investments. Headline statutory corporate tax rates influence both the average and marginal effective tax rates and inform companies' decisions to shift profits to lower taxed jurisdictions.

Studies have also found that particularly low statutory or effective corporate tax rates do not encourage investment as much as particularly high rates deter it, and FDI may be more responsive to tax rate changes the larger the gap is between a given country's tax rate and those of other countries (Bénassy-Quéré, Fontagné & Lahreche-Révil 2003). Results can vary considerably by sector – for example, in manufacturing, effective average tax rates do not appear to significantly affect FDI (Davies, Siedschlag & Studnicka 2018), whereas financial firms are especially responsive (Lawless, McCoy, Morgenroth & O'Toole 2018). Firms with negative or high profitability rates tend to exhibit lower tax sensitivity, in the latter case possibly due to these firms collecting location-specific rents (Millot, Johansson, Sorbe & Turban 2020). Finally, greenfield investment is significantly more affected by statutory corporate tax rates than M&A investment (Hebous, Ruf & Weichenrieder 2010; Swenson 2001).

Descriptive comparison between Australia and selected countries

The following is a descriptive analysis of statutory and effective corporate tax rates, foreign investment and industry structure in Australia, including comparisons with a wide range of other countries. The aim of this analysis is to provide a clearer picture about these phenomena and to help with reasoning about the nature of the linkages between them, following on from the literature outlined in the previous section. Overall, we find that Australia's statutory corporate tax rate, which was at the OECD average 25 years ago, is now high when compared to other countries. This is due to Australia having maintained its statutory corporate tax rate at a constant level while other countries have cut their corporate tax rates over the last 3 decades. FDI into Australia has also remained at high

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levels. Descriptive evidence regarding the correlation between lower statutory corporate tax rates and FDI is mixed, and is econometrically not sufficient to answer the question of the causal impact of corporate tax rates on investment.

An examination of Australia's industry structure confirms that economic and FDI activity is concentrated in specific, highly profitable industries, most notably mining and financial services.¹ On the other hand, Australia lags behind its international comparators in terms of the propagation of new technology through the economy as a result of FDI, and innovation more generally. In light of the industry-specific findings discussed in the Appendix, it seems reasonable that a competitive downward adjustment of tax rates could encourage further growth, especially in more tax sensitive industries.

Around the world, statutory corporate income tax rates have been falling, particularly in developed countries, as shown in Figure 1. Figure 1 shows combined statutory corporate tax rates which combine central and sub-central government rates, less deductions for sub-national taxes. Australia's corporate tax rate is an exception to the norm, having remained at 30 per cent since 2001; the (unweighted) average rate across the OECD and EU-15 has steadily dropped below it. The average rate across the ASEAN region has fluctuated but consistently been well below that of Australia. The statutory rate in the USA was consistently high at almost 40 per cent, before dropping below Australia to around 26 per cent in 2018 with the introduction of the Tax Cuts and Jobs Act.

A more detailed look at the current statutory rates in the Asia-Pacific region tells a similar story about Australia in relation to the rest of the world (Figure 2). Over time, most countries have reduced their statutory corporate tax rates, whereas Australia has not done so, leaving it with the highest statutory corporate tax rate in the region, alongside India, Mexico and Papua New Guinea. Turning to effective average tax rates, which, as seen in the previous section, have been empirically demonstrated to most significantly impact firm location decisions, we reach a similar finding, as shown in Table 1 with reference to the OECD average. Recall that the effective average tax rate is the average tax contribution a firm is estimated to make on an investment project earning an economic profit.

¹ Mining, manufacturing and financial services are the top three recipients of FDI in Australia; see <https://www.dfat.gov.au/trade/resources/investment-statistics/Pages/australian-industries-and-foreign-investment>

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Figure 1: Combined statutory corporate tax rates, 1993-2020 (Tax Foundation 2020)

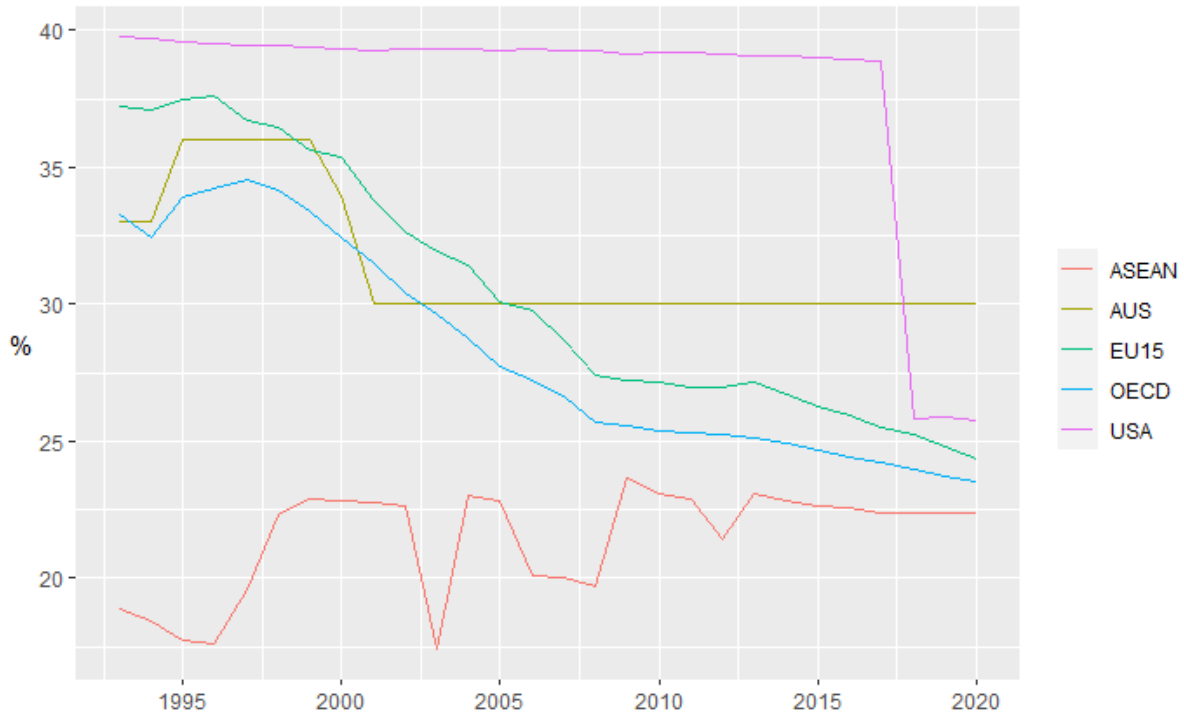


Figure 2: Combined statutory corporate tax rates in the Asia-Pacific region, 2020 (Tax Foundation 2020)

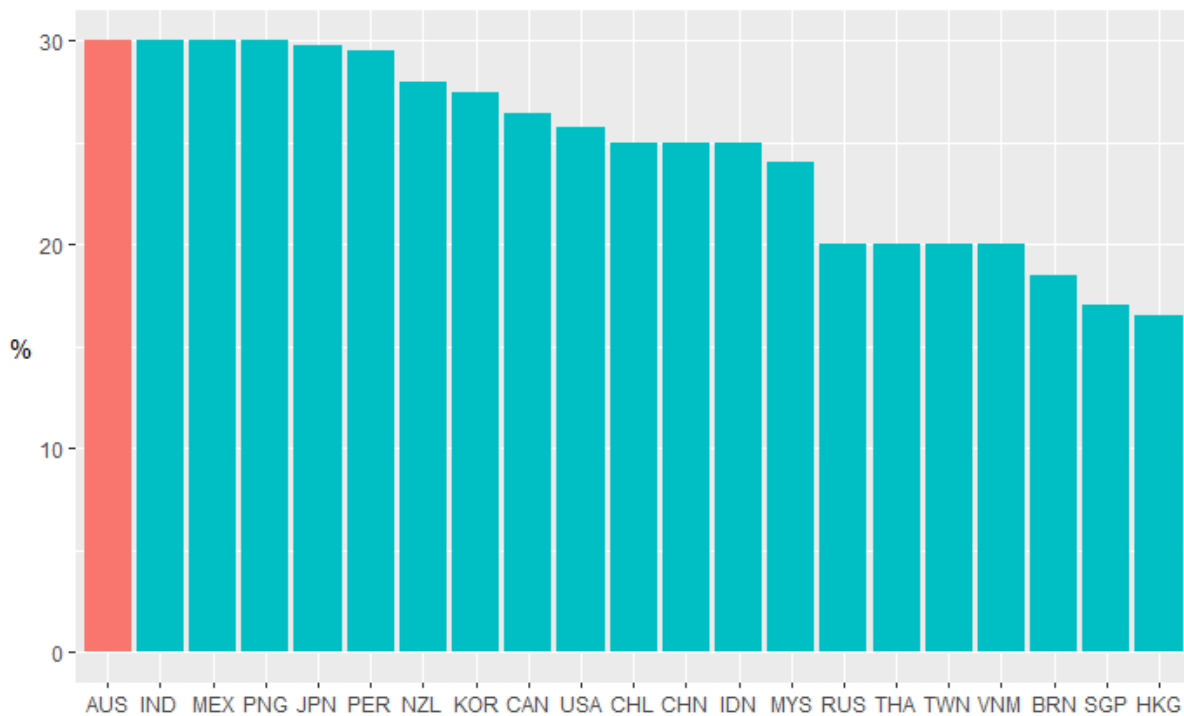
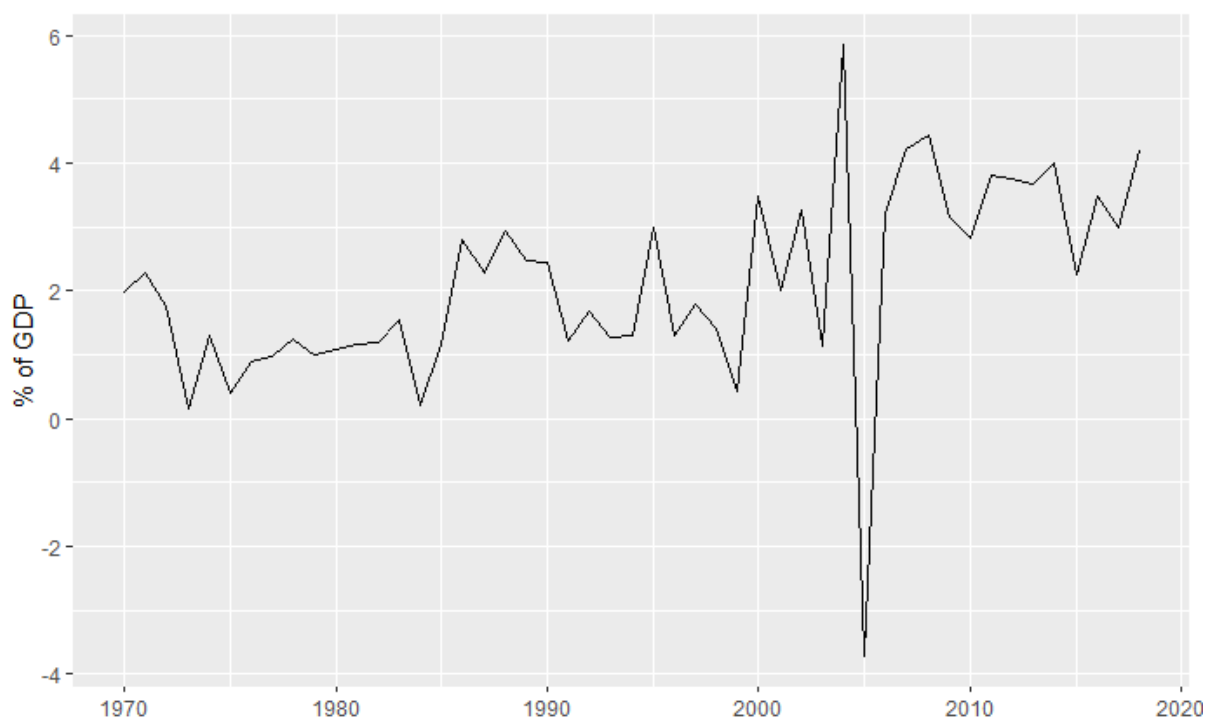


Table 1: Effective average corporate tax rates (%), 2017-2019 (OECD 2020a)

Year	Australia	OECD average
2017	29.9	22.4
2018	29.9	22.2
2019	29.9	21.9

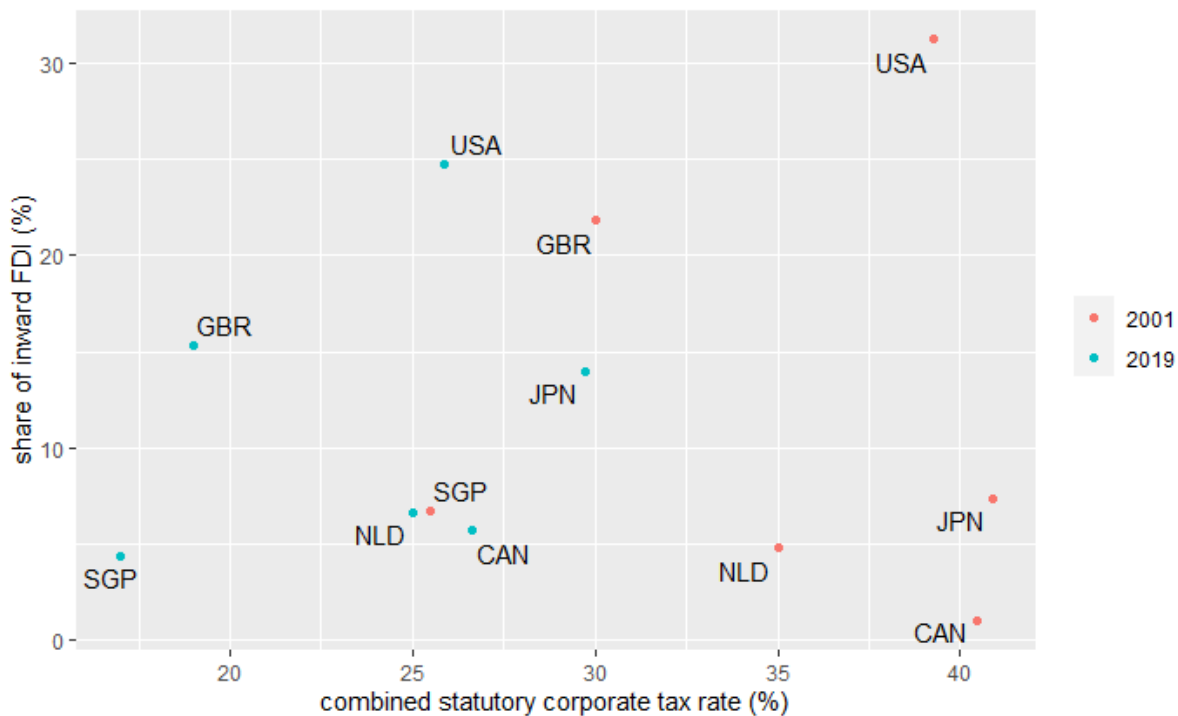
FDI into Australia has been on an increasing though volatile trend at least since the 1980s (Figure 3), averaging around 3.5 per cent of GDP in the 2010s, despite the lack of reduction in corporate taxes (as distinct from many of the countries with which it competes for investment). The top five source countries for inward FDI into Australia in 2001 were (in order): the USA, UK, Japan, Singapore and the Netherlands; and in 2019 the top five source countries were (in order): the USA, UK, Japan, the Netherlands and Canada.

Figure 3: Flow of inward FDI in Australia, 1970-2018 (UNCTADStat 2020)



We plot the shares of inward FDI for these countries and these two years against combined statutory corporate tax rates in Figure 4. In 2001, all of those five countries apart from Singapore had a combined statutory corporate tax rate greater than or equal to that of Australia (30 per cent). However, by 2019, the tax rates of all of these countries had been reduced below Australia's level. Despite this, substantial levels of FDI from these countries have been maintained. This probably indicates the large role that location-specific and historical factors, and existing business arrangements or relationships, play in the perpetuation of foreign investment, despite such investment becoming gradually less favourable over time from a tax perspective. We also note that, in the cases of the USA, the UK and Singapore, shares of inward FDI into Australia have decreased as combined statutory corporate tax rates have been reduced in these countries. One could speculate that some portion of outbound investment has been redirected towards domestic investment owing to more favourable domestic tax settings.

Figure 4: Share of inward FDI vs combined statutory corporate tax rate for the top five sources of FDI in Australia in 2001 and 2019 (ABS 2020a, Tax Foundation 2020)



A perspective on the correlation between corporate tax rates and firm location decisions is provided by Figure 5. The chart shows average annual growth in the combined statutory corporate tax rate vs average annual growth in inward FDI (in terms of percentage points and per cent of GDP respectively) from 2001 to 2018, comparing Australia against a number of other developed economies. Australia has experienced significant growth in FDI alongside a constant corporate tax rate.

We will discuss why this might be the case, but first note how this result compares to the other countries in the chart – some of the depicted countries that have reduced their statutory corporate tax rates have experienced increases in FDI since 2001, such as New Zealand and Singapore, and others have experienced reductions in FDI, such as Canada and Germany. The overall lack of conclusiveness here provides a strong case for the need to conduct rigorous empirical studies such as those outlined in the previous section. Causality cannot be inferred from Figure 5. It is especially important to note that we are unable to observe the counterfactual – what would have happened in the absence of a country reducing its statutory corporate tax rates, or what would have happened to Australia's inward FDI if Australia had changed its statutory corporate tax rates.

Figure 5: Average annual growth in inward FDI (% of GDP) vs average annual growth in combined statutory corporate tax rates (percentage points), 2001 to 2018 (UNCTADStat 2020, Tax Foundation 2020)



Now returning to the question of why Australia has seen strong FDI growth despite a constant statutory corporate tax rate – a large part of the explanation is likely due to the mining and resources boom. In this sense, another component to the counterfactual in Australia is whether in the absence of the mining boom, FDI would have been much weaker. There are a couple of factors worth considering. The first is that when mining companies invest out of retained earnings, the fraction of retained earnings attributable to foreign owners would be classified as FDI. Much of the expansion in mining is done through retained earnings—see Arsov, Shanahn & Williams (2013).

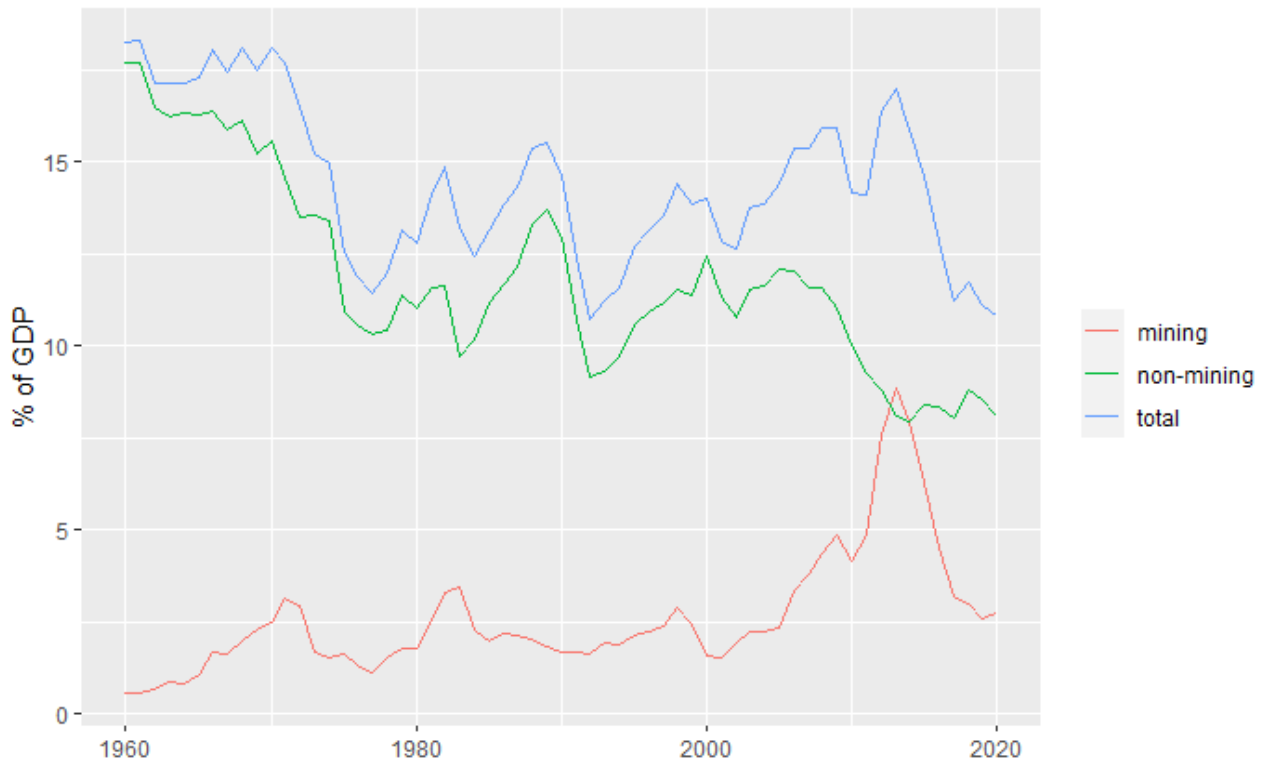
A second factor to consider is that while the statutory tax rate has not changed, there are still differences between the statutory and effective tax rates which may also influence investment; see Greagg, Parham, & Stojanovski (2010). The difference between these two tax rates is driven by differences between accounting profits and taxable income from depreciation, R&D, capital gains and other factors. FDI, even in the form of retained earnings, is likely to be less affected by the statutory rate than by the effective rate.

This explanation is supported by an analysis of the industry composition of business investment over time, as shown in Figure 6. Non-mining investment has been declining since the 1960s, while mining investment has increased significantly, particularly during the main period of the mining boom (around 2001-2013). This illustrates that the growth of

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the mining industry has occurred despite Australia's high statutory corporate tax rate, and that in the absence of the mining industry, overall business investment may have seen a much more pronounced decline since the early 2000s.

Figure 6: Business investment in Australia (% of GDP), 1960 to 2020 (ABS 2020b, 2020c)



Australia's industry structure has become increasingly focused on mining and financial services from 2003 to 2019, as depicted in Figure 7 – with mining more than doubling its share of total gross value added in that period, from 5 per cent to 12 per cent. There has also been a significant shift away from the manufacturing industry. The mining industry benefits significantly from location-specific resources found in Australia, and the Australian banking industry has been among the world's most profitable² due in part to high market concentration and its geographical proximity to fast-growing parts of Asia – these industries may be less sensitive to changes in the corporate tax rate. In the case of banks, many shareholders are domestic and they benefit from the imputation system. For them, the corporate tax rate is somewhat irrelevant.

These observations are characteristic of a lack of economic diversity in Australia, for example as measured by the economic complexity index. A comparison of Australia against other economies in the Asia-Pacific region in 2017 on the basis of this index is

² See Table 4.3 in Chapter 4 of Commonwealth of Australia (2011).

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depicted in Figure 8; Australia clearly exhibits extremely low economic complexity. Given that Australia is ranked most closely to countries with much lower per capita incomes, it is reasonable to suggest that the Australian economy focuses quite heavily on industries that permit location-specific rents.

Figure 7: Australian industry structure by share of gross value added (%), 2003 and 2019 (ABS 2020d)

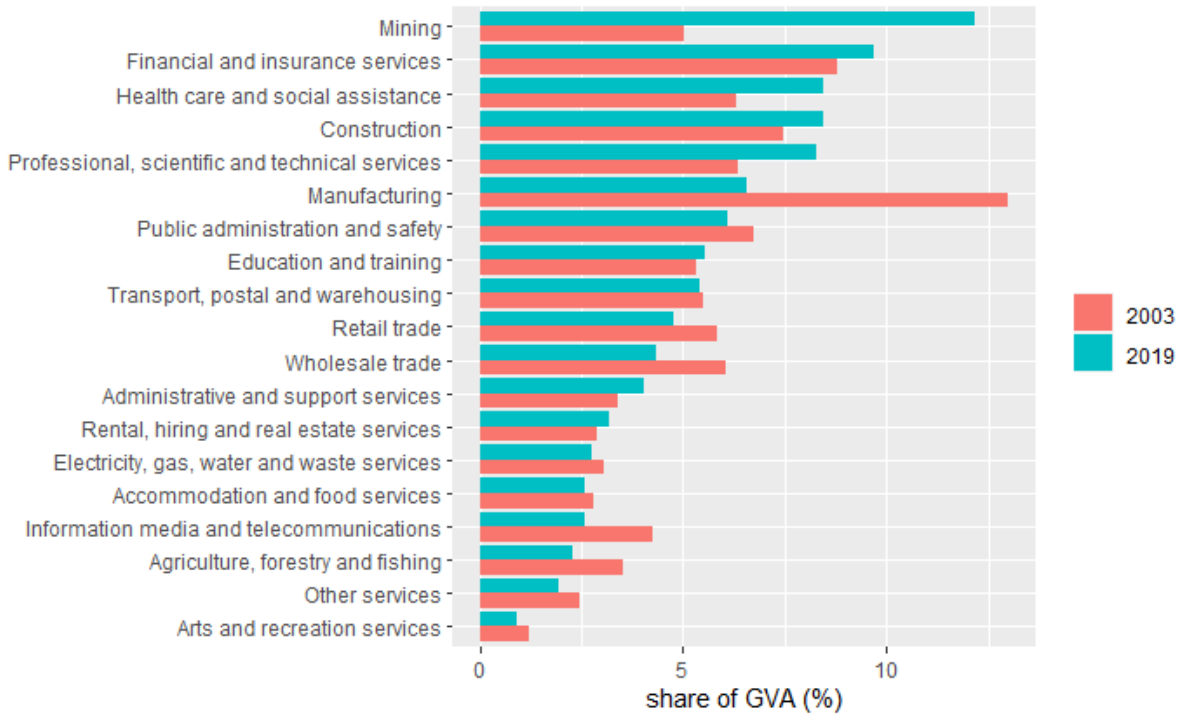
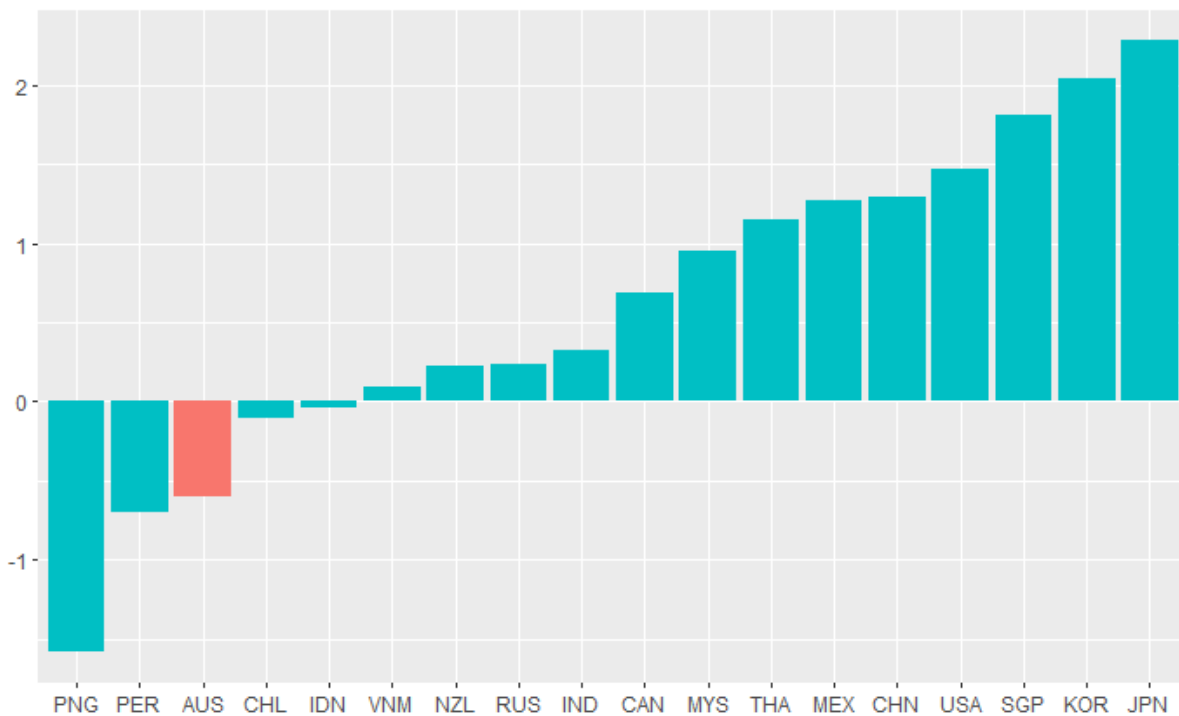


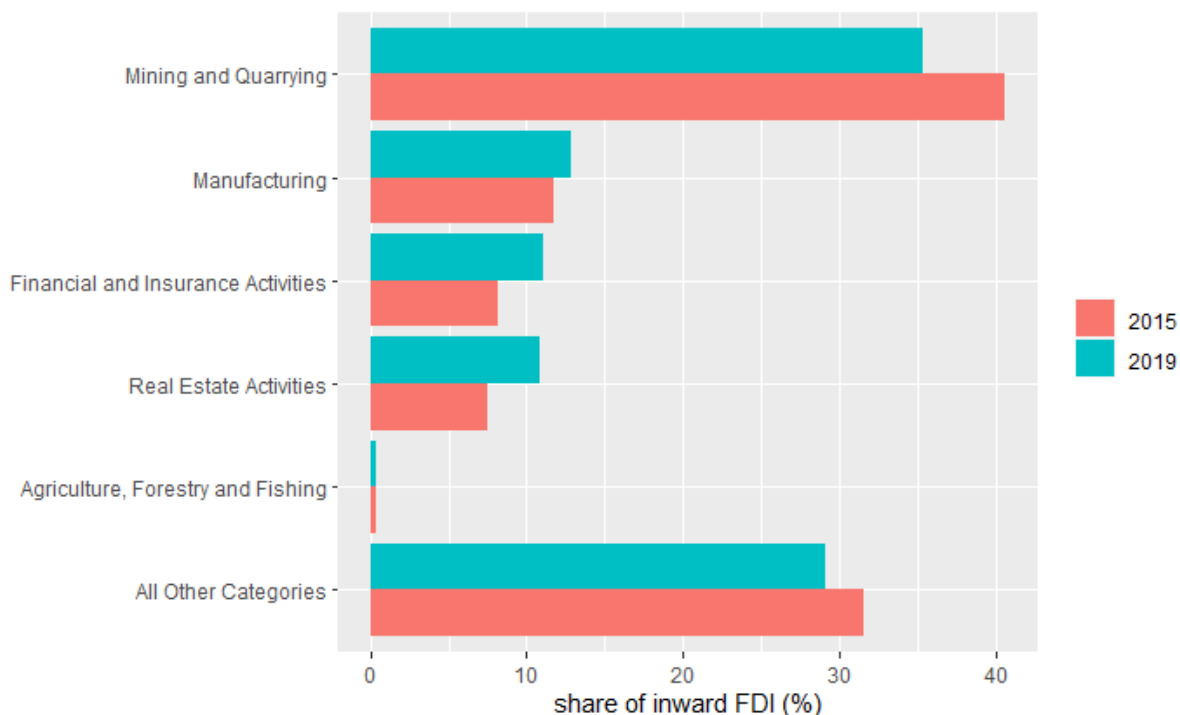
Figure 8: Economic complexity index in the Asia-Pacific region, 2017 (Harvard Atlas of Economic Complexity 2019)



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The emphasis of the Australian economy on mining and financial services is reflected in the composition of FDI, as shown in Figure 9. The four industries with the highest shares are, in order, mining and quarrying, manufacturing, financial and insurance activities, and real estate, together making up around 70 per cent of inward FDI in 2019. Foreign interests appear largely not to be investing in Australia with any tax favourability benefits in mind, but instead they are concentrating on parts of the economy which are already highly profitable, regardless of tax implications – although we might well ask how this would change if Australia's statutory corporate tax rates were lower. The agricultural industry is also depicted, being smaller in terms of FDI than might be expected and all other categories are grouped together for visual simplicity.

Figure 9: Industry shares of inward FDI flow in Australia (%), 2015 and 2019 (ABS 2020e)



Some final descriptive points on the relationship between FDI and industry structure are given by a measure of the link between FDI and technology transfer, and another measure of overall innovation, from the 2017-2018 World Economic Forum's Global Competitiveness Report. These measures are reported in Table 2 for Australia compared with a range of other developed nations. Specifically, the FDI and technology transfer score measures the extent to which FDI brings new technology into the country; the innovation score is aggregated up from sub-indices relating to various components of innovation within an economy, such as the capacity for firms to innovate, company spending on R&D, patent applications and availability of scientists and engineers. These

scores range from 1 to 7. Australia ranks below the large majority of comparable developed nations. Of those considered in the table, Australia has the third lowest FDI and technology transfer score, and the second lowest innovation index score. So, not only is Australia heavily skewed towards a small number of highly profitable industries, both in terms of economic activity and FDI, but it also lags behind comparable countries in terms of innovation and technology. This is also consistent with a large portion of FDI coming out of retained earnings of foreign shareholders in Australian-based companies. One potential consequence of these observations is that, if tax settings were made more favourable to FDI, we would not only see a high volume of FDI in the industries where it is currently concentrated, but also an increasing volume of FDI in industries that are likely more sensitive to these policy settings.

Table 2: FDI and technology transfer score and innovation index score (1-7), 2017 (WEF 2017)

Country	FDI and technology transfer score (1-7)	Innovation index score (1-7)
Singapore	5.9	5.3
USA	5.6	5.8
UK	5.5	5.1
Germany	5.4	5.6
Canada	5.2	4.7
New Zealand	5.2	4.7
Japan	5.1	5.4
Australia	5	4.5
Korea	4.5	4.8
Italy	4	4

Synthesis and discussion of the implications of the empirical evidence for Australia

Does the research suggest that businesses might choose to locate outside of Australia? Can we find evidence of this?

Business investment decisions depend on costs and returns, which are affected by a range of factors, such as the access to an appropriately qualified labour force, natural resources, markets, new technologies and relevant infrastructure. Other factors include macroeconomic stability and institutional factors such as bureaucracy, property rights, environmental regulations, etc. While some of these factors may be viewed as “pull factors” or “stay factors” that attract foreign investment and ensure that it does not move to other countries (such as country-specific resources), other factors operate as “push

factors” or “stay-away factors” that may lead to the relocation of businesses to other countries or that may prevent foreign investment in Australia (such as bureaucratic hurdles). To clarify this terminology, pull and stay factors are similar but not identical notions – pull factors provide incentives for foreign businesses to relocate to a given jurisdiction whereas stay factors provide incentives for already established domestic businesses to remain in that jurisdiction. Analogously, push and stay-away factors refer to incentives for domestic businesses to relocate abroad and incentives for foreign businesses not to invest in a given jurisdiction, respectively. Stay and stay-away factors are generally more relevant in determining firm location than push or pull factors because there are usually good reasons for businesses to be in a certain location. Location choices are also very persistent because relocating to a different country is costly relative to not relocating.

The current corporate tax debate in Australia focuses almost exclusively on two policy options: (1) reducing the statutory corporate tax rate and (2) leaving the statutory corporate tax rate unchanged (we discuss other policy options below). The relevance of the factors mentioned above differs considerably between these two options.

Given the research presented in this paper, it appears plausible that Australia's statutory corporate tax rate contributes to reducing FDI inflows. Economic theory suggests that capital is mobile in a small open economy; this implies that prospective international investors may decide to invest elsewhere. The literature review, included as Appendix A, finds that this theory is broadly supported by empirical research in the international context, which suggests that the effect of statutory and effective average corporate tax rates on FDI is negative and significant. Due to data limitations and formidable empirical challenges, we know very little about the actual size of the effect of corporate taxation in Australia on FDI and firm location behaviour. As a consequence, it is difficult to draw inferences about the change in the corporate tax rate that would be required to achieve a significant increase in FDI. We know it matters but it is hard to say how much with any precision.

A large body of empirical literature finds a negative effect of statutory and effective average corporate tax rates on both location decisions and FDI (Egger & Stimmelmayer 2017). Perhaps not surprisingly, discrete location decisions of international firms are of larger consequence when compared to marginal investment decisions (De Mooij & Ederveen 2008). Given these findings, it appears likely that lower corporate tax rates may contribute to higher FDI inflows and affect location decisions of international firms.

Although the international evidence does not permit inferences about the size of the effects of reducing the Australian statutory corporate tax rate on these outcomes, it seems reasonable to expect that a lower corporate tax rate would contribute to higher FDI inflows and increase the likelihood of attracting international firms to some degree.

As discussed above, the overall FDI statistics are somewhat misleading for Australia. The mining boom and its financing through retained earnings leads to a relatively rosy picture for FDI. When we look at the non-mining sector, however, we see a much less bright story around investment and these poor outcomes are, at least in part, attributable to high corporate tax rates.

There is some evidence suggesting that the link between statutory or effective average corporate tax rates and FDI inflows is not symmetric – low corporate tax rates do not encourage investment as much as particularly high tax rates deter it (Bénassy-Quéré et al. 2003). This finding suggests that FDI inflows to Australia would benefit even from a relatively small reduction in the currently very high (30% for large businesses) statutory corporate tax rate.

A finding that seems to be particularly relevant in the Australian context is that FDI flows may be more responsive to statutory or effective average corporate tax changes if the gap between a given country's corporate tax rate and those of other countries is wider (Bénassy-Quéré et al. 2003). The gap between Australia's statutory corporate tax rate and that of many other countries has widened substantially in recent years. Australia's statutory corporate tax rate seems particularly high when compared to Singapore (17%), the UK (19%) and the US (21%).

Empirical evidence suggests that the extent to which statutory corporate tax rates affect FDI depends on the specific type of investment. For example, Hebous et al. (2010) find that the negative effect of statutory corporate tax rates on greenfield investment (which firms use to build their foreign production capacity from scratch) is almost twice as high as the corresponding effect on M&A investment. This finding suggests that Australia's high statutory corporate tax rate may be particularly detrimental for new sectors that first have to build up their production.

Taken together, theoretical and empirical evidence suggest that reducing Australia's statutory or effective average corporate tax rate will contribute to an increase in foreign investment, and even help to incentivise foreign businesses to relocate to Australia.

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Australia's high statutory corporate tax rate may discourage businesses from relocating to Australia; the problem of the existing high rate incentivising businesses to leave Australia is real, but less important. There are many factors which influence whether a firm decides to relocate to another country and there is a great deal of inertia in this decision.

Nonetheless, there have been departures from Australia which have been attributed, at least in part, to the high corporate tax rate. The CEO of ResMed recently suggested that the differential between Australia's 30 per cent rate and the USA's 21 per cent rate would influence their decisions regarding which country to invest in (Thomson 2018). The CEO of Cochlear has similarly suggested that they might move some of their R&D operations away from Australia, dependent on Australia's tax settings – primarily relating to R&D tax incentives (Redrup 2019). Further examples of Australian companies that have chosen to invest outside of Australia at least partly due to corporate tax rate settings include CSL and BlueScope (BCA 2019).

Falling statutory corporate tax rates in other countries might also worsen this pull factor. The gap in statutory corporate tax rates between Australia and other countries is quite large in many cases and may be enough to offset stay factors and the cost of relocation. Such a scenario appears to be less unlikely for some industries in Australia, such as mining and banking (see below), but more likely for life sciences and information technology.

Is Australia's industry structure affected by Australia's corporate tax system in the way that the international research suggests?

Although there is no scientific evidence on the effects of Australia's effective or statutory corporate tax rates on Australia's industry structure, it appears likely that the relevance of corporate tax rates varies across industries. Research by Greagg et al. (2010) shows that corporate tax rates affect industries differently in Australia. Although a single statutory corporate tax rate is applied, average tax rates vary considerably across industries. Here, average tax rates are measured by tax payments relative to net operating income (that is, gross operating surplus adjusted for certain components which are excluded by this measure but included in taxable income). Greagg et al. (2010) find that the average tax rate is relatively high in the finance and insurance industry and relatively low in most capital-intensive industries (including mining and electricity, gas and water). This is driven by differences between accounting profits and taxable income from depreciation, R&D, capital gains and other factors. These disparities may affect how different industries will respond to a lower corporate tax rate. Specifically, the effects of a tax cut in industries with

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relatively low average tax rates are expected to be smaller than those in industries with relatively high average rates.

It also raised the question of whether a lowering of the corporate tax rate might be accompanied by a winding down of other business concessions. This would produce a fairer corporate tax system and one where companies did not waste their effort applying for government programs or understanding government rules. Everyone would benefit from a lower corporate tax rate with lower compliance and administration costs.

Activities where Australia has some specific resource or a comparative advantage not available to other countries might be less affected by the corporate tax rate. Three important industries – mining, agriculture and tourism – seem intuitively unlikely to respond to the existing (high) statutory corporate tax rate because they benefit substantially from country-specific resources that are hard to find elsewhere.

The finance sector is somewhat more complicated. In Australia, financial firms are subject to a relatively high effective average tax rate. While the international literature suggests that financial firms are more than twice as responsive to changes in tax rates, relative to other sectors, this is unlikely to be the case for financial firms that are already in Australia. The major banks, which are quite profitable, are unlikely to leave Australia in response to the current statutory tax rate. The oligopoly in the banking sector is very persistent despite considerable scope to increase competition; this is because international banks have to overcome significant bureaucratic hurdles to enter the market. Additionally, the relatively high effective average tax rate applied to financial firms in Australia is likely to further discourage new entrants into the sector.

These examples illustrate that stay factors, stay-away factors and the cost of relocation explain location choices of businesses in some industries, while push and pull factors appear (such as corporate tax rates) are relatively less important.

Examples of sectors in which investment or location decisions may have been affected by Australia's statutory corporate tax rate include recently established sectors and start-up businesses.

Options for reform

Lowering the statutory corporate tax rate is one option for corporate tax reform in Australia. There are also alternative policy options if one were to think more broadly about reform of the corporate tax system. We briefly canvass those reform possibilities in the next section. A more detailed discussion of these policy alternatives can be found in a new TTPI Report,

“Corporate income taxation in Australia: theory, current practice and future policy directions” (TTPI, 2021a).

Alternative policy options

TTPI (2021a) provides a detailed discussion of reform options for corporate tax in Australia. Keeping the current source-based taxation of profits and cutting the statutory corporate tax rate is only one amongst many options. It also does not deal with the plethora of problems that are created by source-based taxation, the increasing mobility of capital, the increasing importance of intangible capital such as intellectual property, the bias in the system against equity and towards debt and the prevalence of profit-shifting by corporations. Devereux (2019) discusses how thinking about taxing business profits has evolved over the past 50 years in light of these trends.

Taking these reflections into account, we briefly review some achievable options for reform of the Australian corporate tax system. See TTPI (2021a) for a more thorough discussion. Some authors have proposed removing deductions for debt. This would broaden the tax base and allow for a decrease in the statutory rate. This proposal is often known as the comprehensive business income tax (CBIT). It has not been adopted in any country to date.

Options to move away from taxing all corporate profits to only taxing economic rents have the advantage of encouraging investment at the margin by removing the tax rate from the consideration of whether or not a firm should invest. One way to do this is through a cash-flow tax (CFT); another is through an allowance for corporate equity (ACE) or an allowance for corporate capital (ACC).

The ACE offers several advantages: it is easy to implement as a simple, additional deduction in the current system; many countries over the past 20 years have successfully implemented ACEs and Australia could learn from their experiences; it solves most of the problems with the current Australian corporate tax system identified in TTPI (2021a). TTPI (2021b) looks at some of the implementation issues around the introduction of an ACE and how those might be approached in Australia.

Appendix A – Review of international evidence

Theory

Theoretical literature relating to the incidence of corporate taxation provides some guidance on how firms make location decisions. The main point, from Bradford (1978) and expanded upon by others such as Grubert and Mutti (1985), is that, in a small open economy, capital is internationally mobile. Firms making investment choices in a small open economy with corporate taxation can choose instead to invest elsewhere or reduce costs of production to compensate for tax-induced losses. Prospective foreign investors are deterred to some extent. This effect is expected to be particularly pronounced over the long run. The incidence literature argues that less mobile factors of production (labour and land) consequently bear more of the burden of corporate taxation. While logically coherent, this has generally been employed in the past as a maintained assumption, which empirical researchers have more recently attempted to evaluate, as detailed below.

Empirical studies on the effects of statutory and effective corporate tax rates on firm location decisions

There is an extensive body of empirical literature investigating the effects of statutory and effective corporate taxes on firm location decisions. This literature finds a significant and large negative effect, as concluded by Egger and Stimmelmayer (2017) in a recent survey of evidence on a range of issues relating to the taxation of multinational enterprises. They note that the overall consensus from the empirical literature on corporate tax effects on FDI is that the tax elasticity of FDI is around -0.7, corresponding to a semi-elasticity of -3.3 (with respect to statutory and effective tax rates), also as reported by de Mooij and Ederveen (2003) in their review of the evidence. A tax elasticity is the percentage response in some quantity (e.g. FDI) to a 1 per cent change in the tax rate; a semi-elasticity is the percentage response with respect to a 1 *percentage point* change in the tax rate. In a follow-up, meta-study, De Mooij and Ederveen (2008) extend their earlier work, with a focus on comparing the importance of the marginal investment decision with the discrete location decision for international firms – both are significant but the location decision is of larger consequence.

Feld and Heckemeyer (2011) conducted a comprehensive meta-analysis of the literature regarding the link between FDI and taxation. The authors find a median tax semi-elasticity of -2.49, based on 704 estimates (again with respect to both statutory and effective tax

rates). They find evidence for publication bias in the literature, such that papers reporting higher semi-elasticities are generally more likely to be published – correcting for this bias yields a semi-elasticity of -2.28. Studies based on more highly aggregated data tend to report significantly larger semi-elasticities than studies based on micro data, by a factor of around 1.8. The authors further report that the econometric treatment of unobserved variables has a significant impact on estimation, as tax effects may be difficult to discern from macroeconomic trends. Additional insights from the authors on the literature as a whole include that studies that incorporate information about bilateral tax relationships tend to arrive at better estimates, and that public spending does not appear to influence the effects of statutory or effective tax rates on FDI.

Early empirical studies on firm location, such as that of Hartman (1984), focused on the US and used highly aggregated time series data, making them vulnerable to methodological issues such as omitted variable bias. In other words, variation in taxation or profitability data might be correlated with important omitted variables, meaning that it is difficult to disentangle the effects of taxation from the effect of other variables on FDI (Hines 1999). Nevertheless, this study's reported results are equivalent to a tax elasticity of investment of around -0.6. Subsequent research attempted to correct for the methodological issues of the earlier studies, often using bilateral FDI flow data or firm-level data. As previously mentioned, de Mooij and Ederveen (2003) observe a tax elasticity of FDI of around -0.7 across the literature, which is similar to the result of Hartman (1984), despite significant improvements in methodology and data.

Following the early studies, researchers turned to analysing panel data on bilateral FDI flows, such as Gorter and Parikh (2000), and Bénassy-Quéré, Fontagné and Lahreche-Révil (2003). Both studies considered OECD countries. The former study shows that FDI is responsive to effective corporate tax rate differentials within the EU; an EU country typically increases its FDI position in another EU country by around 4 per cent if the other country reduces its effective corporate income tax rate by 1 per cent. Bénassy-Quéré et al. (2003) explore the sensitiveness of FDI to statutory and effective tax differentials across 11 OECD countries over 1984-2000. The authors find that high relative corporate tax rates (especially effective average tax rates, but results are robust to a range of tax rate measures) discourage FDI inflows, but that this result is not symmetric – particularly low corporate tax rates do not encourage investment as much as particularly high tax rates deter it. They also observe that FDI may be more responsive to tax rate changes the larger the gap is between a given country's tax rate and those of other countries.

The motivation to look beyond FDI flow data and instead use firm-level data is driven by methodological concerns. FDI is made up of multiple components that can respond very differently to statutory or effective tax rates (de Mooij & Ederveen 2003) – thus, results are sensitive to the composition of aggregate FDI. Studies using firm-level data include those of Grubert and Mutti (2000) and Altshuler, Grubert and Newlon (2001), both of whom examine outbound FDI from the US. The former study uses firm-level data on multinationals collected from tax returns in the US, finding that average effective tax rates have a significant effect on choice of location and the amount of capital invested in a location. A lower average effective tax rate that increases the after-tax return to capital by 1 per cent is associated with about 3 per cent more real capital invested, provided that the country has an open trade regime. Also, around 19 per cent of US capital abroad would be located elsewhere in the absence of tax effects. The latter study finds that the elasticity of US outbound FDI with respect to a country's after-tax rate of return was -1.5 in 1984 and increased in magnitude substantially to -2.8 in 1992. Further evidence of the increasing mobility of capital and perhaps firms and investors paying greater attention to tax rates.

A different empirical approach from the studies considered thus far is to explicitly model firm location decisions to study the effects of taxation, following a random utility maximisation framework (McFadden 1974) and multinomial logit estimation. Broadly, this approach is based on the idea that firms consider a set of possible investment locations, and choose the location which provides the highest profitability. Following this general method, Devereux and Griffith (1998) find that choice of location is significantly influenced by the host country's effective average tax rate rather than the effective marginal tax rate. Their study is based on data from US multinationals that invested in European countries in 1980-1994. This is not surprising as the effective marginal tax rate is more likely to impact the decision to expand an existing operation. Büttner and Ruf (2007) find a high degree of sensitivity in the location decision to the statutory tax rate of the potential investment location, using data on German multinationals investing in 18 foreign countries over an 8-year period. In particular, for an investment with a 50 per cent probability of being carried out in a given location, an increase in the statutory corporate tax rate by 10 percentage points reduces the probability by 12.5 percentage points.

A more recent study explicitly modelling firm decisions is that of Davies, Siedschlag and Studnicka (2018). The authors analyse the impacts of effective average corporate tax rates and other factors on the attractiveness of EU countries to FDI, accounting for investor heterogeneity and substitutability of location. They find that lower effective

average tax rates increase attractiveness to FDI. From outside the EU, or in the case of the services sector, effective average tax rates matter a lot, but for intra-EU investment, or in the case of the manufacturing sector, they do not seem to play a role in location choice. Factors that play a significant role besides tax rates include market size, market potential, production costs, geographic and cultural proximity, and research and innovation capacity.

The empirical literature has continued to largely use firm-level data, with more recent studies providing further granularity in the analysis of the effects of corporate tax rates on investment of multinationals, across several dimensions, including firm profitability and tax rates in the parent country. Millot, Johansson, Sorbe and Turban (2020) conduct a firm-level study using a cross-country panel. The authors find the expected negative relationship between investment and effective marginal corporate tax rate increases, but also a U-shaped relationship between tax sensitivity and multinational group profitability, in which a negative or high profitability rate implies lower tax sensitivity. Barrios, Huizinga, Laeven and Nicodème (2012) study impacts relating to the prospective host country's effective tax rate, the host country's withholding tax on dividend distributions to non-residents, and repatriation tax in the parent country, using firm-level data from 33 European countries. They find that a 10 percentage point increase in the host or parent country effective tax rate reduces the probability of location by 9.0 and 10.7 per cent respectively, whereas withholding tax on dividend distributions has no significant effect. They also find that highly profitable foreign subsidiaries are less sensitive to host and parent country taxation, which the authors believe is due to location-specific rents that would be lost in the case of relocation.

A further group of studies highlights how taxation affects specific forms of FDI or specific types of investment in different sectors of the economy. Hebus, Ruf and Weichenrieder (2010) find that an increase in the statutory corporate tax rate of 10 per cent reduces the probability of that country being chosen as the host of a greenfield investment (that is, where a firm builds its foreign production capacity from scratch) by 6.4 per cent, whereas for an M&A investment the estimate is only 3.6 per cent. Swenson (2001) also finds a significantly higher tax sensitivity of greenfield investment compared to M&A investment with respect to US state taxes. These observed discrepancies between tax impacts on M&A and greenfield investment may be due in large part to interactions with tax settings in the home country – for example, foreign owners may be shielded from a higher tax rate in the host country by the credit system in the home country, which would not be possible under domestic ownership in the host country (de Mooij & Ederveen 2008).

Focusing on location decisions by economic sector, Lawless, McCoy, Morgenroth and O'Toole (2018) analyse the effects of statutory and effective average corporate tax rates on newly established multinational subsidiaries across 26 European countries over an 8-year period. The study makes the methodological enhancement that it allows for nonlinear responses to tax rates in location decisions – it is part of the literature explicitly modelling firm location decisions, along the lines of Devereux and Griffith (1998). The authors find that financial firms are more than twice as responsive to changes in tax rates relative to other sectors. Their baseline result is that a 1 per cent increase in the statutory corporate tax rate leads to a reduction in the conditional location probability of 0.68 per cent (or 1.15 per cent using effective average tax rates). Marginal effects are also found to be lower at higher rates of tax. Merz, Overesch and Wamser (2017) analyse how statutory corporate tax rates and regulation affect the location of financial sector FDI, using a new dataset with information on new financial services entities established by multinationals in 83 host countries, again via a logit model. As expected, they find a negative effect of host country statutory tax rates on the probability of choosing that host country, and estimate elasticities. Djankov, Ganser, McLiesh, Ramalho and Shliefer (2010) use new data from a PwC survey on effective corporate income tax rates in 85 countries in 2004, finding that effective corporate tax rates have a large adverse impact on FDI, as well as on aggregate investment and entrepreneurial activity.

The incidence of corporate taxation

We now discuss the literature on the incidence of corporate taxes – and while incidence of taxation is not the focus of this paper, this literature frequently refers to the notion of capital mobility. See TTPI (2021a) for a more detailed discussion of the theory and empirical research on the incidence of corporate taxation.

Policy analysis of corporate taxes often uses simulation models, especially computable general equilibrium (CGE) models, which take capital mobility assumptions as inputs. Traditionally, capital is assumed to be perfectly mobile. However, as Gentry (2007) notes, as empirical evidence regarding this assumption has been gathered over the years, the incidence literature has increasingly referred to this evidence, including much of the research we have considered thus far, to assist with specifically determining the capital mobility assumption.

It should briefly be noted that, within the incidence literature, perfect or high capital mobility has not been unanimously assumed. Feldstein and Horioka (1980) introduce their

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'Feldstein-Horioka puzzle', in which the authors argue that high capital mobility should lead to a low correlation between saving and investment within a country, but empirically demonstrate that the correlation is relatively high. This suggests surprisingly that capital may not be particularly mobile. Home country bias for the average investor could coincide with marginal investors who are happy to invest in any location. Gentry (2007) considers Feldstein and Horioka's research in this context, concluding that, controversy notwithstanding, overall evidence suggests that capital is mobile. Further, he notes that empirically the Feldstein-Horioka puzzle has been dissipating, especially in the EU. In Australia, the growth in private savings in recent decades has not been matched by strong business investment, consistent with the decline of this puzzle. Correspondingly, the OECD (2017) provides some evidence of declining business investment, despite growth in the net savings ratio (although this measure has been slightly declining in recent years).³

There is some research in the incidence literature that provides evidence relating to the capital mobility assumption. Hassett and Mathur (2006) assess the link between several taxes (including corporate taxation) and manufacturing wages in 72 countries and over a 22-year period, using panel data. They find that wages are significantly responsive to corporate taxation, and that responsiveness is larger in smaller countries. In particular, a 1 per cent increase in corporate tax rates is associated with nearly a 1 per cent drop in wage rates. This result is consistent with the assumption in the incidence literature that capital is highly mobile but labour is not. The authors also find that high wages in neighbouring countries (whether "neighbour" is defined geographically or economically) lead to high wages in the domestic economy – their explanation is that, as capital moves to relatively low wage destinations, it increases worker productivity which causes wages to rise.

Other researchers have used simulation models to vary the capital mobility assumption, testing how sensitive results are to this assumption – such as the question of how mobile capital needs to be for tax incidence to be shifted to other factors due to capital flight. The study of Grubert and Mutti (1985), introduced earlier, includes a CGE model of the US and the rest of the world. The authors vary their capital mobility assumption to find that only a modest degree of international capital mobility is required to substantially alter closed economy patterns of tax incidence, such that the incidence is distributed to less mobile factors (labour and land).

³ It is important to recognise that there is not universal agreement about this point. At least one paper has found that the puzzle has increased based upon a regression of investment on savings which is the measure used by Feldstein and Horioka; see <https://www.lowyinstitute.org/the-interpreter/capital-globally-mobile>

Studies specific to Australia

As mentioned previously, there is a scarcity of Australia-specific studies that directly examine whether there is a capital outflow as a result of corporate taxes or which try to quantify this outflow. Freebairn (2015), primarily concerned with the incidence of taxation, notes that the investment response to corporate taxation should be greater the larger the share of corporate income earned on geographically mobile investments and the less the share of economic rents earned on immobile inputs. He characterises the problem of this key parameter as being up for debate and lacking evidence in the Australian context. Nevertheless, he argues in favour of high capital mobility over the long run due to the growing importance of intangible capital in all activities and the process of capitalisation of economic rents in one-off windfall capital gains.

Several studies do assert that corporate taxes in Australia should have a significant impact on international investment, citing theory and international empirical evidence. Policy reports asserting this include Sorensen and Johnson (2010), TTPI (2021a) and Henry, Harmer, Piggott, Ridout and Smith (2009). CGE modelling with assumptions around capital mobility has been conducted by several authors including Cao et al. (2015), KPMG (2010), Kouparitsas, Prihardini and Beames (2016), Murphy (2016), Murphy (2018), Tran and Wende (2017), and Rimmer Smith and Wende (2019).

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