Australian National University

Crawford School of Public Policy

TTPI

Tax and Transfer Policy Institute

Australia's high company tax rate and dividend imputation: a poor recipe for a small open economy?

TTPI - Working Paper 9/2018
May 2018

Chris Murphy
TTPI Fellow,
Arndt-Corden Department of Economics &
Tax and Transfer Policy Institute,
Crawford School of Public Policy
The Australian National University

Abstract

By international standards, Australia's business tax system combines a high company tax rate of 30 per cent with low taxation of domestic investors through dividend imputation. This prioritising of domestic investors over foreign investors is at odds with the evidence in this paper that the marginal investor is foreign. Better aligning Australia's business tax system with international practice would encourage business investment, reduce tax avoidance and reduce the riskiness of national income. This paper assesses the evidence on the size of these three effects and models the consumer benefits of better aligning the Australian business tax system with international practice.

JEL Codes: C58, C68, H25.
Keywords: business taxes and subsidies, computable general equilibrium models, financial econometrics

* *Previous versions of this work were presented at a roundtable on business tax convened by the Centre for Independent Studies and at an ANU ACDE Trade and Development seminar. Helpful comments were received at these two events as well as from two anonymous referees of this working paper. I accept responsibility for this version. Correspondence: Chris Murphy, PO Box 4129, Kingston ACT 2604. Email: chris.murphy@anu.edu.au*

Tax and Transfer Policy Institute

Crawford School of Public Policy

College of Asia and the Pacific

+61 2 6125 9318

tax.policy@anu.edu.au

The Australian National University

Canberra ACT 0200 Australia

www.anu.edu.au

The Tax and Transfer Policy Institute in the Crawford School of Public Policy has been established to carry out research on tax and transfer policy, law and implementation for public benefit in Australia. The research of TTPI focuses on key themes of economic prosperity, social equity and system resilience. Responding to the need to adapt Australia's tax and transfer system to meet contemporary challenges, TTPI delivers policy-relevant research and seeks to inform public knowledge and debate on tax and transfers in Australia, the region and the world. TTPI is committed to working with governments, other academic scholars and institutions, business and the community.

The Crawford School of Public Policy is the Australian National University's public policy school, serving and influencing Australia, Asia and the Pacific through advanced policy research, graduate and executive education, and policy impact.

1. Introduction

The Australian business tax system is unusual by international standards, combining heavy taxation of corporate income and light taxation of dividends paid to domestic investors through the dividend imputation system. Gruen (2006) argues that this prioritising of domestic investors over foreign investors is a poor strategy for encouraging investment in a small open economy where the marginal investor is foreign. He argues for more closely aligning Australia's business tax system with international practice by funding an Australian company tax cut through higher taxation of dividends.

This paper analyses this idea more comprehensively in three ways. It considers the range of economic issues important in deciding the balance between taxing corporate income and dividends. It presents an up-to-date account of the evidence on the central issue of whether the marginal investor in Australia is foreign. It uses economy-wide modelling to evaluate alternative scenarios for the corporate tax rate and dividend tax policy.

Australia's corporate tax rate of 30 per cent is high by international standards. Under the recent US corporate tax changes, the US corporate tax rate has been cut to around 26 per cent, after taking both federal and state corporate taxes into account[1]. In addition, 100 per cent immediate expensing has been introduced for new investment in equipment. The US accounts for one-third of foreign equity investment in Australia[2], making its corporate tax regime of particular significance. The next most important source of foreign equity investment for Australia is the UK[3]. It has a lower corporate tax rate of 19 per cent, but without the immediate expensing now allowed in the US, making the tax environment for investment broadly comparable in the two countries. Either the US or UK corporate tax systems are possible models for Australia.

[1] The new US Federal tax rate is 21%, while the US weighted average state tax rate is 6.0%. The state tax is deductible against the Federal tax giving a total tax rate of 21%+6%–(21%x6%)=25.7%.
[2] At the end of 2016, US equity investment in Australia was $318 billion, out of total equity investment in Australia where the source country was identified of $965 billion (Australian Bureau of Statistics, 2017).
[3] At the end of 2016, UK equity investment in Australia was $125 billion. Together, the US and UK accounted for 46 per cent of foreign equity investment where the source country was identified.

When originally introduced in many countries, the aim of dividend imputation was to avoid double taxation, when dividend income that has already been taxed as part of company profits is taxed again at the shareholder level. Imputation achieves this by reversing the tax that has already been applied at the corporate level when shareholders are taxed on their dividends. However, the concern about double taxation presupposes that the incidence of company tax falls on shareholders, whereas on a small open economy view it falls on labour. If the small open economy view is correct, then dividend imputation would amount to an arbitrary shareholder subsidy, rather than relief from double taxation.

If dividend imputation does amount to a shareholder subsidy, domestically-sourced dividend income paid to domestic investors is taxed lightly. At the personal level, imputation means that locally-sourced dividends (e.g. Australian bank dividends) received by resident shareholders are taxed at rates ranging from -43 per cent per cent to 24 per cent[4], depending on the investment vehicle and/or the income of the recipient. In contrast, imputation credits are not available for foreign-sourced dividends (e.g. CSL or Microsoft dividends), which are taxed fully at rates ranging from 0 to 47 per cent.

Rather than offering dividend imputation, the US and UK tax dividends at concessional rates, but generally without discriminating between locally-sourced and foreign-sourced dividends. In the US, qualified dividends[5] are taxed at concessional rates ranging from 0 to 28.6 per cent, depending on the income of the recipient (Tax Foundation, 2015). The UK applies rates ranging from 0 to 38.1 per cent. Thus, Australia stands out in taxing domestically-sourced dividends lightly, particularly in superannuation funds, and foreign-sourced dividends heavily.

As capital markets have become more integrated around the world, other countries have jettisoned the Australian approach to business taxation. Ainsworth (2016) observes that: "many countries have shifted away from imputation systems, including the United Kingdom (1999), Ireland (1999), Germany (2001), Singapore (2003), Italy (2004), Finland (2005), France (2005), Norway (2006) and Malaysia (2008)".

[4] Under a company tax rate of *tc*, and an individual marginal tax rate of *tm*, under imputation the tax rate on the cash dividend is *(tm-tc)/(1-tc)*. This is on the open economy view that corporate tax does not fall on shareholders. The estimates in the text are based on top and bottom marginal rates of 47 per cent and zero, and a company tax rate of 30 per cent.

[5] Qualified dividends include dividends that are domestically-sourced, as well as dividends that are foreign-sourced provided a double taxation agreement is in place with the source country.

Further, all nine of these countries, apart from Norway, "lowered the corporate tax rate at, or around, the time when imputation was removed". In Europe, "a further motivation was the desire to satisfy concerns that the European Court of Justice (ECJ) would rule that dividend imputation was discriminatory" (Ainsworth, 2016). In any case, the only OECD countries that retain dividend imputation, apart from Australia, are Canada6, Chile, Mexico and New Zealand (Ainsworth, 2016).

In response, the two major Australian political parties have adopted relatively modest policies to better align Australia's business tax system with international practice.

For taxation of companies, the policy of the Coalition is to cut the company tax rate to 25 per cent by 2026-27. The policy of the ALP (2018a) is to allow immediate expensing of 20 per cent of the value of new investment in equipment from 2020-21. More is needed to achieve a corporate tax regime that is as favourable for investment as the regime already in place in the US or the UK. Specifically, the 25 per cent corporate tax rate proposed by the Coalition would need to be combined with 100 per cent immediate expensing of new investment in equipment, rather than the 20 per cent proposed by the ALP. Alternatively, to broadly match the UK regime, the Australian company tax rate would need to be cut more deeply to around 20 per cent, rather than to 25 per cent.

For taxation of dividends, the policy of the ALP is to make imputation credits non-refundable (ALP, 2018b). In broad terms, this puts a floor of zero under the tax rate for domestically-sourced dividends[7]. Foreign-sourced dividend income would continue to be fully taxed. More fully aligning our dividend tax system with international practice would require abolishing dividend imputation and replacing it with a dividend tax concession that applied uniformly to domestically-sourced and foreign-sourced dividend income.

Rather than assess the specific, current business tax proposals of the two major political parties, this paper addresses the overarching policy issue of evaluating the best corporate tax rate and dividend tax policy for Australia. It does this using CGETAX, a computable general equilibrium (CGE) model of

[6] Canada practices dividend imputation in only an approximate way, partly because of complications from corporate tax being imposed by both the federal and provincial governments.

[7] However, negative dividend tax rates could still be accessed by some taxpayers if they have a tax liability from non-dividend income, as this tax liability can be reduced or extinguished using imputation credits.

the Australian economy purpose built to analyse tax policy. As Freebairn (2018) notes, "a computer general equilibrium model (CGE) with detailed and disaggregated industry, product and factor markets has great potential to quantify the general equilibrium effects of taxation".

Previous studies have modelled the Coalition Government proposal to reduce the company tax rate from 30 to 25 per cent, including Murphy (2016a), Kouparitsas, Prihardini and Beames (2016), Dixon and Nassios (2016) and Tran and Wende (2017). Ingles and Stewart (2018) and Murphy (2018) consider corporate tax policy at a broad level, including the choice of corporate tax rate and base.

This paper differs in focussing on the balance between taxing corporate income and dividends. This choice depends most importantly on whether the small open economy view is correct, and this paper provides an up-to-date account of the latest evidence on that issue. It undertakes economic, econometric and modelling analysis as follows.

Section 2 provides an economic analysis of the issues in choosing a corporate tax rate and dividend tax policy. Besides the implications of the small open economy view, other issues include profit shifting by multinational corporations (MNCs), tax-induced home country bias in portfolios, the presence of excess profits or economic rents, and the disguising of labour income as dividend income.

Section 3 provides an econometric analysis of whether the small open economy view that the marginal investor is a foreign investor is correct. This is assessed by the extent to which the Australian share market values imputation credits, as these credits are generally only usable by domestic investors. If the share market does not value these tax credits, then it can be concluded that the marginal investor is foreign.

Section 4 provides an overview of the modelling approach used in this paper. It explains the main features of CGETAX that are pertinent for corporate tax rate and dividend tax policy modelling. It places these features in the context of Australian CGE modelling studies of business tax policy.

Section 5 presents the modelling of the economic impacts of relying less on company tax. The main funding option modelled is a reduction in dividend tax concessions, in line with international practice.

Other funding options modelled are an increase in personal income tax or GST. To analyse the choice of company tax rate, economic outcomes are compared under rates of 30, 25, 20 and 15 per cent.

2. Issues for Taxing Companies and Dividends

The section provides an overview of the economic issues in choosing a corporate tax rate and dividend tax policy. Besides the issue of whether the small open economy view is correct, other issues are profit shifting by multinational corporations (MNCs), tax-induced home country bias in portfolios, the presence of excess profits or economic rents, and the disguising of labour income as dividend income.

2.1 When the marginal investor is foreign

Here it is provisionally assumed that Australia operates as a small open economy in the world capital market on the basis that Australian residents hold only 2.6 per cent of world wealth (Credit Suisse, 2017) and Australia's international capital flows are only lightly regulated. The open economy assumption is tested in greater depth in section 3.

Two papers provide the intellectual foundation for the widely-held view that small open economies, such as Australia, should offer a lower corporate tax rate, not dividend imputation, to encourage investment. Gordon (1986) found that a small open economy should not impose corporate tax because it discourages investment. Further, Boadway and Bruce (1992) found that dividend imputation "has no effect on the investment decision of a corporation operating in an open economy". The economic reasoning in these papers is shown in a simplified way in Figures 1 and 2. Figure 1, which follows Bruce (1992), shows the effects of imposing company tax on the local market for business capital.

By definition, in a small open economy foreign investors are willing to perfectly elastically supply capital to the local market (K_{for}) at the post-company rate of return available elsewhere on the world capital market (rs). The perfectly elastic nature of this supply means that foreign investors are the marginal investor, determining the total level of investment. Compared to foreign investors, domestic investors have far more limited funds. Consequently, higher rates of return are needed to induce them to supply more funds to the local business capital market (K_{dom}). On the demand side of the local market

for business capital, the diminishing marginal product of capital means that the demand for capital (K_d) rises as the required return (r) falls.

In the absence of local company tax, equilibrium is reached with a required rate of return of rs and a capital stock of K_0. When local company tax is imposed, adding to the cost of capital by an amount t, foreign investors add that amount to the pre-tax rate of return that they require before investing locally. In that way, they continue to receive the same post-tax rate of return available elsewhere on the world capital market. Thus, foreign capital is now supplied at a pre-tax return of $rs+t$ instead of rs.

At this higher required rate of return, the demand for capital falls from K_0 to K_1. Company tax revenue is equal to the effective tax rate t times the capital stock K_1 and is shown as the shaded rectangle "Revenue". By discouraging capital demand, company tax also results in a loss of national income given by the shaded triangle labelled EB_d. This also represents the excess burden (EB) of the tax, namely, the cost to consumers over and above the amount of revenue raised from them through the tax.

The implied fall in the capital to labour ratio not only raises the marginal product of capital to match the higher required rate of return. It also reduces the marginal product of labour, resulting in a lower real wage. In this way, the incidence of company tax is passed on from capital, which continues to receive the same post-company tax rate of return as before, to labour. This discourages labour supply in the same way that it would if labour were taxed directly. Gordon (1986) summarises the implications for tax policy.

> *Since the supply of capital from abroad is infinitely elastic, labor bears the entire burden of either a labor income tax or a corporate income tax, so both lead to a change in labour supply decisions. A corporate tax, however, simultaneously creates an additional distortion which reduces capital investment in the economy. It is therefore dominated by a labor income tax…A small country should therefore not attempt to tax capital, regardless of the tax policies in other countries.*

As noted in the introduction, dividend imputation aims to provide shareholders with relief from double taxation on the premise that the incidence of company tax is borne by domestic investors. However, under the small open economy analysis of Figure 1, the incidence of company tax is borne by labour,

so imputation provides domestic shareholders with a refund of a tax that they do not bear. This makes imputation a subsidy for domestic investors. This is depicted in Figure 2.

Under imputation, domestic investors receive an after-subsidy return on their investment of $rs+t$. This induces an inefficiently high supply of funds with an excess burden given by the shaded triangle of EB_s. The imputation subsidy also erodes government revenue so that revenue only reflects company tax paid with respect to foreign investment. Thus, the revenue rectangle under imputation in Figure 2 is smaller than the revenue rectangle without imputation in Figure 1.

At the same time, imputation for domestic investors does nothing to mitigate the fall in the demand for capital to K_1 resulting from company tax. This is because of the small open economy assumption that the marginal investors determining the total level of investment are foreign investors.

These adverse effects of imputation mean that it increases the average excess burden (AEB) of company tax, defined as the ratio of the excess burden to the revenue raised. In the absence of imputation, from Figure 1, company tax has an AEB given by the ratio of the investment distortion triangle EB_d to the "Revenue" rectangle. With imputation, from Figure 2, the excess burden numerator increases to include the domestic investor subsidy triangle EB_s, while the revenue rectangle has shrunk with imputation credits. This higher AEB means that imputation makes company tax a more inefficient way of raising revenue.

Imposing company tax but then granting imputation for domestic investors narrows the tax base to foreign capital. This makes the business tax system operate like a tariff on foreign capital. In fact, while Figure 2 shows the effects of this tariff on foreign capital, it is completely analogous to the usual diagram showing the effects of a tariff on foreign imports. Under either interpretation, Figure 2 refers to a small open economy. Thus, for small open economies, just as most trade economists oppose import tariffs, most tax economists oppose the combination of company tax and imputation.

The same reasoning against imputation, or double taxation relief for dividends, continues to hold in the considerably more sophisticated, stochastic model of Fuest and Huber (2000).

In an open economy, it is not desirable to offer double taxation relief for dividends paid by domestic firms to domestic households. The reason is that the marginal shareholder in domestic firms is a foreign investor. This implies that the level of real investment is not affected by the taxation of domestic dividend income at the household level. A reduction of the tax burden on dividends is therefore merely an undesirable subsidy on domestic asset holdings.

While in a small open economy dividend imputation is based on a false premise of double taxation, there is a case for taxing dividends and other forms of asset income concessionally compared to labour income. For example, the Australian Future Tax System Review (2009), better known as the Henry Review, recommended that asset income be discounted by 40 per cent before it is taxed. Taxing saving makes consumers worse off by discouraging them from using saving to smooth their living standards over their life cycles in the face of often large variations in income. This paper returns to the issue of how dividend income might best be taxed in section 5.

To summarise, the small open economy view that the marginal investor is foreign has three main policy implications for this paper. First, company tax is undesirable[8] because it discourages investment and labour supply at the same time. Second, the presence of imputation makes company tax even more inefficient by eroding its revenue yield, adding to the case for reducing its rate. Third, imputation is itself undesirable because it is a subsidy on domestic asset holdings, not relief from double taxation.

This is all predicated on the provisional small open economy assumption that the marginal investor is foreign. Section 3 provides an up-to-date account of the evidence on whether that is true.

2.2 Profit Shifting by MNCs

The analysis so far has not taken potential tax avoidance into account. However, corporate tax is vulnerable to avoidance by MNCs because corporate income is taxed in the country in which it is sourced. Tax can be avoided by shifting accounting profits from higher-taxed to lower-taxed jurisdictions. This takes place through three main channels: "lending from a low-tax country to a high-tax country, locating intangible assets that earn a royalty or license payment in a low tax country, and

[8] This conclusion is qualified in section 2.4, when economic rents are considered.

manipulating transfer prices" (Auerbach, Devereux, Keen and Vella, 2017). This erodes the base for corporate tax in countries with relatively high corporate tax rates, such as Australia. It also leads to wasteful tax avoidance activity. Both of these effects make corporate tax a more inefficient way of raising revenue.

Taxing dividends received by residents is less vulnerable to avoidance because dividends are taxed in the country of residence of shareholders. Accessing a lower dividend tax rate therefore involves an individual moving to a lower-taxing country. Because people are less internationally mobile than accounting profits, dividend tax is less open to avoidance than corporate tax.

Both company tax and dividend tax apply to the returns made by Australian residents from their Australian equity investments. However, the two taxes differ in that company tax also applies to foreign equity investment in Australia while dividend tax also applies to Australian equity investment abroad. From a government revenue perspective, this may not be an important difference in Australia's case because equity investment in both directions is similar in magnitude[9].

The main policy implication is that tax avoidance considerations further strengthen the case for relying less on company tax and more on dividend tax.

2.3 Home country bias in portfolios

As noted in the introduction, imputation is only available for dividends paid from domestically-sourced income, not for dividends paid from foreign-sourced income. This creates a tax bias in favour of investing Australian savings in domestically-focussed Australian companies that pay fully franked dividends. Conversely, removing imputation would reduce home country bias, leading to greater diversification into foreign investments, so reducing the riskiness of national income.

For example, Bond, Devereux and Klemm (2007) observe that removing a 20 per cent imputation credit for UK pension funds in 1997 led those funds to increase the share of foreign equities in their equity

[9] At the end of 2016, foreign equity investment in Australian and Australian equity investment abroad both rounded to $1.1 trillion (ABS, 2017).

portfolios from around one-quarter to one-third. This implies an increase of 50 per cent in the ratio of foreign equities to domestic equities.

Similarly, Mishra and Ratti (2013), using panel data for 49 countries, find that the presence of a dividend imputation system leads to a statistically significant increase in home country bias. They present a range of regression results that imply that, in a representative imputation country, removing imputation would increase the ratio of foreign to domestic equity holdings by between 44 per cent and 67 per cent. The average imputation rate for the imputation countries in their panel was 23.9 per cent.

Australia has an imputation rate of 30 per cent, higher than for both the UK and the average imputation country in the panel. Thus, removal of imputation here can be expected to lead to a large reduction in home country bias, with the ratio of foreign equity to domestic equities rising by at least 50 per cent. While a range of factors validly contribute to home country bias in portfolios (see Mishra and Ratti, 2013), imputation takes home country bias substantially beyond naturally occurring levels.

The main policy implication is that imputation should be replaced with a tax regime that operates uniformly across locally and foreign-sourced dividends, to remove a tax-induced risk factor to national income.

2.4 Economic rent taxes

So far, corporate tax has been shown to have two adverse effects. First, it acts as a disincentive to investment. Second, it leads to tax avoidance through profit shifting. It also has a third adverse effect, which is to create a bias towards debt funding of investment.

One strategy for addressing these three adverse effects is to reduce the corporate tax rate, which is the strategy analysed in this paper. Another strategy is to try and redesign the corporate tax to remove these three adverse effects. The most comprehensive redesign solution to date is the Destination-based Cash Flow Tax (DBCFT), which is a form of economic rent tax. The DBCFT addresses the three adverse effects of corporate tax as follows.

Corporate tax discourages investment because it only provides a partial deduction for investment costs. When an investment expenditure is incurred, it is gradually expensed through future depreciation

deductions at historic cost. These future deductions will always have a lower present value than the original investment cost because of the time value of money. Cash flow rent taxes such as the DBCFT, "R base" and "R+F base", eliminate this investment disincentive by allowing immediate expensing of investment costs in place of depreciation deductions.

Corporate tax creates a bias in favour of debt funding of investment because debt costs are deductible. The Auerbach, Devereux, Keen and Vella (2017) version of the DBCFT addresses this adverse effect by following the "R base" cash flow tax in removing the deduction for net interest expenses. By allowing immediate expensing of investment costs, the DBCFT removes the rationale for allowing any deduction for investment financing costs through either debt or equity. To tax the profits that banks make from the interest margin between their deposits and loans, Auerbach et al. (2017) propose adding to the tax base the non-equity financial transactions of the financing sector with households[10]. This amounts to a limited application of an "R+F base" cash flow tax in the financing sector only.

As discussed in section 2.2, a relatively higher corporate tax rate drives profit shifting to lower-taxed jurisdictions. The DBCFT addresses profit shifting by taxing profits in the country of final sale ("the destination") instead of along the production and distribution chain ("the source"). Customers are less internationally mobile than source-based corporate income, which can be shifted using the three methods referred to in section 2.2, so DBCFT should lead subject to less profit shifting.

With these features, Dharmapala (2016) suggests that "the DBCFT would solve virtually all distortions from the corporate tax". However, he also points out that the DBCFT is equivalent to a tax on consumption and an equal subsidy on labour income, which Auerbach et al. (2017) acknowledge. Thus, in theory, corporate tax does not need to be replaced with a DBCFT but instead could be replaced by adjusting existing taxes, provided pure taxes on consumption and labour income are already in place.

In the 2017 US business tax reform process, both strategies for addressing the adverse effects of corporate tax were considered. While some Republicans in the House of Representatives originally

[10] It is not necessary to tax the profits that the financing sector makes in financial intermediation with business. The resulting addition to the tax base of the financing sector would simply be offset by the same reduction in the tax base of the rest of the business sector, resulting in no net gain in government revenue and no behavioural change (Auerbach et al., 2017).

proposed adopting a DBCFT (Auerbach and Devereux, 2017), ultimately Congress decided against the DBCFT and in favour of cutting the Federal corporate tax rate, from 35 to 21 per cent. However, on one interpretation, Congress made some steps in the direction of an "R base" cash flow tax by allowing immediate expensing of equipment investment for a 5-year period and imposing a cap on deductions for net interest expenses. It may be unviable for Australia to go it alone in replacing its standard corporate tax with a DBCFT, so this paper focusses on the other strategy of cutting the tax rate.

There is a limit to the extent to which the corporate tax rate should be cut. The finding of Gordon (1986) reported in section 2.1 that the corporate tax rate should be zero only considers normal profits. Once excess profits or economic rents are taken into account, Bruce (1992) demonstrates that a corporate tax is justified, in the absence of a separate economic rent tax such as the DBCFT. Location-specific economic rents may arise from factors such as oligopoly power, the conferring of mineral rights or land ownership. The dilemma in setting the corporate tax rate is that it is inefficient to tax normal profits whereas, in principle, it is efficient to tax location-specific economic rents.

Even if Australia does not introduce a broad-based economic rents tax, efficiency improvements are still available from replacing existing sector-specific taxes with rent taxes. Australia already has an economic rents tax in the form of the Petroleum Resource Rent Tax (PRRT). Murphy (2017) considers how an economic rent tax might be introduced in the banking sector in place of the Major Bank Levy.

Freebairn (2016) questions the merit of economic rent taxes on the basis that economic rents will become capitalised into asset values. "Recent purchases of such market price assets results in the economic rent being taken as a one-off capital gain by preceding owners. At the higher asset acquisition price the new owner obtains only an average rate of return."

While this is true, it is nevertheless feasible and efficient to apply an economic rent tax on the new owners. This involves allowing a deduction for the depreciable assets that were purchased from the previous owners, but not for the capitalised economic rents, which often will be taken up as a goodwill asset on the balance sheet of the new owners. The imposition of a new economic rent tax will result in a capital loss for the new owners. To the extent that this is considered unfair, this unfairness can be moderated through transitioning provisions.

The main policy implication of taking the existence of location-specific economic rents into account is that international action to replace company tax with a broad-based economic rent taxation such as a DBCFT would be desirable, but in the meantime company tax should be maintained, but levied at a moderate rate.

2.5 Labour income disguised as dividends

While most countries concessionally tax dividends for the reason given in section 2.1, this creates a tax avoidance risk. In particular, high income small business owners on the top marginal rate of personal tax may attempt to avoid tax by disguising part of their labour income as corporate profit, which they subsequently receive as dividends. Imputation achieves tax neutrality in this situation because the over-stated dividend income is taxed at the same rate as the understated labour income, while a tax credit is given for the corporate tax paid on the overstated profit.

If imputation is removed, tax neutrality can still be preserved with a calibrated discount for the dividend income. The formula for the tax neutral discount, *d*, is as follows where the top marginal rate of tax is *tm*, and the company tax rate is *tc*.

$$d = [tc/(1 - tc)]/[tm/(1 - tm)]$$

For example, at the current Medicare-levy inclusive top marginal rate of 47 per cent, and the proposed company tax rate of 25 per cent, the formula gives a tax neutral discount rate, *d*, of 37.6 per cent. This discount rate achieves tax neutrality as follows. If $100 of labour income is disguised as profit, there is company tax of $25, then personal tax of $22 when the remaining $75 is taken as a dividend and the discount is applied. The total tax of $47 is the same amount of tax that would apply if the $100 of labour income were not disguised but rather was taxed at the top marginal rate of 47 per cent.

The policy implication is that dividend imputation can be replaced with a dividend income discount that is calibrated to avoid any new opportunity for tax avoidance.

3. Testing if the marginal investor is foreign

The analysis of company tax and imputation in section 2.1 made the provisional assumption that Australia is a small open economy in the world capital market so that the marginal investor is foreign. This was on the basis that Australian residents hold only 2.6 per cent of world wealth (Credit Suisse, 2017) and Australia's international capital flows are only lightly regulated. As seen in section 2.1, if the marginal investor is foreign, the disincentive effects of business tax on investment are minimised by providing a low company tax rate, rather than a generous tax concession for domestic investors in the form of dividend imputation.

The purpose of this section is to test this open economy perspective on business tax by weighing the evidence on whether the marginal investor is foreign or domestic. By definition, if the marginal investor is foreign then share prices will be driven by foreign investor, rather than domestic investor, valuations. The factors driving both valuations have much in common, but a key difference is that under dividend imputation foreign investors generally cannot utilise franking credits, whereas domestic investors can.

So if share market valuations do not incorporate franking credits then the marginal investor is foreign whereas if they fully incorporate franking credits then the marginal investor is domestic. Of course it is possible that the truth lies somewhere in between, in which case our interest turns to the relative weightings of the valuations of domestic investors and foreign investors in determining share prices.

There is a considerable literature on whether share market valuations incorporate franking credits. One concern of this literature is the concern here, namely the implications for tax policy. Another concern is the implications for measuring the cost of capital when companies are subject to price regulation.

There are four broad ways of looking at how franking or imputation credits affect share prices: (i) market responses to changes in imputation tax policy; (ii) comparing prices when shares in a company trade contemporaneously with different dividend entitlements; (iii) dividend drop-off studies; and (iv) price and investment return studies. The first three types of studies are event-based, while the fourth type analyses returns over time.

Ainsworth, Partington and Warren (2016) summarise the findings of this research as follows. "Empirical research suggests that imputation credits may be partially priced based on examination of dividend events, while any footprints from imputation are hard to detect in either returns or price levels."

Many of the previous studies are somewhat dated and it is possible that the influence of foreign investors on valuations has become greater as capital markets around the world continue to become more integrated. Hence, in considering the four types of studies, the approach taken here is to obtain evidence from the latest data, where possible.

This section is structured as follows. The four types of studies of how franking credits affect shares prices are considered in turn in the first four sub-sections. Sub-section 3.5 draws the results together in an overall assessment of whether it is a reasonable approximation to reality to assume that the marginal investor is foreign. Sub-section 3.6 considers a more nuanced view that domestic investors have a small influence on share prices. The final sub-section considers circumstances in which foreign investors may obtain some value for their franking credits by "recycling" them to domestic investors.

3.1 Imputation tax policy changes and share prices

Imputation tax policy changed significantly in the 1997 UK Budget brought down on 2 July 1997. Prior to that, the UK operated a partial imputation system, with an imputation credit rate of 20 per cent. Under the policy change, imputation for UK pension funds was abolished immediately. Bond, Devereux and Klemm (2007) explain the share market response as follows.

> *For example, if UK pension funds were the marginal investor: there should have been a fall of around 20% in the value of the (FTSE) index on the announcement of the reform. Clearly, this did not happen. Instead the index continued to rise.*

They concluded that this evidence, and other evidence on the share market response, was consistent with the marginal investor being foreign.

In Australia, the ALP unexpectantly announced on the morning of 13 March 2018 that it would, if elected, make a major change in imputation policy. Imputation credits would become non-refundable (ALP, 2018b). This would result in a fall in the after-tax value of franked dividends for individuals and

superannuation funds that currently receive cash refunds for imputation credits. Depending on the tax circumstances of an individual or fund, the fall in the after-tax value of fully-franked dividends would range from 0 to 30 per cent. Based on the betting odds at that time, the expectation of the ALP being elected was 64 per cent.

The share market response to this announcement was very small, with the ASX200 down 0.4 per cent for the day. Like the UK experience, this is consistent with the foreign investor being the marginal investor. Local investors in both countries protested, but they did not significantly influence share prices and thus the cost of capital for new investment.

The next two types of studies investigate share price behaviour on the date in which a share goes ex-dividend. On the day before the ex-dividend date, purchasers of a stock are entitled to the next dividend payment, but those who purchase on the ex-dividend date or later are not, so the value of the stock typically falls.

3.2 Dividend entitlement studies

In some circumstances, shares in a company may trade contemporaneously with different dividend entitlements. Differences in prices between these shares are one way of estimating the market value of dividends.

In particular, for some larger companies, a cum-dividend (CD) market operates in parallel with the regular market on a single day, the ex-dividend date. Purchasers in the CD market are entitled to the upcoming dividend whereas purchasers in the regular market for the same stock are not. Other shareholder rights are the same. A comparison of closing prices in the two markets on the ex-dividend date can be used to estimate the value that the market places on dividends.

For example, on 28 February 2018 Telstra (TLS) went ex-dividend. The upcoming dividend was 11 cents cash or 15.7 cents including franking. The closing price for TLSCD was $3.47 whereas the closing price for TLS was $3.35. The market valuation of the dividend is estimated as the difference between these closing prices of 12 cents. This is much closer to the foreign investor valuation of 11 cents than to the domestic investor valuation of 15.7 cents. In fact, even if the foreign investor is strictly

the marginal investor, the presence of transaction costs combined with the ASX tick size for Telstra shares of 1c may mean that foreign investors are only prepared to sell their dividend rights for 12c rather than 11c.

This exercise, which was undertaken in March 2018, was repeated for the two half-yearly dividend payments made in the last 12 months by each of the top ten payers of company tax. The results are shown in Table 1. Averaged over the 20 dividend payments, the market valuation places a weight of 10 per cent on the value of dividends to domestic investors and 90 per cent on the value of dividends to foreign investors. Put another way, on average franking credits are only valued at 10 cents in the dollar.

This suggests that, at least for these top 10 taxpaying companies, the foreign investor is the marginal investor to a close approximation. This is important from a business tax policy perspective because these 10 companies alone account for around 30 per cent of company tax collections (Australian Taxation Office, 2016 and 2017).

3.3 Dividend drop-off behaviour

The CD market soon thins out beyond the top 10 taxpaying companies. So to estimate the market valuations of franking credits for the other companies in the ASX200, a different approach is needed. This involves undertaking a dividend drop-off study for share price movements on ex-dividend days.

The loss of entitlement to the next dividend for buyers on the ex-dividend day, compared to buyers on the previous day, should result in a share price fall (*sp*) reflecting the market value of the dividend. We separately identify both the cash component of the dividend (*div*), which will be valued by all shareholders, and the franking credit (*frcr*), which will only be valued by domestic shareholders. The price movement for a stock on its ex-dividend day may also be affected by any overall movement in the share market (*market*) and well as the random factors (*u*) that affect the daily movement in a stock price. These factors are incorporated in the following equation.

$$sp = a + b.market + c.div + d.frcr + u$$

$$where: sp = \Delta SP_t/SP_{t-1}\,;\; market = \Delta MP_t/MP_{t-1}\,;\; div = DIV_t/SP_{t-1}$$

$$frcr = fr_t.DIV_t.[30\%/(1-30\%)]/SP_{t-1}$$

This specification for the dividend drop-off equation is relatively flexible to avoid biases from imposing any potentially invalid restrictions. See Vo, Gellard and Mero (2013) for a survey of the generally more restrictive specifications used in earlier studies.

To construct the variables appearing in the above regression equation, raw data was obtained for ex-dividend dates, dividend amounts (*DIV*), franking percentages (*fr*) and closing share prices on the ex-dividend date (SP_t) and on the immediately preceding trading day (SP_{t-1}). The ASX200 index was used as the market index (*MP*).

This ex-dividend day data was obtained for the 200 companies included in the ASX200 as at 1 January 2018. Data was collected for ex-dividend events from 1 January 2008 to 27 March 2018. The dividend data is from the dividend.com.au web-site, while the share price data is from the Yahoo finance web-site. This data was cleaned in three ways as follows.

First, in line with common practice in the literature, the real estate sector was excluded. This is because "distributions from Australian REITs contain multiple components with differing tax status" (Siau, Sault and Warren, 2015). For example, tax deferred components are common and are likely to be valued by domestic investors more highly than both unfranked and franked distributions. The regression specification is only designed to accommodate franked and unfranked dividends.

Second, twelve ex-dividend events with incomplete data were discarded. The main reason for incomplete data is trading halts or suspensions that mean a share price is not observed immediately before and/or after a stock goes ex-dividend.

Third, one of the ex-dividend events for Genworth Mortgage Insurance Australia (GMA) was discarded because it coincides with an extraordinary share price fall due to an extraneous shock[11]. Less extreme outliers were retained, but their influence was moderated by using robust estimation methods, as described below.

[11] On 18 February 2015 it was announced that Westpac (WBC) would no longer outsource its mortgage insurance business to GMA, and GMA's share price fell by 23 per cent. This was easily the most extreme outlier in the sample.

Following this cleaning, the final dataset contains a total of 2,586 ex-dividend day events. This dataset is available from the author.

If all dividends were fully franked, cash dividends and franking credits would be perfectly correlated, so the effects of each on share prices could not be estimated separately. Fortunately, there are sufficient instances of partially franked and unfranked dividends in the sample for the correlation to be substantially less than perfect at 0.64. This is important because the main coefficient of interest is for the value of franking credits (*frcr*).

The estimation results are displayed in Table A1 of the Appendix. There are nine different versions of the results, obtained by applying three estimation methods over three estimation periods.

The first estimation method is OLS. Table A1 shows that the error term fails the kurtosis test because the z-statistic of between 4.9 and 6.7 is always well above the critical value of 2.0. This reflects the presence of outliers, which are a common complication for dividend drop-off studies and other studies of daily share price movements.

OLS estimation can be sensitive to such outliers, so we follow some other dividend drop-off studies, including Vo et al. (2013), by using robust estimation methods that are less influenced by outliers. The robust estimation methods used here are M-estimation[12] and Least Absolute Deviation (LAD) estimation[13].

In principle, cash dividends have full value for both domestic and foreign investors, so that the loss of entitlement to a cash dividend should result in an equal fall in the share price[14]. This expectation is borne out in the estimation results, with the estimated coefficient on the cash dividend varying in a fairly narrow range around minus unity of -0.85 to -1.18.

[12] While OLS minimises the simple sum of the squared residuals, M-estimation minimises a weighted sum of the squared residuals. Residuals that are larger in absolute value are automatically assigned lower weights, thus reducing the influence of the outliers. M-estimation was applied under its default settings in EViews.

[13] LAD estimation replaces the squared values of the residuals used in OLS with their absolute values. Thus, while residuals that are twice as large have four times the influence under OLS, they have only twice the influence under LAD, thereby reducing the influence of the outliers.

[14] This is before considering complicating factors such as granularity in share prices associated with the size of price ticks, and differences in tax treatments between cash dividends and capital losses for different investors.

In contrast to cash dividends, while franking credits have full value for domestic investors, they have no value for foreign investors. The coefficient on the franking credit varies across the nine regressions from -0.13 to -0.35. That is, the estimated market value for franking credits varies between 13 and 35 cents in the dollar. This suggests that foreign investors have a greater influence than domestic investors in determining the market value of dividends.

These estimation results are consistent with the literature. Ainsworth, Partington and Warren (2016) average the results from 12 Australian dividend drop-off and dividend entitlement studies that cover dividend events that are early as 1988 and as late as 2012. They calculate that franking credits are valued at 38 cents in the dollar on average. For our nearest comparable estimation period of 2008 to 2014, franking credits are valued at 32, 35 or 31 cents in the dollar, depending on the estimation method.

The results here are also consistent with the hypothesis that the value of franking credits has been lower in recent years. Using an estimation period of 2015 to 2018, the value of franking credits is estimated at 19, 13 or 15 cents in the dollar, depending on the estimation method. While we cannot reject the null hypothesis that the value of franking credits is the same in both estimation periods, there are several additional reasons for believing that there has been a fall in the market value of franking credits.

First, we cannot reject the null hypothesis that the value of franking credits is zero in the more recent period. Second, the analysis in section 3.2 of the cum-dividend market over the last 12 months also found a low value for franking credits of 10 cents in the dollar. Third, in section 3.1 it was found that the ALP's new policy of rolling back dividend imputation had a very weak announcement effect on the share market. On balance, this paper adopts the estimates from the more recent estimation period, extending from 2015 to 2018.

For this more recent estimation period, the three estimation methods produce broadly similar results. However, LAD and M estimation both have the advantage of being more robust to outliers than OLS estimation. The M estimation results have the further advantage that they appear to be the most plausible because the values for the coefficient on the cash dividend over the three estimation periods are more tightly bunched around the expected value of minus unity than is the case for the other two estimation methods. For those reasons, the M-estimation results are adopted from hereon.

Thus, our preferred equation applies M-estimation to the more recent period of 2015 to 2018, which is equation (9). This gives our preferred point estimate for the market value of imputation credits in the context of the ASX200 companies of 15 cents in the dollar. It is acknowledged that the surrounding 95 per cent confidence interval is wide, extending from -10 cents to +41 cents. The estimated coefficient on the cash dividend is -1.10, which is not significantly different from the expected value of -1.

The estimated coefficient on the market price movement is 0.70, indicating that prices for most shares tend to move with the overall market. Interestingly, this coefficient is significantly different from both zero and unity. This cautions against the common practice in the literature discussed by Vo et al. (2013) of either omitting this variable or imposing its coefficient at unity, in both cases without testing the implied, and apparently invalid, restriction.

3.4 Price and investment returns

In estimating the market value of franking credits, an alternative to the three types of dividend event studies just discussed is to analyse investor returns. If franking credits are valued in the market, then investors would require a lower return (measured exclusive of franking credits) from a company paying franked dividends than from a company with a comparable outlook whose dividends are not franked. Similarly, the share price would be higher for the company paying franked dividends.

These price and investment returns studies are more complex than the three types of dividend event studies because they need to take into account the various factors that influence investor valuations of companies. If factors are omitted, and those omitted factors are correlated with the propensity of a company to pay franked dividends, then the estimates of the value of franking credits will be biased, as acknowledged by Siau, Sault and Warren (2015). For example, companies may have limited capacity to distribute franking credits because they have incurred recent tax losses or their income is mainly foreign sourced, characteristics that may also influence investor valuations.

Dividend event studies avoid this problem of excluded variables bias by not attempting to model the valuation of a company. Instead, they only model the change in valuation at the specific time of a dividend event. On the one hand, Siau et al. (2015) also issue a note of caution about dividend event studies. They suggest "the possibility that shorter term return patterns around dividend events may be

influenced by traders or arbitrageurs, while having no impact on the overall level of prices, and hence longer-term returns achieved through time". However, if share prices were systematically determined in a different way around ex-dividend dates than at other times that would itself attract arbitrage trading that would tend to eliminate such differences.

The three main Australian studies using the investment returns approach are Lajbcygier and Wheatley (2012), Siau et al. (2015) and Swan (2018). The main characteristics of these studies are compared in Table 2. These three studies of investor returns differ greatly in their results for the value of imputation credits. The results of Lajbcygier and Wheatley (2012) generally show negative values, which does not make economic sense, Siau et al. (2015) find values around zero and Swan (2018) finds positive values. These conflicting results are consistent with the view that excluded variables bias seriously hampers attempts to reliably estimate the market value of imputation credits by modelling investor returns or share prices. In contrast, the studies of dividend events discussed earlier provide more consistent estimates: in most such studies the market value of imputation credits is positive but small.

Of the three studies of investor returns, Siau et al. (2015) are the most convincing in both acknowledging and attempting to address the excluded variables bias problem. They attempt to counter it by using a more varied approach in which they model the impact of imputation credits on both investor returns and share prices. They also use analysts forecasts of returns rather than actual returns, which has the advantage of reducing volatility in the data, but the disadvantage that analysts forecasts may not accurately reflect market expectations. They find that the marginal investor is foreign.

> *There is little convincing evidence that imputation credits are priced from the perspective of long-term buy-and-hold investors…We posit that the most likely explanation is that imputation credits are not valued by the marginal investor (who in a small open economy such as Australia may be an international investor), for the simple reason that they do not receive them.*

Swan (2018) obtains unstable results. When all companies are included in the regression analysis, Swan (2018) estimates a weight of 61 per cent on domestic investors in determining market valuations of

dividends[15]. However, when companies that have never paid franking credits are excluded from the regression analysis, the estimated weight on domestic investors drops to 31 per cent. In the full sample, the payment of imputation credits may be acting as a proxy for omitted company characteristics that affect required returns. Dropping companies that have never paid imputation credits helps limit the analysis to a group of companies that are more homogeneous from an investor perspective, reducing excluded variables bias. Hence, the better estimate of the weight on domestic investors in determining shares prices would be 31 per cent from the second regression, rather than the 61 per cent from the first regression that Swan (2018) refers to in "finding that imputation credits are almost fully priced in". The lower estimate is also more consistent with the results of Siau et al. (2015) and the dividend event studies.

Further, as can be seen by comparing Tables 2 and 3, the relatively large sample of companies used by Swan is dominated by public companies that are defined as "medium and large" under ATO definitions[16]. Such companies only account for 4 per cent of company tax collections, compared to the 54 per cent of company tax collections accounted for by "very large" [17] public companies. These less large companies are likely to be less visible to foreign investors leading to higher valuations of imputation credits that are not representative of company tax collections viewed more broadly.

3.5 Is the marginal investor foreign?

The results from the four types of studies are now brought together to make an overall, up-to-date assessment of the market value of franking credits. This assessment is made in Table 3, which considers, in turn, the market value of franking credits for five types of companies. These values are then weighted together using the contribution of each type of company to total company tax collections. Public companies are considered first, followed by private companies.

For the top ten payers of company tax, the analysis in section 3.2 of the cum-dividend market suggested that franking credits are currently valued by the market at 10 cents in the dollar. For other very large

[15] This is a simplified interpretation of Swan's results. See Swan (2018) for the full details.
[16] Large companies have a total income of $100 million to $250 million, while medium companies have a total income of $10 million to $100 million.
[17] Very large companies have a total income (not profit) of over $250 million.

public companies, the preferred dividend drop-off equation for the ASX200 companies developed in section 3.3 gives a value of 15 cents in the dollar.

The announcement effects in the share market from major wind backs in imputation policies provide a useful reality check on these estimates. As discussed in section 3.1, the announcement effects on major share indices in the UK in 1997 and in Australia in 2018 were negligible, suggesting that imputation credits have a rather low market value for larger public companies. Both of these reality checks are consistent with our estimates of small valuations of only 10 or 15 cents in the dollar, depending on company size.

For medium and large public companies, it seems plausible that they would have lower visibility to foreign investors so imputation credits may be valued more highly. Swan's study primarily uses this this group of companies. On our interpretation of his results, his study suggests a market value of imputation credits of around 30 cents in the dollar.

Turning to private companies, medium and larger private companies are diverse in nature. They include Australian subsidiaries of MNCs[18], for whom franking credits are worthless. They also include private subsidiaries of very large public companies[19], for whom franking credits would be valued in line with the parent company value at around 15 cents in the dollar. Finally, they include sizeable independent private companies of which some[20], but not all, would have good access to international capital markets. Balancing these three types, a value of 20 cents in the dollar was judged to be reasonable. Turning to smaller private companies, they would generally not have direct access to foreign equity investment. However, they compete for funds in the Australian capital market with companies that do have direct access. Given that indirect influence, a market value of 40 cents in the dollar seems reasonable.

Weighting together the estimates for the five types of companies generates an aggregate estimate for the market value of franking credits of 21 cents in the dollar. That is, the domestic investor has a weight of 21 per cent and the foreign investor a weight of 79 per cent in determining the cost of equity capital.

[18] e.g. Singapore Telecom Australia Investments Pty Ltd or Optus
[19] e.g. Robe River Mining Co Pty Ltd, a subsidiary of Rio Tinto
[20] e.g. Hancock Prospecting Pty Ltd, which is associated with Gina Rinehart

This relatively low weight on domestic investors suggests that the small open economy assumption that the marginal investor is foreign is reasonable as an approximation to reality. Hence, the widespread use of this assumption in Australian CGE tax modelling, including KPMG Econtech (2010), Murphy (2018), Kouparitsas, Prihardini and Beames (2016) and Tran and Wende (2017), is defensible. In this modelling, domestic investors have a weight of zero in determining share valuations and so the foreign investors supply of capital is perfectly elastic, as was provisionally assumed in Figures 1 and 2.

3.6 Partial weight on domestic investors

Alternatively, these empirical results could be used to ease the small open economy assumption by allowing for some small weight on domestic investors in determining share valuations. In terms of the simple analysis of Figures 1 and 2, this means using the following formula to calculate a value for the semi-elasticity of the supply of foreign equity with respect to its post-tax rate of return, in place of the small open economy assumption that this semi-elasticity is infinite.

$$\varepsilon^f = \varepsilon^d . \frac{\alpha/(1-\alpha)}{w/(1-w)}$$

where:

$$\varepsilon^f = semi-elasticity\ of\ supply\ of\ foreign\ equity\ with\ respect\ to\ rate\ of\ return$$

$$\varepsilon^d = semi-elasticity\ of\ supply\ of\ domestic\ equity\ with\ respect\ to\ rate\ of\ return$$

$$\alpha = domestic\ share\ of\ equity\ capital$$

$$w = domestic\ weight\ in\ determining\ cost\ of\ equity\ capital$$

Using this formula, our estimate that foreign investors have a weight as high as 79 per cent in determining share valuations and yet own only about one-third of the capital stock implies that the supply of funds is 7.5 times more elastic for foreign investors than for domestic investors.

The policy implications of softening the small open economy assumption in this way would be modest. If the supply of foreign equity is 7.5 times more elastic than the supply of domestic equity, then taxation of foreign investors through company tax will put much more of a brake on business investment than taxation of domestic investors through dividend tax. Hence, it would still be desirable to shift the

business tax mix towards lower taxation of company income and higher taxation of dividend income, even though dividend taxation will now have a small negative effect on business investment, rather than no effect as in the small open economy case.

If we move beyond the simple setting of Figures 1 and 2 to a more sophisticated economic analysis, the implications of relaxing the small open economy assumption may be different. For example, Turnovsky (2002) notes that relaxing the small open economy assumption in the Ramsey model changes the structure of the steady-state equilibrium.

3.7 Franking credit recycling

The foregoing analysis assumes that foreign investors are not able to obtain any value for the franking credits distributed to them, in keeping with the intention of the tax law. However, in practice, some foreign investors may be able to obtain some value for franking credits by employing strategies to sell their dividend rights to domestic investors who then utilise the franking credits. This is known as franking credit recycling. The significance of franking credit recycling depends on both the market value of franking credits and the prevalence of recycling. These two topics are considered in turn.

Under one recycling strategy, on the ex-dividend date foreign investors could sell their shareholdings on the cum-dividend market and buy them back on the regular market. While this strategy provides a way for foreign investors to maintain their shareholdings, the pay-off may be small. In section 3.2 it was shown that, over the last year, franking credits have only been valued at around 10 cents in the dollar on the cum-dividend market for very large companies.

More generally, if we make the stylised assumption that foreign investors are the marginal investors, then share trades will largely reflect the worthless nature of franking credits to them. Hence, foreign investors who recycle their franking credits are only likely to be able to obtain a low value for those credits.

The second topic is the prevalence of recycling. The potential level of recycling is constrained by the fact that it is only an option for foreign portfolio investors. Foreign direct investors, who account for

53 per cent of foreign equity investment in Australia (ABS, 2017), are not able to trade their dividend rights on the ASX.

More generally, if franking credit recycling were commonplace, its footprints should be visible in the ATO data for usage of franking credits. However, as shown in Table 4, the historical average for usage of franking credits is only 30 per cent. Even allowing for the fact that companies do not distribute all of their franking credits, this low usage rate suggests that most franking credits distributed to foreign investors are not utilised.

Thus, the available data suggests that most franking credits distributed to foreign investors are not recycled. Further, to the extent that they are recycled, the value obtained for them is low.

Contrary to this evidence, Swan (2018) argues that recycling of franking credits is commonplace and achieves full value. He appeals to the following recycling strategy.

> *Foreign traders would appear to recycle just sufficient imputation credits to Australian imputation-eligible investors to eradicate the Australian corporate tax liability on their marginal investment. They can do this very simply by selling their imputation-rich shares 47 days prior to the ex-dividend date twice a year and repurchasing at the lower price once the share is trading ex-dividend.*

Swan does not provide evidence that this recycling strategy is widely pursued in practice. For example, under Australian regulations, foreign investors holding more than 5% of the shares in an ASX-listed company would need to issue ASX announcements showing the changes in their holdings as they followed this strategy in the lead-up to the ex-dividend date, but no evidence of such a trail of announcements has been produced.

Despite this, Swan argues that the franking credit system, combined with recycling, allows both domestic and foreign investors to escape company tax. From this, he concludes that company tax does not act as a significant disincentive to business investment. This is at odds with the fact that only 30 per cent of franking credits generated by payment of company tax are utilised. The remaining 70 per cent of company tax continues to act as a disincentive to business investment.

4. Economic modelling approach

So far this paper has been concerned with analysing the economic factors that are important for determining policy towards the corporate tax rate and taxation of dividends. This section discusses to what extent and how those factors are taken into account in CGETAX, using other Australian Computable General Equilibrium (CGE) models as a reference point. In the final section CGETAX will be used to evaluate options for the corporate tax rate and dividend tax policy.

CGE models represent the interaction of the household, business, government and foreign sectors in economic markets. The household and business sectors aim to maximise their utility and profit respectively. Prices adjust in each market until supply is balanced with demand. Taxation, including of company and dividend income, can distort the price signals needed for the efficient functioning of markets, and CGE models provide a means of quantifying the resulting losses in consumer welfare.

Several studies have used Australian CGE models to assess the effects of changing the company tax rate. These studies include KPMG Econtech (2010), Murphy (2016a, 2018), Kouparitsas, Prihardini and Beames (2016), Dixon and Nassios (2016) and Tran and Wende (2017). In addition, the CGE study of McKeenhan and Zodrow (2017), which refers to a representative small open economy rather than specifically to Australia, provides a useful point of comparison. The main assumptions made by each model for the economic factors influencing corporate tax policy are compared in Table A2. This comparison helps explain why this study and four of the other studies provide a positive picture of the effects of a company tax cut while Dixon and Nassios (2016) provide a negative picture.

4.1 The Market for Business Capital in CGETAX and other CGE Models

Naturally, the optimal business tax policy is heavily influenced by the workings of the local market for business capital. This market was depicted in Figures 1 and 2, which were discussed in section 2.1. The three curves depict the foreign supply of capital, the domestic supply of capital and the demand for capital. The slopes of these curves are the subject of the first three rows of the model comparison table.

Regarding the foreign supply of capital, CGETAX and most of the other models assume that the marginal investor is foreign, as seen in the first row of Table A2. This means that the supply curve for foreign capital is horizontal, as depicted in Figures 1 and 2. The empirical analysis in section 3 suggests

this is a reasonable approximation, although it may be more precise to assume that the foreign supply curve is highly, rather than perfectly, elastic. Unusually, Dixon and Nassios (2016, 2018) adjust domestic saving to "ensure that the ratio of net foreign liabilities to GNI stabilizes over a seven-to-ten year time period", thus placing a subjective cap on the gain in foreign-supplied capital when a company tax cut is simulated.

For the demand for capital, the studies all assume that there is some scope for substitution between capital and labour, as seen in the second row of Table A2. Thus, as shown in Figures 1 and 2, the demand for capital rises as the required rate of return falls. In their international survey of parameters in CGE models, Gunning, Diamond and Zodrow (2008) find that the elasticity of factor substitution lies in the range of 0.4 to 1.0. CGETAX uses a midrange value around 0.8 while Dixon and Nassios (2016) use the bottom-of-the-range value of 0.4.

For the domestic supply of capital, CGETAX and Tran and Wende (2017) follow the modern, formal approach of modelling saving based on a household choice between present and future consumption. Under this approach, the sensitivity of saving decisions to rates of return depend on the elasticity of intertemporal substitution (EIS). Gunning, Diamond and Zodrow (2008) find that the EIS values used in CGE models typically range from 0.25 to 0.50. On the basis that Australia's system of compulsory superannuation is likely to make voluntary saving less important, CGETAX uses the bottom-of-the-range value of 0.25[21], as seen in the third row of Table A2, while Tran and Wende (2017) adopt a mid-range value of 0.4.

Putting aside the unusual treatment of domestic saving in Dixon and Nassios (2006), the three other studies simplify by holding the domestic supply of capital fixed, so that the domestic supply curve for capital appearing in Figures 1 and 2 is vertical. This means that they are unable to take into account the effect of dividend imputation on the domestic supply of capital that is depicted in Figure 2.

[21] In CGETAX, the rate of time preference for consumers is calibrated in the usual way for a Ramsey model of a small open economy. It is set to ensure that the equilibrium growth rate for consumption matches the equilibrium growth rate for output (Turnovsky, 2002).

4.2 Other Aspects of Business Tax Modelling in CGETAX and other CGE Models

Moving beyond the simple depiction of the market for business capital seen in Figures 1 and 2, Table A2 also covers several other factors that are important in formulating corporate tax policy. Profit shifting by MNCs was identified as one of those factors in section 2.2.

There has been much international research on the extent of profit shifting and its sensitivity a country's corporate tax rate. Dharmapala (2016) states that "the consensus of the recent literature is a semi-elasticity of reported income with respect to the tax rate differential across countries of (minus) 0.8". Similarly, after allowing for both profit shifting to tax havens and profit shifting through transfer pricing, de Mooij and Devereux (2011) estimate a semi-elasticity of (minus) 0.73. CGETAX uses this de Mooij and Devereux estimate.

This makes the judgment that the severity of the profit shifting problem for Australia is similar to the international norm. The Henry Tax Review (AFTSR, 2009) suggested that our franking system may discourage outward profit shifting by Australian-based MNCs as it would weaken their ability to distribute franking credits to their shareholders. While this may be true, Dharmapala (2014) points to the empirical finding that such outward profit shifting is not usually the main problem, because parent companies are generally reluctant to transfer income away from themselves, even in the absence of dividend imputation. Rather, the main forms of profit shifting are foreign-to-foreign shifting from high tax to low tax jurisdictions and inward shifting from high-tax foreign jurisdictions. Given the substantial level of foreign equity investment in Australia, we would be vulnerable to both of these forms of profit shifting by foreign-based MNCs. Overall, it seems reasonable to assume that the profit shifting problem in Australia is similar to the international norm.

Applying the de Mooij and Devereux semi-elasticity of (minus) 0.73 and their methodology to Australia, the proportion of the corporate tax base lost to profit shifting, *p*, is given by the following formula.

$$p = (0.62).(t - 5\%)$$

At the existing company tax rate of 30 per cent, this formula implies that 15 per cent of the company tax base is lost to profit shifting, as shown in the fourth row of Table A2. McZeehan and Zodrow (2017) adopt a slightly lower estimate of 13 per cent. However, this small difference is explained by the fact that their modelling refers to a representative small open economy that has a lower corporate tax rate than Australia. The CGETAX and McZeehan and Zodrow (2017) estimates are similar in a like-for-like comparison.

Returning to the CGETAX formula, the proportion of the tax base lost to profit shifting shrinks as the company tax rate is reduced. The proposed cut in the company tax rate from 30 to 25 per cent would reduce the tax base loss from 15 to 12 per cent. This is associated with significantly less wastage of national income on tax avoidance activities. Kouparitsas et al. (2016) make a more muted allowance for profit shifting. The other three studies, Dixon and Nassios (2016), KPMG Econtech (2010) and Tran and Wende (2017), do not take account of profit shifting and so in that respect will understate the consumer benefit from reducing the corporate tax rate.

A potential cost of reducing the corporate tax rate is that it may increase the incentive to avoid tax by owner-operators of incorporated small businesses receiving their labour income as profit/dividends, as discussed in section 2.5. McKeehan and Zodrow (2017) allow for this in their model of a representative small open economy and estimate that 7 per cent of the labour income base is shifted to the corporate tax base in this way. However, CGETAX and the other Australian studies do not take this form of tax avoidance into account, possibly because the Australian system of dividend imputation is designed to neutralise this tax avoidance problem.

As discussed in section 2.4, corporate tax applies to both the inefficient tax base of normal returns to capital as well as the efficient tax base of economic rents. Thus, a model should take the presence of economic rents into account so that it does not exaggerate the benefits of reducing the corporate tax rate. All of the studies do take economic rents into account, as can be seen from the sixth row of Table A2. In CGETAX economic rents account for 41 per cent of the corporate tax base, as detailed in Murphy (2018).

CGETAX is the only one of these models that takes into account that some economic rents arise from the exercise of oligopoly power, as seen in the seventh row of Table A2. In CGETAX oligopoly power exists in sectors including financial services and telecommunications where it generates economic rents through over-pricing. This oligopolistic over-pricing is exacerbated by most taxes, including company tax, making them more inefficient. The exception is an economic rents tax, which in principle taxes oligopoly rents perfectly efficiently. Because the other models do not take account of oligopoly over-pricing, but instead misattribute oligopoly rents to an unidentified fixed factor of production, they will tend to understate the benefits from reducing the company tax rate.

As discussed in section 2.3, the tax concession from dividend imputation is restricted to dividends paid from domestically-sourced income, so that the home country bias in the portfolios of Australians is more pronounced than would naturally be the case. As seen in the eighth row of Table A2, none of the studies covered in the table allow for this effect. Hence, none of the models, including CGETAX, will pick up the benefit when dividend imputation is removed of reduced home country bias. The evidence assessed in section 2.3 suggests that this effect is likely to be substantial.

In assessing any tax policy, including changes to corporate tax or dividend tax, it is important to measure the resulting gains or losses in living standards appropriately. Popular discussion of economic policies often focusses on GDP as a measure of living standards. However, tax models usually use consumer welfare[22], because it improves on GDP as a measure of living standards in four ways. First, consumer welfare takes into account that some income from domestic production goes to foreigners, and so does not add to the living standards of local residents. Second, consumer welfare values consumption smoothing over time through saving/dissaving. Third, consumer welfare values leisure time. Fourth, consumer welfare takes into account consumer preferences over the consumption mix.

The studies in Table A2 use consumer welfare to appropriately measure changes in living standards. The sole exception is Dixon and Nassios (2016) who use national income. Compared to using consumer welfare, this captures only the first of the four improvements.

[22] CGETAX measures the loss in consumer welfare from a tax increase using the equivalent variation, which is the maximum amount a consumer would be prepared to pay to stop the tax increase from occurring.

So far, this paper has considered business tax policy from a long-run or equilibrium perspective. Consistent with this, CGETAX and three of the other models abstract from the dynamics of the economy, as can be seen from the final row of Table A2. The remaining two studies, Dixon and Nassios (2016) and Tran and Wende (2017), incorporate dynamics.

CGETAX abstracts from dynamics on the basis that allowing for dynamics would not change the conclusions from long run modelling about the optimal goals for tax policy. For example, in section 5 we will see that the CGETAX modelling suggests that the optimal goal for the rate of Australian company tax is in the range of 15 to 20 per cent. Implicitly this rate balances the undesirability of taxing normal returns to capital with the desirability of taxing excess returns or rents. Would allowing for dynamics change this goal for the company tax rate? For Ramsey CGE models[23] such as CGETAX, this question has been answered in the optimal tax policy literature.

A cut in the company tax rate will encourage new investment in capital, adding to productivity, but it will also provide an improved return to existing or old capital, which will not add to productivity. Introducing dynamics allows this distinction between old and new capital to be made. However, the optimal tax literature shows that this does not change the optimal goal for the company tax rate in a Ramsey model.

In surveying that literature, Mankiw, Wienzierl and Yagan (2009) summarise the well-known studies by Chamley and Judd in the following terms. "In the short run, a positive capital tax may be desirable because it is a tax on old capital and, therefore, is not distortionary. In the long run, however, a zero tax on capital is optimal." While Chamley and Judd considered a closed economy, Correia (1996) shows that their result carries over to a model of a small open economy, such as CGETAX.

As discussed above, because CGETAX allows for economic rents, its optimal goal for capital tax is not zero but rather is 15 to 20 per cent. However, the principle from the optimal tax literature that introducing dynamics would not change this optimal goal continues to hold. However, because it is harmless to tax old capital, the targeted rate reduction should be gradually phased in, to reduce the

[23] Ramsey models combine a utility maximising representative consumer with an infinite time horizon with a neoclassical model of production.

benefit to old capital, rather than implemented in one step. Thus, introducing dynamics to CGETAX would provide guidance on the appropriate rate to phase in a new tax policy, but it would not change the insights from the long run modelling as to what that new policy should be.

4.3 Other Aspects of CGETAX

CGETAX is designed to model a wide range of tax reforms, not just reform of business tax. This involves representing the effects on economic behaviour of all of the more significant federal, state and local government taxes.

To support this, the model has fine detail for industries and factors of production. There are 278 industries, eight types of labour, nine types of capital and three types of economic rent (from labour, minerals and oligopolies). Similarly, the model allows for negative externalities from household consumption of alcohol, tobacco and gambling as well as from household and business use of fuel, to help account for the specific taxes on these products. This is consistent with the advice of Freebairn (2018) that CGE models used for tax analysis should embed such externalities.

The three main broad-based taxes of personal income tax, GST and company income tax are modelled in detail. For personal and superannuation income tax, this involves distinguishing between marginal and average tax rates, allowing for dividend imputation, allowing for the tax concessions on superannuation earnings and employer contributions, and allowing for the special tax treatment of housing. The modelling of GST involves distinguishing between products according to whether they are taxable, input-taxed or GST free. The modelling of company tax allows for tax depreciation at historic cost, investment allowances, profit shifting, debt deductibility and alternative business tax systems including CBIT, ACC and ACE.

Similarly, the other significant taxes and associated main behavioural responses are modelled. This includes payroll tax, with detailed modelling of the impact and behavioural effects of the small business exemption. It also includes individual commodity taxes such as the wine equalisation tax, excise and equivalent customs duty on petroleum products, beer, spirits and tobacco, state gambling taxes disaggregated by form of gambling, import duty, and insurance taxes disaggregated by form of insurance. The behavioural effects of the main property taxes, such as local government rates, land tax

and stamp duty on conveyances disaggregated to residential and commercial, are also modelled. Finally, mining royalties, while not formally a tax, are also modelled, as is the new major bank levy.

Previous tax reform studies using CGETAX include Murphy (2016a), Murphy (2016b), Murphy (2017) and Murphy (2018).

5. Changing company and dividend tax

Having considered the economic issues for corporate and dividend tax policy in sections 2 and 3, and explained how those issues are represented in CGETAX in section 4, this section uses CGETAX to model policy reforms.

As a point of reference, the modelling begins with the standard approach of evaluating the tax mix between the three major taxes, which are personal income tax, company income tax and GST. It then moves on to the main focus of this paper, namely varying the business tax mix to rely less on company tax and more on dividend taxation. The modelling then turns to identifying the optimal rate of company tax, by considering outcomes under tax rates of 30, 25, 20 and 15 per cent. In each of the three modelling exercises, consumer and economic outcomes are analysed.

5.1 Company tax in the broad tax mix

Table 5 presents the consumer and economic effects of raising an additional $1 billion for the annual government budget in four alternative ways. The four alternatives are higher personal income tax, higher company income tax, higher GST and a partial wind back of franking credits[24]. In each case the $1 billion that is raised is then returned to consumers in a lump sum transfer, as indicated in the first row of Table 5. With this return of the revenue, the tax changes have no income effect on consumers. Rather, the results reported in Table 5 show how each tax change affects consumer and economic outcomes by altering economic incentives and choices.

The second row of Table 5 shows the impact of each tax increase on annual consumer welfare. Consumer welfare is less in each case, even though the revenue raised is returned to consumers as a

[24] This involves individuals and superannuation funds only being able to claim a proportion of the franking credits that they receive.

lump sum transfer. This is because each tax increase distorts economic choices, resulting in economic outcomes that leave consumers worse off. However, some taxes do more economic harm than others.

According to the OECD (2010), "corporate taxes are the most harmful type of tax for economic growth, followed by personal income taxes and then consumption taxes". The basic economic reasoning for this ranking starts from the observation that personal income tax, as applied to labour income, acts as a disincentive to supply labour. This can be compared with the disincentive effects of the other two taxes.

When corporate tax is applied in a small open economy, the final incidence falls on labour, as explained in section 2.1. Hence, like personal income tax, corporate acts as a disincentive to supply labour. However, corporate income tax also acts as a disincentive to demand capital, as also explained in section 2.1 and seen in Figure 1. Thus, corporate income tax is more inefficient than personal income tax.

GST is a tax on consumption. To the extent that consumption is funded out of labour income, GST is similar to a labour income tax, and hence acts as a disincentive to supply labour. However, consumption is also partly funded out of economic rent, which is an efficient tax base. Hence, GST is less inefficient than personal income tax.

This basic economic reasoning is supported by the CGETAX results shown in the second row of Table 5. Raising an additional $1 billion in annual revenue, and then returning it to consumers as a lump sum transfer, has different effects on annual consumer welfare depending on the revenue raising method. Annual consumer welfare is lower by $1.32 billion under higher company income tax, $0.29 billion under higher personal income tax and $0.24 billion under higher GST.

Dividing the loss in consumer welfare by the initial budget gain of $1 billion gives the marginal excess burden (MEB) of each tax increase, as reported in the third row of Table 5. Because the initial budget gain was calibrated to be the same in each case, the MEBs of each tax follow the same pattern as the losses in consumer welfare. That is, the MEBs from increasing each tax are 132 per cent for company tax, 29 per cent for personal income tax[25] and 24 per cent for GST.

[25] The estimate of an MEB of 29 per cent for personal income tax refers to a tax increase that is not redistributive: an income levy calculated as a fixed percentage of income is added to tax liabilities. Redistributive changes in

The high MEB for company tax also reflects other inefficiencies that are taken into account in CGETAX beyond the disincentives to supply labour and demand capital. In a third effect, company tax becomes more inefficient in the presence of dividend imputation, as was seen in the comparison of Figure 2 with Figure 1. In particular, the imputation system erodes the effectiveness of company tax in raising revenue. In a fourth effect, a higher statutory company tax rate leads to further shifting of accounting profits offshore, eroding the effectiveness of corporate tax in raising revenue and diverting scarce economic resources to wasteful tax avoidance activity, as discussed in section 2.2. In a fifth effect, the preceding effects of corporate tax are partly offset by the fact that company tax applies not only to normal returns to capital, which are highly inefficient to tax, but also to location-specific economic rents, which in principle can be taxed perfectly efficiently, as discussed in section 2.4. All five effects are taken into account in CGETAX.

Consumer welfare is increased by reducing taxes with high MEBs and increasing taxes with low MEBs. To maximise consumer welfare, this tax mix switch would continue until the point is reached that MEBs are the same for each tax. In any case, consumer welfare can be increased by reducing reliance on company income tax, with its very high MEB, and increasing reliance on personal income tax or GST.

Such a move away from reliance on company tax would have economic effects beyond increasing consumer welfare. As explained above, all three taxes act as a disincentive to supply labour. Consequently, Table 5 shows a similar negative employment effect from raising the same $1 billion of additional revenue with any of the three taxes.

The big difference is in the effects of the three taxes on investment. The disincentive effect of company tax on capital demand leads to a loss in business investment of around 0.7 per cent, compared to a loss of less than 0.1 per cent from the other two taxes. The associated loss in the capital stock means the supply of real GDP is lower by 0.23 per cent for the increase in company tax, compared to a loss of only 0.05 per cent for the other two taxes.

---

the tax scale have higher MEBs because, by definition, they lift marginal tax rates, which reduce work incentives, relative to average tax rates, which lift revenue.

By taxing labour, all three taxes lead to a fall in the real after-tax wage. However, the fall is greater for an increase in company tax because it reduces labour productivity by reducing the capital stock. The theory and evidence on the link from the corporate tax rate to real wages is reviewed by the US Council of Economic Advisers (2017). They provide a useful, albeit partisan, assessment.

The final three rows of Table 5 provide some insight into the equity effects of the three taxes. Irrespective of whether one's main source of income is from labour, assets or a wage-linked government transfer such as the age pension, the greatest loss of real income occurs when company tax is increased. Taking equity considerations into account in this way reinforces the conclusion based on efficiency considerations that relying less on company tax is the top priority for tax reform.

5.2 Company tax vs dividend tax

The results in Table 5 suggest that from an efficiency perspective there is an even better option for funding a reduction in the company tax rate. Raising more revenue by reducing franking credits has the lowest MEB of only 13 per cent. This suggests that Australia should follow the lead of other countries by shifting the tax mix to rely less on company tax and more on dividend tax. For example, consider the case where $1bn in annual company tax revenue is replaced by $1bn in annual dividend tax revenue.

From the second row of Table 5, this $1bn company tax cut would provide consumers with a gross annual gain of $2.32bn. This consists of the direct value of the company tax cut of $1bn plus the $1.32bn gain in consumer welfare from improved economic efficiency. This $1bn annual cost to the budget needs to be financed. If it is financed by winding back dividend imputation, there is the direct cost from lower franking credits of $1bn plus a $0.13bn annual loss in consumer welfare from reduced economic efficiency. Therefore, consumers make a net gain of $1.19bn. This net gain to consumers of $1.19bn is achieved from a tax mix switch of only $1bn that has no net cost to the budget. Put another way, this relatively large gain reflects the large gap between the very high MEB for company tax of 132 per cent and the low MEB for the reducing franking credits of only 13 per cent.

Why is the MEB for raising revenue by reducing franking credits so low? Reducing franking credits has the effect of increasing taxes on asset income. Such taxes reduce economic efficiency because they

inhibit consumers from using saving to help smooth their living standards in the face of often large fluctuations in income over their life cycle. Indeed, for this reason, CGETAX implies that asset income should be taxed at a lower rate than labour income, despite the work disincentive effect from taxing labour income. However, the existing Australian tax system overdoes this. The existing tax treatments of housing, superannuation and dividends combine to mean that asset income is taxed at a very low rate. It is this very low initial rate that explains the low MEB for raising the taxation of asset income by reducing franking credits.

The economic costs of increasing dividend taxation by reducing franking credits are limited, as can be seen from the final column of Table 5. In a small open economy franking credits have no impact on investment, as was seen in Figure 2. Their only behavioural impact is to encourage saving in the form of equities that pay franked dividends. The saving disincentive effect of reducing franking credits is responsible for the small loss in consumer welfare of $0.13 billion.

Turning to equity, the incidence of reducing franking credits falls entirely on asset holders. Thus, the $1 billion tax increase in the form of reduced franking credits reduces real after-tax asset incomes by 0.33 per cent, which is a bigger loss in asset income than for any of the other three tax increases of the same size, as seen in Table 5. Consistent with this, a reduction in company tax financed by higher taxation of dividends would leave asset holders worse off, as their 0.33 per cent loss due to the dividend tax increase is only partly offset by their 0.13 per cent gain from the company tax cut.

This result that asset holders are worse off when a company tax cut is funded by higher dividend taxation is despite the fact that this funding method produces the largest overall gain in consumer welfare. However, this gain is captured by labour income earners and recipients of government benefits rather than by asset holders.

Moving beyond the modelling, there are better options for reforming dividend taxation than the modelled option of reducing franking credits. They involve completely removing dividend imputation and replacing it with an alternative concessional tax treatment for dividends.

As explained in section 2.3, dividend imputation exacerbates home country bias in portfolios because it is only available for dividends paid from locally-sourced income. A better system would provide a uniform tax concession for dividends, irrespective of whether dividends are paid from locally-sourced or foreign sourced income, in line with practice in the USA and UK. This uniform dividend tax system would reduce home country bias in portfolios, removing a tax-induced risk factor to national income.

Unfortunately, this benefit from a uniform dividend tax system of reducing home country bias in portfolios is not currently captured in CGETAX. This is because CGETAX, like the other models covered in Table A2, does not model portfolio substitution, as discussed in section 4.2. Thus, in practice full dividend tax reform would deliver even greater benefits than are suggested by the CGETAX modelling.

In considering a uniform dividend tax system, the two simplest alternatives are the partial inclusion system and the flat rate system, both of which have applied in Germany at different times. Under the partial inclusion system, only a fixed percentage of dividend income is included in calculating total taxable income. When this system was applied in Germany, the percentage was set at 50 per cent. Under the flat rate system, dividend income is taxed separately at a fixed rate. Under the current German system, that flat rate is 26.375%[26]. The partial inclusion system is a more likely candidate for Australia because, like dividend imputation, it maintains a progressive rate scale and so may be considered more equitable. It is also consistent with the way capital gains are taxed.

As discussed in section 2.5, the inclusion rate (or equivalently the discount rate) could be set to achieve tax neutrality if a small business owner disguises labour income as dividend income.

For example, if it is assumed that the company tax rate is reduced to 25 per cent, the implied tax neutral rate of dividend inclusion would vary with the top marginal rate as follows. Under a top marginal rate of 45.5 per cent, the dividend inclusion rate would be 60 per cent, in line with the Henry Review proposal (Australia's Future Tax System Review, 2009) for a 40 per cent discount rate for asset income.

[26] Taxpayers can opt out of the flat rate system and instead include their dividends in their taxable income, which can provide a lower tax outcome for taxpayers on lower incomes.

Under a top marginal rate of 40 per cent, the dividend inclusion rate would be 50 per cent, in line with the existing CGT inclusion rate.

The replacement of dividend imputation with a dividend inclusion rate that is neutral for those on the top marginal rate would also bring Australia broadly into line with OECD practice on taxation of dividends. It would keep unchanged dividend tax for those on the top marginal rate, which is already in line with OECD levels. At the same time, it would eliminate the substantial imputation subsidies for dividend income received in the low-tax environment of superannuation.

The removal of dividend imputation would remove the rationale for not applying withholding tax to franked dividends paid to foreign investors. Currently, dividend withholding tax is applied to unfranked dividends, usually at a rate of 15 per cent, but not to franked dividends. Under a reformed system this withholding tax rate would apply to all dividends. This would raise additional revenue. At the same time it would not discourage foreign investment in Australia because most foreign investors are able to claim a tax credit for withholding tax in their home countries.

There are also other options to assist in funding a company tax cut from within the business tax envelope. For example, to limit the excessive reliance on debt associated with the unlimited deductibility of interest expenses, a cap could be placed on interest deductions. For example, Germany caps net interest deductions at 30 per cent of EBITDA. The USA has introduced the same cap under section 3301 of the 2017 Tax Cuts and Jobs Act or TCJA[27] (US House of Representatives Committee on Ways and Means, 2017). Ingles and Stewart (2018) discuss the more sweeping proposal of a Comprehensive Business Income Tax (CBIT) that would completely abolish deductibility of net interest expenses. On the other hand, Sørensen (2017) finds that an interest deductibility cap is superior to a CBIT.

[27] To conform with US Senate procedure, the Tax Cuts and Jobs Act was formally renamed at the last moment to be the "Act to provide for reconciliation pursuant to titles II and V of the concurrent resolution on the budget for fiscal year 2018". Unsurprisingly, most people continue to refer to the act by its original name, a practice which is also followed in this paper.

5.3 Choosing a company tax rate

The modelling results discussed so far show that company tax is highly inefficient at the existing large company rate of 30 per cent, with a MEB of 132 per cent. This raises the question of how far the company tax rate should be cut.

Like other taxes, corporate income tax imposes lower marginal costs on the economy as its rate is reduced. Modelling of reducing the rate in five percentage point steps shows that the MEB declines with each rate cut. As seen in Table 6, this is because the gain in consumer welfare declines with each rate cut, while the budget cost increases.

Overall, the results in Table 6 indicate that there is a strong case for reducing the rate to somewhere between 15 and 20 per cent. The MEB from having a corporate tax rate of 30 per cent rather than 25 per cent is an extremely high 104 per cent. The MEB from having a corporate tax rate of 25 per cent rather than 20 per cent is still very high at 68 per cent. There is some case for reducing the corporate rate further, from 20 to 15 per cent. This is because the MEB from having a corporate rate of 20 per cent rather than 15 per cent is still a somewhat high 45 per cent.

From these results, the optimal Australian company tax rate of 15 to 20 per cent is clearly well below the existing large company rate of 30 per cent. At this lower level, company tax is justified as a way of crude method of taxing economic rents.

5.4 An International Comparison

It seems policy makers in the countries on which we rely for 46 per cent of our foreign equity investment, the USA and the UK, have reached similar conclusions. The current UK rate is 19 per cent and the UK Government proposes to reduce this to 17 per cent from 1 April 2020. This is consistent with our modelling of an optimal rate for Australia of 15 to 20 per cent.

Under the US 2017 Tax Cuts and Jobs Act, there are two major forms of corporate tax cut. First, as noted in the introduction, after allowing for both US Federal and state corporate taxes, the total corporate tax rate has been reduced to around 26 per cent. Second, 100 per cent immediate expensing

is now allowed for an initial 5-year period for investment in equipment. These two measures taken together make the US tax environment for investment broadly competitive with the UK[28].

Either the UK or UK approaches provide a suitable corporate tax model for Australia. With dividend tax reform, policy settings of this nature may become affordable and achievable sooner rather than later.

[28] The significance of the US tax reforms can be appreciated by the estimate from Barro and Furman (2018) that, if the measures are made permanent, they will add 3.1 per cent to US GDP.

REFERENCES

Ainsworth, A. (2016), "Dividend Imputation: the International Experience", *JASSA: The Finsia Journal of Applied Finance*, 2016:1, 58-63.

Ainsworth A., Partington G. and Warren G. (2016), "The Impact of Dividend Imputation on Share Prices, the Cost of Capital and Corporate Behaviour", *JASSA: The Finsia Journal of Applied Finance*, 2016:1, 41-49.

ALP (2018a), "Australian Investment Guarantee".

ALP (2018b), "Ending cash refunds for excess imputation".

Auerbach A. and Devereux M. (2017), "The Case for a Border-Adjusted Tax", *The New York Times*, 6 March 2017.

Auerbach A., Devereux M., Keen M. and Vella J. (2017), "Destination-Based Cash Flow Taxation", Said Business School Research Papers, 2017-9.

Australian Bureau of Statistics (2017), "International Investment Position, Australia: Supplementary Statistics, 2016", Cat 5352.0, Table 2.

Australia's Future Tax System Review (2009), Report to the Treasurer, Commonwealth of Australia.

Australian Taxation Office (2016), "2014-15 Report of Entity Information".

Australian Taxation Office (2017), "Taxation Statistics 2014-15".

Barro R. and Furman J. (2018), "The macroeconomic effects of the 2017 tax reform", *Brookings Papers on Economic Activity*, BPEA Conference Drafts, 8-9 March 2018.

Boadway, R. and N. Bruce, 1992, 'Problems with Integrating Corporate and Personal Taxes in an Open Economy,' *Journal of Public Economics*, 48, 39-66.

Bond, S.; Devereux, M. and Klemm, A. (2007), "The Effects of Dividend Taxes on Equity Prices: A Re-examination of the 1997 U.K. Tax Reform", IMF Working Paper, WP/07/204, International Monetary Fund.

Bruce N. (1992), "A Note on the Taxation of International Capital Flows", *The Economic Record*, 68:202, 217-221.

Correia I. (1996), "Dynamic optimal taxation in small open economies", *Journal of Economic Dynamics and Control*, 20, 691-708.

Council of Economic Advisers (2017), "Corporate Tax Reform and Wages: Theory and Evidence", October 2017.

Credit Suisse (2017), "Global Wealth Report 2017", November.

Dharmapala D. (2014), "What Do We Know about Base Erosion and Profit Shifting? A Review of the Empirical Literature", Fiscal Studies, 35:4, 421–448.

Dharmapala D. (2016), "The economics of corporate and business tax reform", Oxford University Centre for Business Taxation Working Paper, 16/04.

Dixon J. and Nassios J. (2016), "Modelling the Impacts of a Cut to Company Tax in Australia", Centre of Policy Studies Working Paper, No. G-260, Victoria University.

Dixon J. and Nassios J. (2018), "The effectiveness of investment stimulus policies in Australia", Victoria University.

Freebairn J. (2016), "Design alternatives for an Australian allowance for corporate equity", *Australian Tax Forum*, 33, 555-575.

Freebairn J. (2018), "Opportunities and Challenges for CGE Models in Analysing Taxation", *Economic Papers*, 37:1, 17-29.

Fuest C. and Huber B. (2000), "The Optimal Taxation of Dividends in a Small Open Economy", CESifo Working Paper, No. 348.

Gordon R. (1986), "Taxation of Investment and Savings in a World Economy", *The American Economic Review*, 76:5, 1086-1102.

Gruen N. (2006), "Tax Cuts to Compete: The influence of corporate taxation on Australia's economic growth", CEDA Information Paper 85, 27 September.

Gunning T., Diamond J. and Zodrow G. (2008), "Selecting Parameter Values for General Equilibrium Model Simulations", Proceedings of the One Hundredth Annual Conference on Taxation, National Tax Association, Washington, DC, 43–49.

Ingles D. and Stewart M. (2018), "Australia's Company Tax: Options for Fiscally Sustainable Reform", *Australian Tax Forum,* 33:1, 101-139.

Kouparitsas M., Prihardini D. and Beames A. (2016), "Analysis of the Long-term Effects of a Company Tax Cut", Treasury Working Paper, 2016-02.

KPMG Econtech (2010), "CGE Analysis of the Current Australian Tax System", report to the Australian Treasury.

Lajbcygier P. and Wheatley, S. (2012), "Imputation Credits and Equity Returns", *The Economic Record*, 88:283, 476–494.

Mankiw N., Weinzierl M. and Yagan D. (2009), "Optimal Taxation in Theory and Practice", *The Journal of Economic Perspectives,* 23:4, 147-174.

McKeehan M. and Zodrow G. (2017), "Balancing act: weighing the factors affecting the taxation of capital income in a small open economy", *International Tax and Public Finance,* 24, 1–35.

Mishra A. and Ratti R. (2013), "Home bias and cross border taxation", *Journal of International Money and Finance,* 32, 169–193.

Mooij R. de and Devereux M. (2011), "An applied analysis of ACE and CBIT reforms in the EU", *International Tax and Public Finance,* 18, 93-120.

Murphy C. (2016a), "The effects on consumer welfare of a corporate tax cut", ANU Working Papers in Trade and Development, 2016/10.

Murphy C. (2016b), "Efficiency of the tax system: a marginal excess burden analysis", ANU Tax and Transfer Policy Institute Working Paper, 4/2016.

Murphy, C. (2017), "GST and how to tax Australian banking", *Australian GST Journal,* 17, 84-105.

Murphy, C. (2018), "Modelling Australian corporate tax reforms", *Australian Tax Forum,* 33:1, 5-49.

OECD (2010), "Tax Policy Reform and Economic Growth", OECD Tax Policy Studies, No. 20.

Siau K., Sault S. and Warren G. (2015), "Are imputation credits capitalised into stock prices?", *Accounting and Finance*, 55, 241–277.

Sørensen P. (2017), "Taxation and the optimal constraint on corporate debt finance: why a comprehensive business income tax is suboptimal", *International Tax and Public Finance*, 24, 731–753.

Swan P. (2018), "Investment, the Corporate Tax Rate, and the Pricing of Franking Credits", Banking and Finance, UNSW Business School Sydney, drafts of 5 March and 11 March.

Tax Foundation (2015), "The Tax Burden on Personal Dividend Income across the OECD", June 2015.

Tran C. and Wende S. (2017), "On the Excess Burden of Taxation in an Overlapping Generations Model", ANU Tax and Transfer Policy Institute Working Paper, 7/2017.

Turnovsky S. (2002), "Knife-edge Conditions and the Macrodynamics of Small Open Economies", *Macroeconomic Dynamics*, 6, 307–335.

US House of Representatives Committee on Ways and Means (2017), *Tax Cuts and Jobs Act: Section-by-Section Summary*, December 2017.

Vo D., Gellard B. and Mero S. (2013), "Estimating the Market Value of Franking Credits: Empirical Evidence from Australia", Economic Regulation Authority WA, April.

TABLES

Table 1. *The Cum-dividend Market for the Top 10 Company Tax Payers*

ASX Code	dividend	gross dividend	market value	domestic weight	CD price ($)	price ($)
CBA	230.00	328.57	223.00	-7%	82.07	79.84
CBA	200.00	285.71	208.00	9%	76.06	73.98
WBC	94.00	134.29	95.00	2%	32.11	31.16
WBC	94.00	134.29	91.00	-7%	33.36	32.45
BHP	52.95	75.64	54.00	5%	27.87	27.33
BHP	70.59	100.84	83.00	41%	29.65	28.82
ANZ	80.00	114.29	80.00	0%	30.75	29.95
ANZ	80.00	114.29	77.00	-9%	30.28	29.51
NAB	99.00	141.43	102.00	7%	32.52	31.50
NAB	99.00	141.43	104.00	12%	31.62	30.58
WES	120.00	171.43	130.00	19%	42.65	41.35
WES	103.00	147.14	98.00	-11%	42.33	41.35
TLS	15.50	22.14	17.00	23%	3.77	3.60
TLS	11.00	15.71	12.00	21%	3.47	3.35
WOW	50.00	71.43	50.00	0%	25.80	25.30
WOW	43.00	61.43	48.00	27%	27.57	27.09
RIO	137.72	196.74	130.00	-13%	66.31	65.01
RIO	228.53	326.47	237.00	9%	80.22	77.85
AMP	14.50	20.09	16.00	27%	5.12	4.96
AMP	14.50	20.09	17.00	45%	5.40	5.23
average				10%		

Sources: the ASX, Bloomberg and Yahoo Finance web-sites

Note: market value is calculated as the closing CD price less the closing standard price on the ex-dividend date

Table 2. *Studies of investor returns and value of imputation credits*

Study	Lajbcygier and Wheatley (2012)	Siau, Sault and Warren (2015)	Swan (2018)
ASX coverage	top 500	top 300	all (average of 1,650)
time frequency	monthly	annual	monthly
time period	July 1983-Dec 2009	1996-97 to 2010-11	July 2001-Dec 2013
study focus	investor returns	returns & share prices	investor returns
type of investor returns	actual	analyst expectations	actual
finding for value of imputation credits	generally negative	zero	31c or 61c in the dollar

Table 3. *Estimate of Domestic Investor Weight*

type of company	number of companies	company tax weight	domestic investor weight
1. top 10 public	10	29%	10%
2. other very large public	456	25%	15%
3. medium & large public	1,118	4%	30%
4. medium & larger private	11,499	18%	20%
5. smaller private	329,713	22%	40%
6. other	35,873	2%	20%
weighted average	378,669		21%

Sources: ATO (2016, 2017) for company data

Table 4. Usage of franking credits *($ billion)*

	APRA funds	SMS funds	Individuals	Trusts	Total franking credits	CIT revenue	Credits/CIT revenue
2005–06	2.8	1.4	6.6	2.2	12.9	48.7	27%
2006–07	3.3	1.8	8.1	2.9	16.1	58.3	28%
2007–08	2.8	1.9	8.5	3.2	16.4	64.7	25%
2008–09	2.7	2.0	8.7	3.4	16.8	60.6	28%
2009–10	2.4	1.9	7.9	3.5	15.7	53.1	30%
2010–11	4.2	3.1	8.9	4.0	20.1	57.3	35%
2011–12	3.3	2.5	8.8	4.2	18.7	66.5	28%
2012–13	3.6	2.7	9.2	4.5	20.0	68.1	29%
2013–14	4.0	3.1	10.1	5.0	22.1	69.1	32%
2014–15	4.4	3.7	9.7	4.9	22.7	65.5	35%
2015–16	4.5	3.5	9.6	5.2	22.8	63.5	36%
average							30%

Table 5. *Comparing economic impacts on raising an extra $1bn using different taxes*

scenario:	PIT	CIT	GST	less franking
Budget gain / transfer (2016/17, $bn)	1.00	1.00	1.00	1.00
Consumer welfare (2016/17, $bn)	-0.29	-1.32	-0.24	-0.13
Marginal Excess Burden (%)	29%	132%	24%	13%
Household Consumption (%)	-0.06%	-0.18%	-0.05%	0.00%
GDP (%)	-0.05%	-0.23%	-0.05%	0.00%
Business investment (%)	-0.05%	-0.67%	-0.07%	0.00%
Employment (%)	-0.06%	-0.05%	-0.04%	0.00%
Real after-tax wage (%)	-0.15%	-0.24%	-0.13%	0.00%
Real after-tax labour income (%)	-0.21%	-0.29%	-0.17%	0.00%
Real after-tax asset income (%)	-0.08%	-0.13%	-0.09%	-0.33%
Real social transfer income (%)	0.02%	-0.24%	-0.13%	0.00%

Table 6. *The Economic Impacts of Reducing the Company Tax Rate*

bus tax scenario:	30 to 25	25 to 20	20 to 15
Budget gain / transfer (2016/17, $bn)	-4.7	-5.7	-6.5
Consumer welfare (2016/17, $bn)	4.9	3.9	2.9
Marginal Excess Burden (%)	104%	68%	45%
Household Consumption (%)	0.71%	0.59%	0.48%
GDP (%)	0.93%	0.86%	0.80%
Business investment (%)	2.74%	2.57%	2.41%
Employment (%)	0.20%	0.20%	0.20%
Real after-tax wage (%)	0.96%	0.88%	0.80%
Real after-tax labour income (%)	1.17%	1.08%	1.01%
Real after-tax asset income (%)	0.65%	0.78%	0.88%
Real social transfer income (%)	0.96%	0.88%	0.80%

Appendix A

Table A1. *Alternative equations for share price percentage movements on dividend drop-off days*

specification:	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
estimation period	2008-2018	2008-2014	2015-2018	2008-2018	2008-2014	2015-2018	2008-2018	2008-2014	2015-2018
estimation method	OLS	OLS	OLS	LAD	LAD	LAD	M	M	M
coefficients:									
constant	0.0007	0.0005	0.0021	0.0012	0.0006	0.0035	0.0014	0.0013	0.0019
market	0.820	0.865	0.708	0.770	0.829	0.676	0.776	0.820	0.700
div	-0.890	-0.852	-1.056	-0.942	-0.889	-1.179	-0.972	-0.927	-1.101
frcr	-0.315	-0.319	-0.187	-0.337	-0.354	-0.129	-0.288	-0.309	-0.154
std errors:									
constant	0.0007	0.0010	0.0011	0.0008	0.0012	0.0011	0.0006	0.0009	0.0010
market	0.034	0.041	0.064	0.040	0.050	0.057	0.030	0.037	0.053
div	0.039	0.046	0.079	0.043	0.053	0.095	0.034	0.042	0.066
frcr	0.082	0.099	0.156	0.084	0.102	0.185	0.072	0.089	0.131
equation statistics:									
N	2586	1582	1004	2586	1582	1004	2586	1582	1004
R-squared	0.402	0.425	0.358	0.247	0.252	0.244	0.320	0.332	0.312
std error	0.0180	0.0186	0.0169	0.0180	0.0186	0.0169	0.0180	0.0186	0.0169
symmetry (z-statistic)	0.47	0.33	0.73						
kurtosis (z-statistic)	5.42	4.89	6.69						

Table A2. *Corporate Tax Modelling Assumptions by Study*

`	KPMG Econtech (2010)	Kouparitsas et al. (2016)	Murphy (2016a, 2018)	Dixon & Nassios (2016)	Tran & Wende (2017)	McKeehan & Zodrow (2017)
marginal investor	foreign	foreign	foreign	unclear	foreign	foreign
elasticity of substitution between capital and labour	0.75	0.8	0.8	0.4	1.0	1.0
elasticity of intertemporal substitution	nil	nil	0.25	unclear	0.40	nil
corporate tax base lost to profit shifting	nil	10%	15%	nil	nil	13%
labour income tax base lost to corporate tax base	nil	nil	nil	nil	nil	7%
fixed factor rents	yes	yes	yes	yes	yes	yes
oligopoly rents	nil	nil	yes	nil	nil	nil
portfolio substitution (modelling home country bias)	nil	nil	nil	unclear	nil	nil
measure of economic gains/losses	welfare	welfare	welfare	GNI	welfare	welfare
dynamics	nil	nil	nil	yes	yes	nil

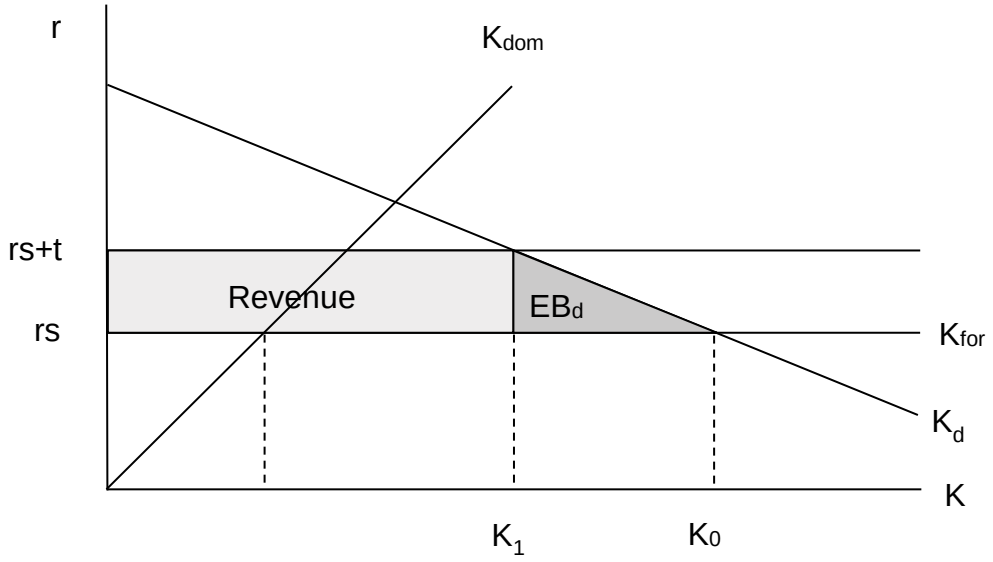

Figure 1. *Company tax, no dividend imputation (simplified)*

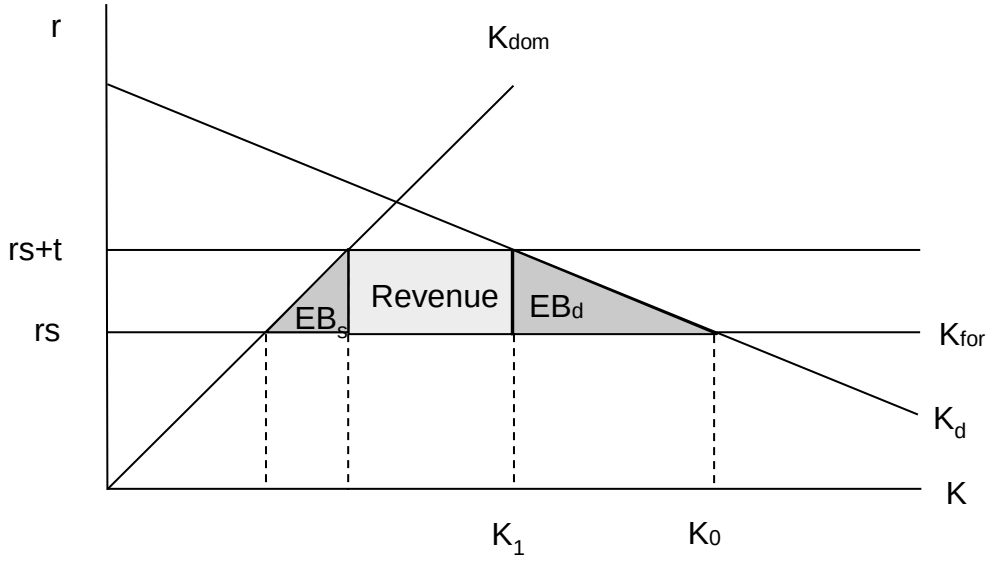

Figure 2. *Company tax with dividend imputation (simplified)*