

## Research Working Paper

---

# Do Franking Credits Matter?

## Exploring the Financial Implications of Dividend Imputation

Dr Andrew Ainsworth  
University of Sydney

Assoc. Prof. Graham Partington  
University of Sydney

Dr Geoff Warren  
Centre for International Finance and Regulation

**WORKING PAPER NO. 058/2015 / PROJECT NO. F004**

**June 2015**

*This research was jointly funded by the Centre for International Finance and Regulation and the University of Sydney under CIFR Project F004. The Centre for International Finance and Regulation is funded by the Commonwealth and NSW Governments, and supported by other Consortium members.*

### AUSTRALIAN UNIVERSITY PARTNERS



**UNSW**  
AUSTRALIA



**MACQUARIE**  
University  
SYDNEY AUSTRALIA



**THE UNIVERSITY OF**  
**SYDNEY**



**UTS**  
UNIVERSITY OF TECHNOLOGY, SYDNEY



**Australian**  
National  
University



### GOVERNMENT PARTNERS



**Australian**  
Government



**NSW** | Trade &  
Investment

### RESEARCH CENTRE PARTNERS



**CMC CRC**  
ASSURING MARKET QUALITY



**sirca**

### INDUSTRY PARTNERS



**Commonwealth**  
Bank



**KPMG**  
cutting through complexity



**KING & WOOD**  
**MALLESONS**



**MACQUARIE**

# Do Franking Credits Matter?

## Exploring the Financial Implications of Dividend Imputation

May 2015

Dr Andrew Ainsworth  
University of Sydney

Assoc. Prof. Graham Partington  
University of Sydney

Dr Geoff Warren  
Centre for International Finance and Regulation

### Synopsis

We examine the implications of the imputation system for stock prices and returns, cost of capital, project evaluation, capital structure, payout policy and investor portfolios. We also discuss potential impacts if the imputation system was dismantled or adjusted, perhaps in conjunction with a reduction in the corporate tax rate. A key theme is that the financial effects of imputation are often contentious. Most notably, the impact of imputation credits on share prices and cost of capital is subject to much debate: the notion that imputation is not priced is an extreme position, and an unreliable basis for policy formulation. More attention should be afforded to how imputation influences the behaviour of investors and companies. In this respect, the incentive that imputation provides for increasing dividend payouts is one of its clearest effects; and a key benefit through enhancing discipline in the use of capital. The effects of any removal of imputation are likely to be felt most strongly among smaller, domestic companies.

*All rights reserved. Working papers are in draft form and are distributed for purposes of comment and discussion only and may not be reproduced without permission of the copyright holder. The contents do not represent the official views or policies of either CIFR or any of its Consortium members, or of the participating universities. Information may be incomplete and should not be relied upon without seeking prior professional advice. The authors, their employers and the CIFR Consortium members exclude all liability arising directly or indirectly from use or reliance on the information contained in this publication.*

Acknowledgements: We thank David Gallagher and Tim Gapes for their useful comments.

Copyright © 2015 All rights reserved.

## TABLE OF CONTENTS

<i>Section</i>	<i>Page</i>
<b>1. Executive Summary</b>	<b>3</b>
<b>2. Background</b>	<b>4</b>
2.1 Historical Context	4
2.2 The Tax Discussion Paper (TDP)	6
2.3 Scope of Potential Changes to the Imputation System	8
<b>3. Theory – Imputation, Share Prices and the Cost of Capital</b>	<b>8</b>
3.1 Investor Taxes and Required Returns	9
3.2 Equilibrium When Tax Status Varies	12
3.3 What Tax Effects Are Taken Into Account?	15
<b>4. Security Pricing: Empirical Evidence</b>	<b>16</b>
4.1 Various Methods, Mixed Results	16
4.2 Methodological Issues	19
4.3 Evidence on Whether Investors Take Tax Into Account	20
4.4 What If Imputation Was Removed?	23
<b>5. Cost of Capital and Project Evaluation in Practice</b>	<b>26</b>
5.1 Evidence from the Corporate World	26
5.2 Regulatory Practice	27
5.3 What If Imputation Was Removed?	27
<b>6. Capital Structure</b>	<b>28</b>
6.1 Theory	28
6.2 Evidence	29
6.3 What If Imputation Was Removed?	31
<b>7. Payout Policy</b>	<b>31</b>
7.1 Theory	31
7.2 Evidence	33
7.3 What If Imputation Was Removed?	34
<b>8. Investor Portfolios</b>	<b>35</b>
8.1 Clienteles	35
8.2 Portfolios	35
8.3 What If Imputation Was Removed?	36
<b>9. Conclusion</b>	<b>37</b>
<b>References</b>	<b>38</b>

## 1. Executive Summary

Questions have been raised over the efficacy of the dividend imputation system, including by the Financial System Inquiry in November 2014 and the Tax Discussion Paper released on 30 March, 2015. We aim to contribute to the policy debate by examining the financial implications of the imputation system for markets, companies and investors. We address the impact of dividend imputation for stock prices and returns, cost of capital, project evaluation, capital structure, payout policy and investor portfolios. We also discuss potential impacts if the imputation system was dismantled or adjusted, perhaps in conjunction with a reduction in the corporate tax rate. This report draws on the literature and available evidence to identify the issues, and offer some novel perspectives.

### *Key Findings*

1. ***The effects of imputation are debatable both in theory and practice along most dimensions.*** The implications of imputation for stock prices and returns, cost of capital, capital structure and investor portfolios are all unclear. The notable exception is payout policy, where higher payout ratios have clearly been encouraged by the desire to distribute imputation credits.
2. ***Whether imputation is priced into the market is a central issue. Unfortunately, both theory and evidence provide very mixed indications, and there is no consensus.*** The effects of imputation can be seen in share price movements around dividend events, but are not readily apparent in returns or price levels. Against this mixed evidence, the Tax Discussion Paper stance that the cost of capital is set in international markets stands as an extreme position. Allowance should be made for the possibility that imputation might be priced partially, or even fully, in some situations.
3. ***One area where imputation probably matters is small, domestic companies.*** It is the smaller, domestic segment where it is more likely that local investors who value imputation credits may determine prices, as well as being chiefly responsible for providing funding. Any adverse impact from removing imputation may well be concentrated in this (economically significant) segment.
4. ***How imputation influences behaviour is important.*** Focusing on how imputation impacts on precise computations like cost of capital estimates is arguably less important than understanding the behaviours that imputation encourages, and how these might change if the imputation system was adjusted. Investors and company management often do not formally build the value of imputation into share price valuations, cost of capital estimates, or evaluations of investment projects. Nevertheless, these players may still acknowledge that imputation credits are valuable to many shareholders, and behave accordingly. Imputation can thus have an important influence on some decisions, even though it may not be explicitly incorporated into any supportive analysis.
5. ***The relation between imputation and payout policy deserves attention.*** The contribution of the imputation system to lifting payout ratios has arguably been one of its key effects and main benefits. By encouraging greater payouts, and thus requiring companies to justify their case when seeking additional funding, the imputation system has probably contributed to more disciplined use of capital. From this perspective, dismantling the imputation system could have detrimental effects for both shareholders and the Australian economy through less efficient deployment of capital.
6. ***Imputation may not have much impact on corporate capital structure or investment decisions.*** The link between imputation and both capital structure and project evaluation is tenuous. The case is stronger for a relation with capital structure, given that imputation increases the net return available to many shareholders. However, linking imputation to capital structure requires companies to be concerned with personal tax effects when making funding decisions; which are

one of many potential influences on capital structure identified in the literature. When estimating cost of capital and evaluating projects, the evidence suggests that few companies take imputation into account. Rather, corporate investment decisions appear primarily based on more subjective considerations, with financial analysis providing a supportive role.

7. ***Imputation is influential in regulatory decisions.*** Regulation of utilities is one area where the value of imputation is explicitly built into the computations, and has real effects in terms of output prices. The impact of changes in imputation on utility prices should be given specific consideration in contemplating any policy changes.
8. ***The influence of imputation on investor portfolios is unclear; but any resulting domestic bias should not be a major policy concern.*** Home bias is observed everywhere around the world, and has many potential explanations. The degree of home bias among Australian investors does not seem untoward, except perhaps in the Self-Managed Superannuation Fund sector. Further, just because a portfolio fails to reflect the available asset universe does not necessarily mean that it is exposed to significant and unwarranted non-diversifiable risk: the bulk of diversification opportunities can be secured with a just a few assets. We see no significant danger to the Australian economy or financial system from having a bias towards Australian equities paying high fully-franked dividends. In any case, it is doubtful that this bias could be substantially addressed through changes to the imputation system.
9. ***The potential effects from removing or adjusting the imputation system are conditional on what else happens.*** Many of the potential effects from changing the imputation system depend on what other tax changes occur. Most relevant is any concurrent reduction in the corporate tax rate, which might provide a full or partial offset in some areas. Whether the corporate tax rate is changed could be particularly important for the tenor of any share price reaction, and any encouragement to change capital structure. A major exception is payout policy, where reducing the availability of imputation credits would dull the incentive to distribute earnings regardless. We note that the impact on investment from a reduced corporate tax rate may be diluted to the extent that tax effects and cost of capital are second-order influences on investment decisions.

This paper proceeds as follows. Section 2 provides background on dividend imputation and the related policy debate. Sections 3 and 4 examine the theory and evidence on how imputation manifests in stock prices, expected returns, and thus cost of capital. Section 5 describes how imputation reflects in cost of capital estimates and project evaluation in practice. Section 6 considers the link between imputation and capital structure; while Section 7 addresses payout policy. Section 8 discusses how imputation impacts on investor portfolios, including any notable clientele effects. Section 9 concludes.

## 2. Background

We commence by providing historical context on Australia's imputation system. This is followed by an overview of the Tax Discussion Paper, including evaluation of the framework under which it was prepared. We also discuss the potential scope of changes that might occur to the imputation system.

### 2.1. Historical Context

The imputation tax system is not the modern development of the Australian tax system that many believe. Rather, it is the so-called classical tax system that is the relative newcomer. Under a classical system, corporate profits are taxed both at the corporate level, and again upon distribution of dividends to shareholders, which are taxed at the latter's marginal income tax rate. Under an imputation system

investors are only taxed at their personal income tax rate on dividends and get a full, or partial, rebate of taxes paid by the company.

Income taxes were introduced in Australia by the States towards the end of the nineteenth century. By the end of that century, several States had imposed a tax on the dividends that companies paid. However, the dividends were then exempt from tax when received by the shareholder. When the Commonwealth began taxing companies in 1915, only undistributed profits were taxed, and dividends were taxed only in the hands of shareholders. By 1923, companies became taxable on all their profits. While shareholders were liable for taxes on dividends received, they received a rebate for the company tax that had been paid. This persisted until 1940, when the tax rebate was abolished (see Livingstone, 1977). It was at this point that Australia moved to a classical tax system.

The situation was reversed for Australian residents on 1 July 1987, when a full imputation system replaced the classical taxation system. As Livingstone (1977) points out, fundamental to the classical tax system is an entity viewpoint, while fundamental to the imputation system is an ownership viewpoint. Livingstone also points out that the choices made by governments about tax systems have largely been driven by pragmatic considerations regarding revenue, e.g. in Australia's case, the need to fund participation in two World Wars.

A number of changes were subsequently made to the imputation system, two of which are most notable for our purposes:

- *1 July 1997* – The ‘holding period rule’ was introduced, which required investors to continue holding<sup>1</sup> a stock for 45 days about the ex-dividend date in order to claim the imputation credit. This was intended to prevent various arbitrage schemes and indirect trading of imputation credits, hence blocking an avenue for foreign (and tax-exempt) investors to extract value from imputation.
- *1 July 2000* – The ‘rebate provision’ was introduced, making imputation credits fully refundable. This made a tax refund available where credits exceed other tax liabilities, thus enhancing the value of imputation to low or zero tax resident payers such as superannuation funds, charities and retirees.

The research into imputation is extensive in some areas, and somewhat thinner in others. Initial research around the time that imputation was introduced tended to have a ‘policy’ focus and was aimed at understanding the economic implications of imputation, with involvement from government bodies such as the Australian Commonwealth Treasury and the Reserve Bank of Australia. Some years after the introduction of imputation, an active agenda emerged in the finance literature examining the implications for share prices, cost of capital and (to a lesser extent) corporate finance policy. Academic research in these areas has remained active since, in part spurred by the relevance of imputation for utility regulation. One of the key tasks undertaken in this paper is to provide an overview and synthesis of this body of research.

Interest in imputation from a public policy perspective has been renewed in recent years, exemplified by the Henry Tax Review released in 2010 (Henry, 2009) and the recent Tax Discussion Paper (TDP) of 2015. The value of the imputation system was also queried by the Financial System Inquiry of 2014. Much of the recent public policy debate is focused around whether Australia would be better off adjusting or even removing the imputation system, and using the revenue increase to fund a reduction in the corporate tax rate, thus moving back towards a classical tax system. The case for doing so was

---

<sup>1</sup> Investors are also required to remain exposed to the risk of price fluctuations, but can hedge that exposure to a delta of 0.7. Other concessions were made for small investors, and for institutional investors tracking an index. Such concessions, coupled with a two year legislative delay, resulted in a rather weak restriction on arbitrage in the early years of the 45 day rule.



put forward in an influential CEDA paper prepared by David Gruen in 2006 (Gruen, 2006). We sketch out and evaluate the discussion appearing in the TDP in the next sub-section.

## 2.2. The Tax Discussion Paper (TDP)

The TDP raises the question of whether Australia is getting value out of its imputation system. For context, we list below the relevant aspects mentioned in “Section 5: General Business Tax Issues”, followed by discussion of the conceptual underpinnings of the TDP’s stance. The TDP makes the following points:

### *On company tax:*

- The Australian corporate tax rate, and the ratio of corporate tax to total tax revenue, are relatively high in a global context.
- The economic burden of corporate tax is shared among shareholders, consumers and employees.
- Corporate tax detracts from the return on investment. In turn, this “reduces the level of investment in small, open, capital importing economies, such as Australia ... because the marginal investor in Australia is likely to be a non-resident, who will invest ... only if they achieve an after-tax return that matches their target rate of return” (page 78). The TDP effectively argues that a higher corporate tax rate boosts the required pre-tax return, which leads to lower investment by foreigners; and infers that this is detrimental to all Australians.
- Higher corporate tax rates increase the incentive for foreign investment to be funded by debt, which may erode the Australian corporate tax base.

### *On the benefits of imputation:*

- Imputation provides strong incentives for Australian-owned companies to pay tax in Australia, i.e. it has integrity benefits for the tax collection system.
- It is acknowledged that imputation increases the rate of return for Australia investors; but this is noted in the context that the associated company tax meanwhile pushes up the pre-tax return that is required to attract non-resident shareholders. Effectively, Australian investors earn a bonus over the market-clearing rate of return, as determined in international capital markets.
- Through encouraging greater use of equity financing, imputation may improve economic stability.

### *On the costs of imputation:*

- Imputation reduces government revenue, with around \$19 billion p.a. of imputation credits claimed over recent years. Revenue concerns related to the refundability of imputation credits for low or zero tax-payers (\$4.6 billion in 2012-3) also receive a specific mention.
- The biases created by imputation may be undesirable in an increasingly open and globalised world.
- Imputation “does not help attract new investment into Australia” (p87); an argument that the TDP links to the effects of the higher required returns stemming from the corporate tax rate (see above).
- Imputation reduces the effectiveness of tax concessions, such as for research and development.
- Imputation adds to the complexity of the tax system.

### *Other effects from imputation (with no comment on whether they are beneficial or detrimental):*

- Australian investors have an incentive to invest more in Australian shares.
- Imputation creates a bias against Australian companies investing overseas.
- Imputation creates a bias towards distributing earnings as dividends, rather than retention.

The conceptual underpinnings running through the TDP largely arise from the economics literature on tax incidence in an international context (for reviews, see: Auerbach, 2005; Griffith, Hines and Sørensen, 2010). A key assumption is that Australia is a small, open economy that has no control over required returns, which are set at the margin in international capital markets. This equates to the proposition that imputation does not lower the cost of capital, and has no influence on the ‘hurdle rate’ of return that a company is required to deliver (after corporate tax, but prior to investor taxes).

The underlying assumption is that assets are entirely priced by an international marginal investor who places little or no value on imputation credits. A major contribution of this report is to examine the evidence for this proposition arising from the finance literature. As it will be seen, whether imputation is ‘priced’ and hence impacts the cost of capital remains the subject of much debate. Accordingly, the validity of the core assumption that required returns and cost of capital are set by international investors cannot be taken as given; and is an extreme position along the spectrum of possibilities. Indeed, whether prices are set by a marginal investor, or by aggregation across investors, is an open question (discussed in Section 3.2). It is our contention, therefore, that a policy decision should not be based on the assertion that the marginal investor setting prices in the Australian market is an overseas investor. To do so would base policy on an insecure foundation, and risks serious error.

A notable sub-text in the TDP’s stance is that higher corporate tax rates reduce economic prosperity for Australia through diminishing foreign investment; and that the incidence of a high corporate tax rate is ultimately borne by Australian consumers and employees as a consequence. The mechanism involves a higher corporate tax rate acting to increase the required return, which results in a reduction in foreign investment, which in turn leads to lower economic growth and employment. It is not our main intent to comment on the corporate tax rate *per se*. Nevertheless, it is clear that the TDP links the rationale for reconsidering imputation to the presumption that it has failed to reduce the cost of capital because international investors do not benefit. It is implied that a revenue-neutral shift involving a lower corporate tax rate funded by a removal of imputation can lead to a lower cost of capital, higher investment, and hence greater economic prosperity. This is essentially the line adopted by Gruen (2006), who appeals to applying higher taxes on immobile factors such as wages along with lower taxes on mobile factors like capital, following Ramsay (1927).

The TDP stance on the effects of reducing the corporate tax rate may also be questioned on a number of fronts. For instance, the potential for investment to increase may be attenuated by the effects of less mobile capital,<sup>2</sup> or complex interactions between tax and risk. There are also some difficult implementation issues to consider. Reducing the corporate tax rate may induce tax leakage from personal taxes as the tax rate gap widens. Lowering taxes on foreign companies (while removing imputation for locals) might be politically unpalatable. An overview of most of these issues can be found in Auerbach (2005), Griffith, Hines and Sørensen (2010), and Sørensen (2014).

A further notable sub-text is that the TDP (and the Financial System Inquiry) queries the value of imputation in light of increasing globalisation. While the trend towards increasing globalisation is evident, the extent to which financial markets are integrated remains an open question. The evidence seems to point towards partial integration, with smaller niches such as emerging markets often remaining largely driven by local forces (see Lewis, 2011). Consistent with this notion, Durand, Limkriangkrai and Smith (2006) find that returns on larger Australian stocks appear to be explained by US factors, while the same does not hold for Australian small stocks, which appear to be priced locally. This leaves some doubt over the extent to which integrated, global pricing applies. We discuss this issue further below, including in Sections 3.2 and 8.1.

---

<sup>2</sup> Capital mobility can be hampered due to the existence of adjustment frictions, location-specific assets or rents, and smaller, local-bound companies.



Overall, the picture is considerably more complex and mixed than portrayed in the TDP (which is admittedly only a discussion paper, not a statement of position). There is no doubt that there is an element of truth in the proposition that funding a reduction in the corporate tax rate by removing imputation would attract more foreign investment, which would enhance Australian economic growth in itself. However, the ultimate effects are very unlikely to be either pure or unambiguous. There is considerable scope for mitigating influences and unanticipated reactions. For instance, eliminating imputation may have adverse impacts on locally-sourced investment; while tax changes can lead to changes in behaviour that result in revenue losses that can be hard to anticipate (e.g. substitution of declared corporate income for personal income; local companies shifting overseas; possibly reduced capital gains tax). The extent to which tax is a first-order effect in determining investment decisions is also debatable: we comment further on this issue in Section 5.1. Having raised these broad issues, we leave it to others to contemplate them in more depth.

### 2.3. Scope of Potential Changes to the Imputation System

Both the TDP and the Financial System Inquiry (2014) have called for a review of the imputation system, rather than specifically requesting comment on its potential dismantling. Further, Treasurer Hockey has stated that he is more interested in how the imputation system might “be improved”, rather than “get rid of it” (*Australian Financial Review*, 13 April, 2015, p5). Interestingly, at the time of writing, the lead article for *The Economist* analysing the problem of too much debt, partly caused by the tax deductibility of debt interest, suggests: “The purest option is to abolish corporate tax entirely and instead have one layer of tax levied on the income that individuals receive from investments in firms”.<sup>3</sup> At least for dividends received by Australian residents, this is what imputation achieves.

The TDP observes that a wide variety of tax treatments for dividends are used in other countries, including partial double taxation systems where dividends are taxed at preferential rates, or where certain tax credits are made available to ease the double taxation of corporate earnings. It lists only Australia, New Zealand, Chile and Mexico as having full imputation systems; plus Canada as providing a tax credit related to notional domestic corporate profits. The possibility exists that the imputation system might be modified, or replaced with a close alternative. One option is removing the rebate for excess imputation credits, which would largely impact zero tax-paying entities such as charities and retirees. We will proceed by discussing a hypothetical scenario where the imputation system is totally dismantled, both in isolation, and in parallel with a reduction in the corporate tax rate. In the latter case, we base our analysis around a reduction in the corporate tax rate from 30% to 20%, in accordance with Gruen (2006). Our aim is to establish juxtapositions to the current full imputation system. Any changes would probably sit somewhere between the two extremes.

## 3. Theory – Imputation, Share Pricing and the Cost of Capital

We start by discussing the theory and related issues regarding how imputation manifests in share prices, required returns and hence the cost of capital. The underlying principle is that share prices are set by the market to generate to a certain expected return or ‘required return’; which in turn establishes the cost of capital as the hurdle rate that a company needs to deliver on its investments in order to generate economic value. The fundamental question is really whether imputation affects company value. There is only one value for a company, but many ways to measure its ‘cost of capital’. Whether imputation changes the cost of capital depends on the definition used, including whether cost of capital is measured before tax, after corporate tax, or after all taxes; and how imputation tax credits are

<sup>3</sup> “The Great Distortion”, *The Economist*, 16 May 2015, 15-18 (see page 17).

accounted for. For example, if an ‘after corporate tax cost of capital’ definition is used, and imputation credits are accounted for in cash flows when valuing the company, then there is no imputation effect on the ‘cost of capital’ so defined. We recognise, however, that much of the debate around imputation is couched in terms of the cost of capital. This debate is typically focused on the after corporate tax cost of capital, with imputation credits accounted for by adjusting cost of capital.

Also relevant is the basic economic distinction between ‘value in use’ and ‘value in exchange’. There is no doubt that imputation credits have considerable value in use to Australian resident investors, who can use them to reduce taxes. Whether they have value in exchange – in other words, whether they are priced – is a separate matter. This fundamental issue can be posed as follows. Consider two companies with identical assets, with the exception that one also has a positive balance in its franking account and can distribute imputation credits, while the other has a zero balance. The question is: “Do the two companies sell for the same price?”

Against this background, we will address three specific questions:

- ***How do tax effects influence the return required by various investors?*** We describe the theory and the issues that arise in Section 3.1.
- ***When the tax status of investors differs, how do tax effects manifest in equilibrium share prices and required returns?*** This is the nub of the issue, and is controversial. We outline the theoretical issues in Section 3.2, and detail the empirical evidence in Section 4.
- ***How is imputation taken into account when making decisions?*** To a large extent this is an implementation issue, the evidence for which will be discussed with respect to investors in Sections 4.3 and Section 8, and for companies through Sections 5 to 7. However, this question cuts across agency theory and behavioural influences, which we briefly acknowledge in Section 3.3.

Our review raises plenty of issues, but yields no clear direction on whether imputation credits should be priced from a theoretical perspective.

### 3.1. Investor Taxes and Required Returns

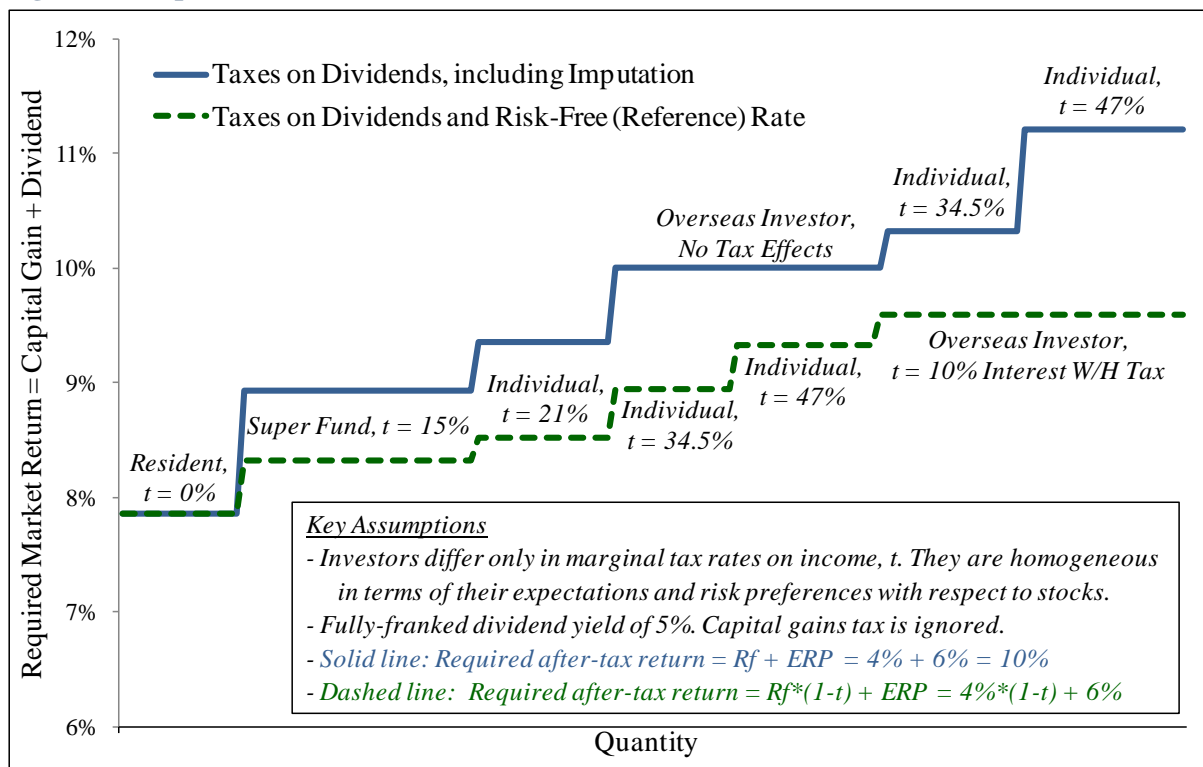
We commence by outlining how imputation and other tax effects impact on the post-tax returns for various investors. This sets up a basis for the discussion in Section 3.2 on the mechanism by which tax effects manifest in prices and required returns *in equilibrium*, and henceforth ultimately determine the cost of capital for a company.

The relation between imputation and an investor’s required return is one component within the broader issue of how tax effects manifest in asset prices and returns. This topic has been widely studied, including how investor (personal) taxes and corporate taxes interact to influence investor returns, and the associated implications for cost of capital and capital structure, e.g. Brennan (1970); Miller (1977). The basic concept is that tax drives a ‘wedge’ between the pre-tax income that a company generates, and the post-tax income that an investor receives (King and Fullerton, 1983). Through influencing the net return received by investors, tax may impact on portfolio structures, asset prices, or both. Where tax detracts from investor net returns, either pre-tax returns need to be higher, the investor could hold less of the asset, or some combination of these effects will eventuate. The extent to which either effect dominates relates to how market equilibrium is determined. This will be discussed below.

Imputation removes the double taxation of dividends by acting as a prepayment of personal income tax. It effectively ensures that distributed Australian-sourced corporate income is taxed at the marginal tax rate for Australian resident shareholders. However, imputation is only one of a variety of tax effects that may influence the after-tax returns required and achieved by a particular investor. Thus it is questionable, perhaps even dangerous, to single out imputation as the only investor (i.e. personal) tax effect that is taken into account when estimating required returns. This issue is directly raised by Lally and van Zijl (2003) with respect to capital gains tax; and could be considered as implicitly accommodated by Dempsey and Partington (2008) in their model of the valuation of dividends.

Figure 1 provides a sense for how variation in tax status can lead to differences in the ‘required market return’ (i.e. capital gain plus dividend) that investors need in order to generate a certain post-tax outcome. Figure 1 plots the required market returns for six representative investors in the Australian equity market that differ only in their marginal tax rates on income, pay no capital gains tax, and are homogeneous in all other respects. Two lines are plotted. The upper solid line reflects differences in the marginal tax rate on dividend income and capacity to utilise imputation credits. The lower dashed line goes one step further by adjusting the required market return for income tax paid on the risk-free or ‘reference’ rate ( $R_f$ ). Applying tax to  $R_f$  has the effect of lowering the overall market return that is required to generate an equivalent equity risk premium ( $ERP$ ). The estimates are built on the assumption that the stock pays a fully-franked dividend yield of 5%,  $R_f$  of 4%, and a required  $ERP$  of 6%. We also assume that overseas investors are not taxed on fully-franked dividends, i.e. they incur no withholding tax, and pay no additional tax in their home countries on the dividend income.<sup>4</sup>

**Figure 1: Required Market Returns with Investor Income Taxes**



<sup>4</sup> To the extent that overseas investors pay additional tax on dividends they receive, their required return would be higher than plotted in Figure 1. It is worth noting that many countries impose a zero tax rate on investment income for pension funds, including the US and the UK (see Mercer, 2013).

There are two messages to take away from Figure 1. First, there can be meaningful variation in the return that different investors require a company to deliver as a consequence of tax effects. This is tantamount to saying that different investors might apply different costs of capital. The issue of how these differences manifest in the cost of capital that a company should be targeting is discussed in Section 3.2. Second, it matters what tax effects are included. For instance, our analysis illustrates how applying tax to the reference asset results in a significant down-shift and flattening in the overall curve, plus a reordering of the position of various investors on that curve. Similarly shifts might occur if capital gains tax was incorporated (let alone other differences across investors). All this hints that tracing tax effects to required returns and hence cost of capital is far from straightforward.

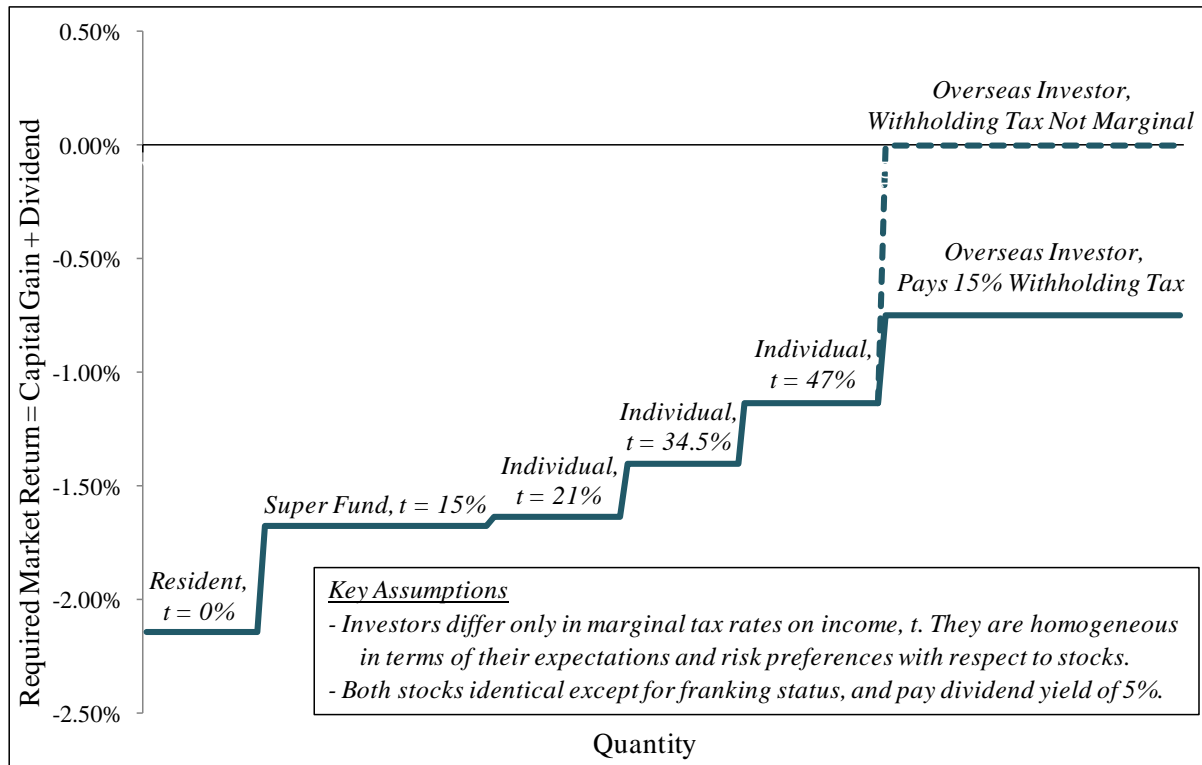
Against this background, a body of literature addresses the determination of expected returns or cost of capital under the imputation system. This literature is typically cast within the framework of the Capital Asset Pricing Model (CAPM), and invokes many simplifying assumptions to make the modeling tractable. Three approaches are described below, with the main message that the available models vary in the scope of personal tax effects they incorporate for estimating the cost of capital:

- Officer (1994) models imputation credits as a prepayment of personal income tax, relating it to the cost of capital after corporate tax but prior to all other personal taxes. In doing so, he bypasses the issue of how personal income taxes and capital gains taxes impact on required returns.
- Demsey and Partington (2008) focus on the value of dividends within the context of discounted cash flow models. They propose applying a multiplier (' $q$ ') to dividends that encapsulates the extent to which distributions are valued by investors. The multiplier potentially reflects any tax effects associated with dividends, including income taxes applied to dividends as well as the value attributed to imputation credits. The model allows for the risk-free rate to be scaled by tax effects.
- Lally (2000) and Lally and van Zijl (2003) work within the single-period CAPM to estimate the required return on equity including a range of tax effects. In particular, capital gains taxes are explicitly incorporated, in addition to corporate taxes, personal income taxes and imputation credits. Lally and van Zijl (2003) also allow for the risk-free rate to be scaled by tax effects.

Nevertheless, our prime concern is the *marginal* effects that arise from imputation. Figure 2 provides a sense by plotting the difference in required market return for identical companies paying fully-franked versus unfranked dividends. Under the assumptions, imputation viewed in isolation reduces required returns by anywhere between 0% and around 2%, depending on the investor.

It is worth noting that there is *only one situation where imputation credits make no difference* to an investor's return at the margin. This is for an overseas investor that pays either zero, or the same, marginal tax rate on both franked and unfranked dividends. Given that franked dividends are subject to zero withholding tax, this situation applies where the withholding tax that is paid on unfranked dividends does not result in an additional tax at the margin. This could occur if either: (a) the withholding tax is treated as a prepayment on their tax obligation in their home countries; or (b) where they are a zero tax payer (like many overseas pension funds), and can claim a credit for the Australian withholding tax paid. The TDP is effectively naming overseas investors in this class as the marginal investor. In situations where withholding tax imposed on unfranked dividends is marginal, then imputation *does* make a difference, even for an overseas investor.

**Figure 2: Difference in Required Market Return: Fully-Franked less Unfranked Dividends**



As noted earlier, imputation may be accounted for in two ways. First is through adding the imputation credit to the cash flow stream that is made available to investors, prior to considering personal taxes. Second is as a reduction in the discount rate. Refer to Officer (1994) for analysis and discussion. Either way, share prices will be higher to the extent that imputation credits are recognised by the market through either a greater numerator or lower denominator in the net present value equation. And either way, the return that a company is required to generate *prior to accounting for imputation* will be reduced. This amounts to a lowering of the hurdle rate of return that a company needs to generate on its operations in order to create value – effectively a reduction in the cost of capital. Another way of seeing this point is that the *operating income* that an investment is required to generate is lower to the extent that part of the corporate taxes paid are remitted as imputation credits, and these credits are valued by investors as an additional cash flow stream.

### 3.2. Equilibrium When Tax Status Varies

How tax impacts on share prices and required returns in equilibrium when tax status varies across investors is far from clear, even in theory. To start with, two approaches to translating investor demands into equilibrium prices can be found in the finance literature: aggregation of investor demands, and the ‘marginal investor’ approach.

#### *Aggregation of Investor Demands*

This approach involves weighting of investor demands, often by the magnitudes involved and risk aversion. For instance, Brennan (1970) weights tax effects according to the marginal utilities of investors. In the Australian literature, Monkhouse (1993) aggregates investor tax rates by risk aversion and the value placed on imputation credits. Lally and van Zijl (2003) aggregate across investors according to wealth invested in risky assets, assuming that all investors have the same risk aversion.

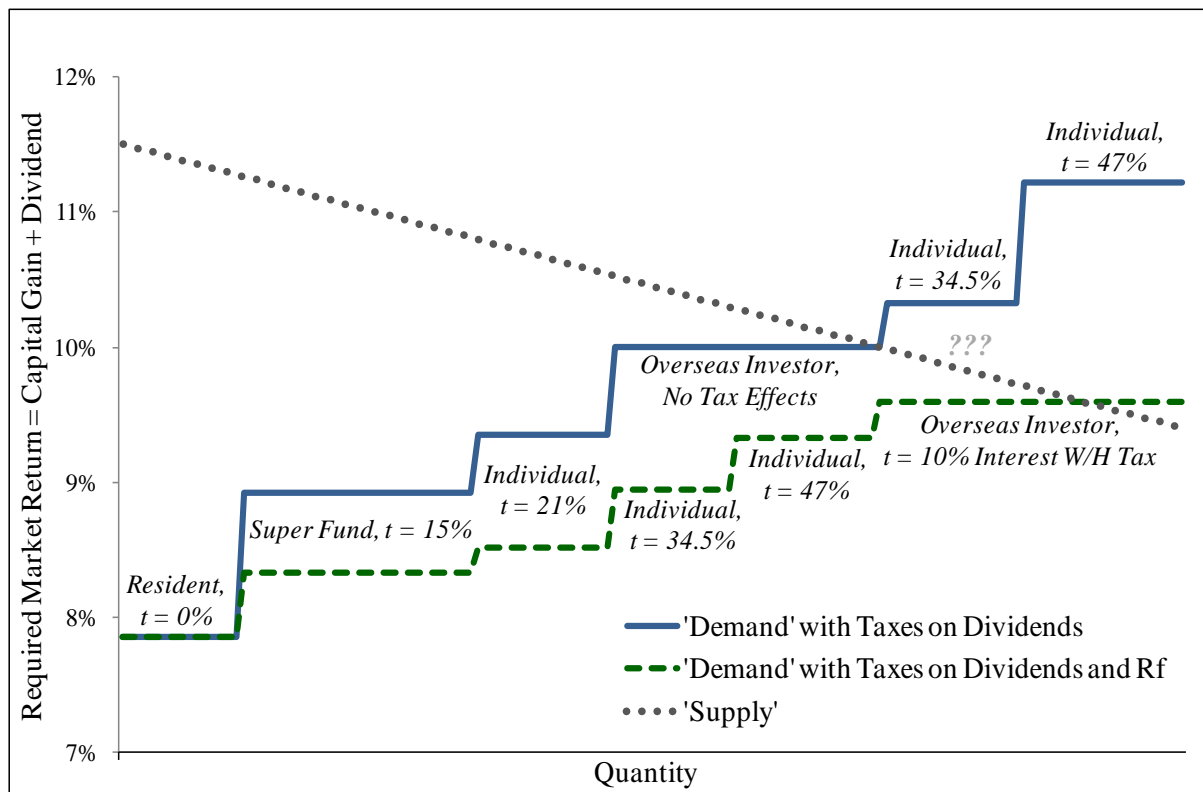
The aggregation approach implies that imputation must be partially priced. For instance, Black and Kirkwood (2010) estimate that approximately 60% of Australian equities are held by domestic investors, while Handley (2014) reports on data indicating that domestic investors own 71% of listed equities and 75%-81% of total equity. Subject to the extent that domestic investors can fully utilise imputation credits and how investor demands are aggregated, this approach suggests that imputation credits might be priced in the order of 60%-80% of face value.

### *Marginal Investor Approach*

The marginal investor approach entails identifying where supply and demand intersect. This approach accords with Miller (1977) among others; and is implicit in references to the 'marginal investor'. Discussion in the TDP effectively adopts this stance, assuming that the marginal investor is an overseas investor operating in global capital markets that attaches no value to imputation credits.

Figure 3 illustrates the 'marginal investor' approach. The required market return estimates produced earlier are presented as two potential demand curves. The demand curves slope upwards because Figure 1 is in return rather than price space. Tax provides the only source of difference in demand under this illustrative case: clearly other factors will also matter to investor demand at various return levels (as will be discussed below). A supply curve has been superimposed. For illustrative purposes, we have made the curve downward sloping, implying that companies willing to issue more equity if the required return is lower. This might occur either due to substitution for debt as equity becomes 'cheaper'; or because the overall quantum of investment responds to decreases in the cost of equity capital, and requires additional funding.<sup>5</sup>

**Figure 3: Market Equilibrium Based on the Marginal Investor**



<sup>5</sup> The relation between imputation and capital structure and project evaluation are both discussed later.



The issue under this approach is whether imputation influences the return required by the marginal investor. The way that Figure 3 is drawn, the lines cross at a point that identifies an overseas investor as marginal. To the extent that this is the case, and the overseas investor receives no marginal benefit (itself a grey area), imputation might not be priced. However, if the supply curve were moved to the right or the left, a tax-paying individual who receives some benefit from imputation becomes the marginal investor. Under these circumstances, imputation may be priced, as the marginal investor is relying on imputation to some extent to make a contribution to achieving their required return.

### *Discussion*

Whether the marginal investor or aggregation approach better describes how imputation credits become priced in equilibrium is a point of debate. The marginal investor approach might be seen as more in keeping with the ‘Economics 101’ notions of price determination, and more consistent with general equilibrium analysis under which investor demand for (and supply of) imputation credits is jointly determined with the market clearing price. As a consequence, the marginal investor approach may assist in analysing the potential effect of *changes* in the demand curve. By contrast, aggregating observed demands assumes that investors have found their equilibrium position given market prices.<sup>6</sup> It thus does not directly address how the market equilibrium emerges in the first place. Nevertheless, the aggregation approach may still provide a useful description of an existing equilibrium. In any event, the key point is that there is no clear consensus on the appropriate approach, adding another layer of uncertainty to the issue of whether imputation credits are priced.

An important issue is that both approaches are often applied as if tax were the only determinant of differences in demand. In practice, an investor’s demand for assets may reflect a whole range of considerations, including their expectations, the broader portfolio context, their liabilities, constraints, other costs, etc.<sup>7</sup> This issue is particularly problematic for applying the aggregation approach through reference to observed holdings, which is the approach typically used in practice. The fact that a domestic investor holds a stock and can fully utilise any imputation credits does not provide incontrovertible evidence that they attribute full value to imputation in exchange. It is entirely possible that a domestic investor could be holding a domestic stock due to expectations of receiving high pre-tax returns or other reasons, and not pricing in the imputation credits in the process. Just because an investor receives imputation credits does not necessarily mean they fully price them, and hence require a commensurately lower pre-imputation return from the company as a consequence.

The existence of influences other than tax is also problematic for the marginal investor approach. Tax considerations may be only one of a raft of factors that are determining pricing at the margin. This makes identifying the marginal investor much more complex than merely assuming it must be the investor who gets least value out of imputation, i.e. overseas investors. The marginal investor could be one for whom imputation credits form part of the overall ‘package’ of effects that entice them to hold a stock.<sup>8</sup> For instance, the marginal investor might be a domestic investor who is relatively pessimistic on the company’s outlook, and imputation matters because it gets them over the line. Meanwhile, it is not impossible that overseas investors might sit lower down on the demand curve, say because they are keen buyers for some other reason, such as optimistic expectations. In these situations, imputation credits could get priced to some extent as part of enticing the last investor in at the margin. Essentially we are saying that drawing demand curves reflecting only tax differences is too simplistic.

<sup>6</sup> Monkhouse (1993) explicitly states this assumption.

<sup>7</sup> This focus on tax alone is encouraged by the manner in which tax effects are modeled. The models are mostly partial equilibrium models where all other factors are assumed constant. The world does not work this way.

<sup>8</sup> Imputation may similarly be one of a range of factors that influences trading patterns, most notable around ex-dividend dates (see discussion in Section 4.2).

Another issue is that the identity of the marginal investor may be a moving feast, varying across stocks or time. Hence the pricing of imputation credits could be conditional, rather than a universal constant. Some stocks may be held entirely by local investors who value imputation credits, and thus become priced for lower expected market returns. One potential area is the small cap sector, where interest from overseas investors is typically low (which will be discussed in Section 8.1). Meanwhile other stocks may need to attract those who are unable to utilise imputation credits, like overseas investors, in order for the market to clear. The possibility of segmented pricing is consistent with the findings of Durand, Limkriangkrai and Smith (2006) with regard to large versus small Australian stocks. It is also consistent with the findings of Jun and Partington (2014) that dividends on ADRs are priced as though they are traded by US investors, while dividends on the underlying stocks are priced as though they are traded by Australian investors who value the imputation credits.

The identity of the marginal investor may change over time in reflection of whoever is active in the market. The availability of imputation credits (or otherwise) might attract a particular clientele in certain situations. For example, Chu and Partington (2008) find that the pricing of parallel CRA bonus issues with differing entitlements to imputation credits varied with proximity to the dividend payment. These authors interpret this finding as consistent with dividend values being set by short-term traders around the ex-dividend date, and by long-term investors at other times (although they also find substantial value is attached to the franking credit at all times).

A related issue is how the pricing of dividend events might accord with the determination of price levels and returns over longer holding periods. One possibility is that the pricing around dividend events may be set by investors who trade to limit the incidence of tax, or capture imputation credits. Ainsworth *et al.* (2010, 2015) examine institutional trading and share prices around ex-dividend dates, and find evidence consistent with tax motivations as an explanation for the observed patterns. Meanwhile, the overall price level and hence longer-term (say year-to-year) expected returns could be dictated by another class of investor who might only become active in response to substantial shifts in prices or long-term expected returns. We will return to this issue in Section 4, as it is relevant for interpreting drop-off and comparative pricing studies relative to those examining prices and returns.

The discussion in this section raises more issues than it offers resolutions. But this is the key point. The manner in which imputation is priced by the market is quite unclear in theory. It is also going to be inherently difficult to extract in practice, given that imputation is just one of many effects that determine share prices, and the limited scope for clean experiments.<sup>9</sup> The fact that the value attributed to imputation credits might also vary across stocks and through time only compounds the problem.

### 3.3. What Tax Effects Are Taken Into Account?

There is no question that imputation and other tax effects affect the net returns actually achieved by investors. However, just because investors incur taxes does not make it a foregone conclusion that those taxes are taken into account when making investment. Imputation is just one of many considerations, and need not be germane to the investment decision. The manner in which imputation and other tax effects are incorporated may be affected by the fact that investment decisions are often made under agency arrangements, and by various behavioural effects. At this point we merely flag the issues, in order to provide background for later discussions of actual practice.

<sup>9</sup> Some clean experiments have been done, such as Walker and Partington (1999) and Chu and Partington (2008). However, such experiments only examine the pricing of dividends and any attached imputation credits (i.e. they do not examine whether imputation is capitalised into the overall price level). They also exploit special situations that may not apply to all stocks. Consequently, while the valuation of distributed imputation credits has high validity under these studies, their generalisability is open to question.

The first issue is whether *investors* take imputation into account when pricing stocks and/or setting their portfolios. There are reasons why this may not necessarily be the case, even where imputation is of value. Much investment occurs under delegated management, i.e. it is undertaken by fund managers, rather than the beneficial investor. The question arises as to whether fund managers allow for tax effects, given their incentive structures and the often opaque tax status of their end-investors. Behavioural issues may arise, such as whether tax is salient, or the extent to which decisions are based on something other than rigorous analysis. Tax might also be ignored because it is considered a second-order effect, relative to aspects like the potential operating outlook for a company.

The second issue is whether *companies* allow for imputation in determining their cost of capital, and making decisions. The fact that companies are managed under agency arrangements raises questions over whether management has reasons or incentives to consider imputation. When contemplating the corporate perspective, it is useful to distinguish tax effects that are incurred by the company directly, versus those that are incurred by its shareholders. Company tax is the main tax effect that is directly incurred by the company. As company tax impacts on earnings, it is highly likely to be of concern for management. For other taxes incurred by the shareholder – those related to dividends, imputation credits and capital gains – it is not immediately apparent that they will be considered by management. Incentive structures and opacity around the tax status of shareholders may dull the motivation to take these effects into account. Nevertheless, one distinguishing feature of imputation is that companies have some control over the amount of credits they earn and distribute. Meanwhile, management is aware that imputation credits are of value to many shareholders. This increases the chances that imputation may be taken into account, relative to (say) capital gains taxes.

*Observing behaviour* is one way of ascertaining how tax effects are actually taken into account. A theme running through this report is that more attention should be paid to how imputation impacts on behaviour, rather than just focusing on how it affects the computations like cost of capital estimates. In the sections that follow, we try to convey what is known about the link between imputation, other tax effects, and behaviours.

## 4. Security Pricing: Empirical Evidence

Section 3 highlighted that no clear theoretical direction emerges on whether and how imputation might impact on security prices and thus required returns. This renders the pricing of imputation credits as a largely empirical issue. This section summarises the evidence on how imputation manifests in security prices, covering both the empirical research and financial industry practice. The evidence is best described as mixed. It is difficult to arrive at a firm conclusion on how imputation is priced by the market, and what might happen if the system was removed or adjusted.

### 4.1. Various Methods, Mixed Results

Four methods that have been used to examine the pricing of imputation credits in the Australian equity market are briefly described below. The bulk of empirical research uses the first two methods – dividend drop-off and comparative pricing studies – which entail estimating the value attributed to imputation credits with reference to specific dividend events. More recently, two papers have attempted to directly examine whether imputation credits impact on returns and price levels. The majority of research uses regression techniques.

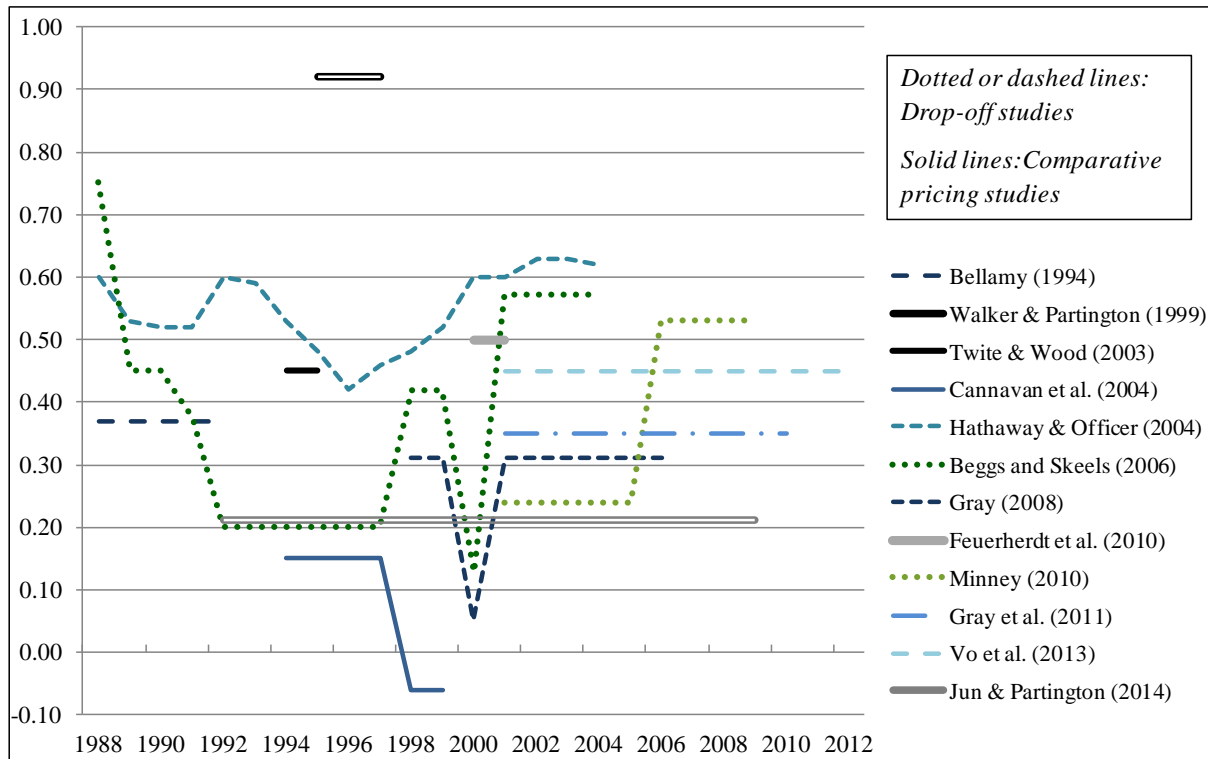
- (i) ***Dividend drop-off studies*** – These studies observe the price drop-off occurring when a stock goes ex-dividend. As the drop-off provides a measure of the combined market value of a ‘package’ of dividends and any attached imputation credits, the objective is to infer the value attributed to imputation credits through examining how they influence the relative magnitude of the drop-off.
- (ii) ***Comparative pricing studies*** – These studies attempt to infer the value of imputation credits by comparing differences in the pricing of securities that provide comparable stock exposure, yet differ in their entitlement to dividends and/or imputation credits. This method has been used to compare: the pricing of various derivatives versus the underlying stock (Twite and Wood, 2003; Cannavan, Finn and Gray, 2004); cum-dividend trades during ex-dividend periods (Walker and Partington, 1999); bonus issues with differing claims (Chu and Partington, 2008); and ADRs listed in the US relative to Australian-listed stocks (Jun and Partington, 2014).
- (iii) ***Examination of returns*** – Lajbcygier and Wheatley (2012) examine whether the presence of imputation credits is associated with lower realised returns under a range of different asset pricing models. The intuition is that if imputation is priced, then stocks that pay imputation credits should generate lower market returns (after controlling for other return determinants).
- (iv) ***Examination of price levels*** – Saiu, Sault and Warren (2015) consider whether the presence of imputation credits is associated with higher stock prices under various valuation models, including a discounted cash flow model employing consensus analyst forecasts, a residual income model, and a regression that explains prospective earnings yield as a function of imputation credits plus a range of controls. They also conduct portfolio sorts to examine the relation between imputation credit yields and various measures of market valuations.

A very mixed set of results emerges from this body of research. Figure 4 (over) summarises the findings from the majority of dividend drop-off and comparative pricing studies. While a wide range of estimates emerges, these studies on balance indicate that imputation credits are partially priced. The data points in Figure 4 average 0.38, which would suggest that imputation credits are priced at about \$0.38 in the dollar.

In contrast, examination of returns and price levels reveals little evidence that imputation credits are priced. Lajbcygier and Wheatley (2012) find that the presence of imputation credits is *not* associated with lower realised returns. Further, they find a positive relation between realised returns and imputation credits, which is significant under some specifications. This implies an (implausible) negative value on imputation credits. While the sign on the coefficient probably flags issues with the empirical method (see Section 4.2), it is nevertheless the case that no hint emerges that imputation credits have lowered the distribution of realised returns. Saiu, Sault and Warren (2015) find that imputation might be reflected in share prices under discounted cash flow models, at perhaps about \$0.30 in the dollar. However, the imputation variable adds little explanatory power. Meanwhile, the results under the earnings yield model and portfolio sorts suggest that imputation credits are not priced, and in fact may be associated with higher earnings yields as well as lower prices relative to other valuation measures.<sup>10</sup> The fact that the earnings yield results have the wrong sign suggests that caution needs to be applied in interpreting these findings (similar to Lajbcygier and Wheatley, 2012).

<sup>10</sup> Portfolio sorts reveal that stocks offering higher imputation credit yields also trade on higher dividend yields, lower price/earnings ratios, and lower ratios of price to net present value. However, the relation between imputation credit yields and the valuation measures disappears under double-sorts, whereby portfolios are initially sorted on dividend yield prior to sorting by imputation credit yields.

**Figure 4: Empirical Estimates of Value of Imputation Credits Attached to Dividends**

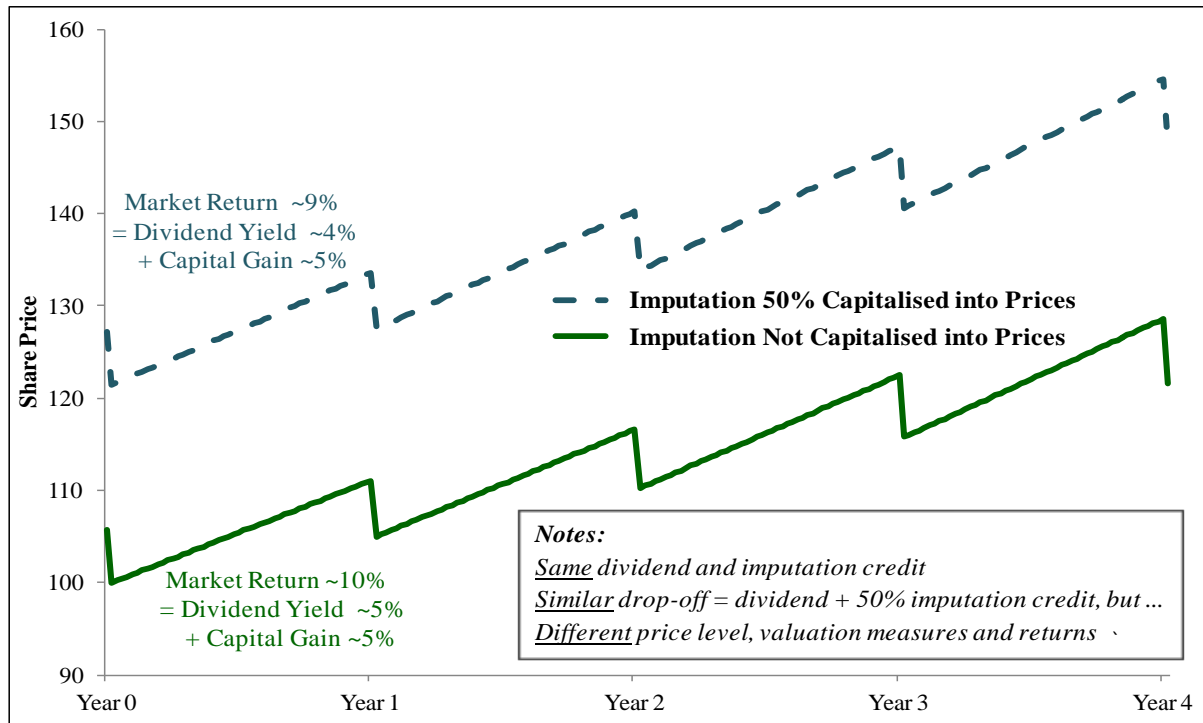


Thus the empirical evidence suggests that imputation credits may be partially priced based on examination of dividend events; while any footprints from imputation are harder to detect in either returns or price levels. One possible way to reconcile these conflicting findings is to draw on the point raised in Section 3.2 that the marginal investor around dividend events may differ to that determining price levels and longer-term expected returns. Figure 5 illustrates how this might play out. The *upper dashed line* represents a notional price path where 50% of the value of imputation credits is capitalised into the price level; while the *lower bold line* aligns with *no value* is incorporated into prices. Annual market returns are 1% lower where imputation credits are partially priced, relative to where they not priced. This 1% annual return difference is attributable to differences in *dividend yield*, reflecting different share price levels. Nevertheless, both price paths are drawn such that the dividend drop-off ratio is (nearly) the same under both scenarios, reflecting the dividend plus 50% of the imputation credit. Thus the lower bold line reflects a scenario whereby imputation affects neither the price level nor long-run returns, but yet is still reflected in drop-off rates. The key take-away is that studies that examine price levels and longer-term returns may be testing for different things to studies that examine dividend events, i.e. overall price and return levels, versus the pricing with respect to specific dividends and any attached imputation credits.

This raises the question of which empirical method is more attuned with the issue of how imputation is reflected in prices and required returns in equilibrium, and henceforth the cost of capital that a company should be trying to achieve. This is another debatable issue that only further adds to the uncertainty around how imputation manifests in market prices. In any event, we think it better to reserve judgment on the empirical evidence until after methodological issues and practical treatment of imputation are considered.



**Figure 5: Dividend Drop-off and Price Level**



## 4.2. Methodological Issues

There are substantial methodological problems in identifying the value attributed to imputation credits by the market. We provide an overview of the major problems here: refer to McKenzie and Partington (2010) for a more comprehensive discussion. The problems with estimating the market value of imputation credits are significant enough to suggest that the empirical findings discussed above should be viewed with considerable caution. The most substantial problems relate to the fact that dividends and imputation credits arrive together as a package. This greatly hampers the ability of researchers to confidently tease out how imputation impacts prices relative to other influences.

- **The allocation problem** – The allocation problem is an identification issue that arises from the need to disentangle the value of the combined package of dividend plus imputation credits into two components. The allocation problems relates to three aspects. First, the two components are highly correlated, given that higher dividends are often associated with greater imputation credits. This results in considerable multicollinearity that undermines the effectiveness by which regression analysis can distinguish effects related to imputation credits from those that relate to dividends. Second, identification is further hampered by the fact that most dividends are either fully franked or unfranked, with little in the way of partially franked dividends; coupled with the minimal variation in the corporate tax rate over the periods typically analysed. Third, when observed value relates to the package overall, the value attributed to imputation credits becomes conditional on the assumed value attributed to cash dividends. That is, the larger the value attributed to the dividend component, the less residual value is attributed to the associated imputation credits. However, the issue of whether cash dividends should be valued at \$1 or something less<sup>11</sup> is the subject of debate.
- **Other influences on pricing around dividend events** – The pricing of dividend events and hence imputation credits may reflect many factors apart from just imputation-related tax effects. The

<sup>11</sup> Hathaway and Officer (2004) assume cash dividends are valued at 80 cents in the dollar.



literature highlights that drop-off ratios may be impacted by other tax effects (e.g. capital gains tax), any discounting for the effects of time, the costs and risks associated with arbitrage, as well as various microstructure effects arising from aspects like the bid-ask bounce.<sup>12</sup> The existence of these features compounds the allocation problem.

- ***Sensitivity to method and sample*** – McKenzie and Partington (2010, 2011) highlight how the data used in drop-off studies is very noisy; and that the findings are sensitive to both empirical method and the particular sample, including how the data is filtered. The potential for variation is clearly visible in the range of results seen in Figure 4. Saiu, Sault and Warren (2015) also note that their estimates for sub-periods and industry sectors are quite unstable. The majority of comparative pricing studies suffer from limited data samples and potentially narrow frames (e.g. heavy representation from large companies), which creates some doubt over their general applicability.
- ***Unobserved variables*** – Identification is further hampered by the possibility that high dividend and imputation credit yields could be correlated with unobserved variables. In particular, this issue arises for the return analysis of Lajbcygier and Wheatley (2012), and the earnings yield analysis of Saiu, Sault and Warren (2015). In a nutshell, higher dividend and imputation credit yields could be associated with greater risks and hence higher expected returns, which in turn are not being properly captured by other control variables.<sup>13</sup> This could explain why the analysis in these studies finds imputation credits to be associated with higher returns and higher earnings yields respectively. Another issue is the implicit assumption that zero value is attributed to franking account balances (i.e. undistributed imputation credits), which may not be correct.

### 4.3. Evidence on Whether Investors Take Tax Into Account

We now outline what is known about whether Australian investors actually take imputation into account when pricing and selecting stocks. Our evidence is partly anecdotal, drawing on observation and knowledge about how the finance industry operates. We also note the studies that have surveyed industry about their practices, although unfortunately these do not focus directly on equity fund managers or private investors.

Again, the evidence is mixed. Imputation appears to be considered in some situations, but not others. When imputation is considered, it may be a second-order influence. Overall, there are some substantial gaps between the incurrence of imputation tax effects, and allowance for imputation credits in evaluation of stocks. This dilutes the case that imputation is likely to be priced at the margin. However, changes are occurring that make it more likely that tax effects, like imputation credits, will progressively receive more attention going forward. Nevertheless, the push towards after-tax investment management is in its formative stages; and the influences other than imputation appear to remain most important for stock selection decisions made at the coalface.

- ***Investment mandates*** – Traditionally the vast majority of equity funds have been managed on a pre-tax basis. For instance, the current standard “Investment Management Questionnaire” designed by the Financial Services Council<sup>14</sup> does not prompt asking candidate managers about tax. Nevertheless, the importance of taxation to returns is becoming more broadly acknowledged; and there are signs of increasing activity aimed towards managing funds on a post-tax basis. The shift is being driven by a greater focus on tax from asset consultants<sup>15</sup> and superannuation funds,

<sup>12</sup> Ainsworth and Lee (2014) examine bid-ask effects around ex-dividend days in Australia.

<sup>13</sup> This is a similar argument to that raised by Berk (1995) around size and value factors.

<sup>14</sup> See <http://www.fsc.org.au/standards-guidance/the-investment-management-questionnaire.aspx>.

<sup>15</sup> For example, Towers Watson has conducted research into after-tax investing (see <http://www.towerswatson.com/en-AU/Insights/IC-Types/Survey-Research-Results/2011/01/After-Tax-Investing->

reinforced by a legislative change in July 2013 that requires superannuation funds to consider “the expected tax consequences for the (fund) in relation to investments.”<sup>16</sup> Mackenzie and McKerchar (2014) survey and interview CIOs from 22 superannuation funds about their approach to tax management. While the responses were mixed, the majority (71%) attempt to actively manage imputation credits. Many are requiring their investment managers to actively manage tax, although this mainly appears to be on a ‘best endeavours’ basis rather than formalized. Nevertheless, it is clear that the industry is transitioning towards greater prevalence of after-tax management.

- ***Performance evaluation and incentives*** – Consistent with the above, Australian equity managers appear to be mostly evaluated and rewarded on their pre-tax performance versus benchmark or peers. Services that compare manager returns typically do so on a pre-tax basis (e.g. Mercer Performance Analytics); although Warakirri Asset Management has created a post-tax survey.<sup>17</sup> Work is also ongoing in building post-tax benchmarks,<sup>18</sup> which Mackenzie and McKerchar (2014) uncover as an area requiring further development.
- ***Rising pool of potentially tax-aware funds*** – Ross (2015) estimates that the portion of superannuation assets being managed directly has increased from 34% in 2004 to 46% in 2014, reflecting the growth in the Self-Managed Superannuation Fund (SMSF) sector and internal management by larger funds. In addition, funds in the pension phase (which pay zero tax, but receive full rebate for imputation credits) are growing as the system matures. These trends increase the volume of funds with a strong propensity to be managed in a tax-aware manner.
- ***What research analysts consider in valuing stocks*** – Our understanding (based on discussions with industry contacts) is that research analysts are aware of imputation credits, but rarely build them into their valuations and price targets. This is consistent with the uncertain and probably undeveloped status of equity managers with respect to after-tax management, given that the approach adopted by broking analysts typically reflects client demands.
- ***Evidence from short sale contracts*** – Lai *et al.* (2014) examine short-selling agreements, and find evidence of recognition for imputation credits. The average contracted value for the dividend plus imputation credit package is \$1.07-\$1.17 per dollar, versus a full value of \$1.42. This is consistent with partial pricing. However, four contract types are detected, with packages valued at between \$0.70 and \$1.42. This variation is consistent with contracting between differing tax clienteles.
- ***Asset allocation versus security selection*** – Even if most equity portfolio managers and analysts may not give imputation much consideration when valuing and selecting stocks, asset allocators may still take the availability of imputation credits into account when setting Australian equity weightings. Every now and again, some reference to imputation credits is made as justification for maintaining higher weightings in Australian equities. This is consistent with imputation having an influence on decision behaviour, even if not via formal analysis. Nevertheless, greater allocations to Australian equities as an asset class might have an influence at the overall market level, without necessarily impacting on how imputation affects pricing across stocks.

---

[in-Australian-Shares](http://www.russell.com/au/solutions/sector-funds/data.aspx?id=RATASF); as has Russell Investments, who offer a tax-aware Australian equities emulation fund (see <http://www.russell.com/au/solutions/sector-funds/data.aspx?id=RATASF>).

<sup>16</sup> Superannuation Industry Supervision Act (1993) (Cth) (SIS Act), Section 52(6)(a)(vi).

<sup>17</sup> See <http://www.warakirri.com.au/13084425/warakirri-asset-management-after-tax-management.htm>. A report in the BRW on 21 February 2013 noted that the survey covered 35 managers at the time.

<sup>18</sup> AFSA and FTSE have combined to create the FTSE ASFA Tax-Adjusted Indices for Australian shares. Another example is GBST, who offer an after-tax benchmarking service, see: <http://gbst.com/our-expertise/financial-services/after-tax-benchmarks>.

- ***Private investors more likely to consider tax*** – The discussion so far refers to investment managers. Private investors – including those with SMSFs – are more likely to consider imputation credits when evaluating and selecting stocks, given that they feel tax effects more directly.
- ***Other surveys of industry practice*** – Lonergan (2001) and KPMG (2005) examine independent expert reports prepared for takeovers. They find that imputation is rarely taken into account in valuing companies. However, the reasons given seem to suggest that imputation is ignored either because its value is uncertain, or because it may not be relevant to the acquirer, rather than due to an assumption that it has no value at all. KPMG (2013) surveyed 23 participants about their valuation practices, including investment banks, professional service firms, infrastructure funds and ‘other’ investors. They found that imputation was taken into account by 53% of the sample for non-infrastructure companies, and 94% for infrastructure companies. The issue with these surveys is that the sample does not reflect the major ‘portfolio’ investors in the Australian equity market.
- ***Imputation as a second-order effect*** – There are many good reasons to suspect that imputation could be seen as a second-order effect when selecting stocks. Imputation credits offer an increment to income that mostly sits in the range of 0%-3% per annum. While this increment is potentially meaningful when accumulated over long periods, it is small relative to the volatility of individual stocks, which may be 20%-50% per annum. Further, business performance and earnings tend to dictate returns over the medium-to-long term. The difficulty in establishing how imputation credits are priced may also hamper their use as quantitative consideration in stock selection. In addition, certain investment processes are unlikely to give much consideration to imputation. Investors who focus on momentum, style-timing, growth potential and possibly even thematic investing may care little about the imputation yield. On the other hand, managers pursuing a value or GARP style might be more likely to consider imputation; and there exists a cohort of dedicated high yield and imputation funds. Nevertheless, most evaluations and associated trades in stocks will often relate to reasons other than the availability of imputation credits. While this does not preclude imputation from having some effect on average, it does reduce the chances that the marginal investor is being influenced by imputation. The dominance of other factors may be one reason why the value afforded to imputation credits is hard to reliably identify, as researchers are trying to detect a needle in a haystack of effects.

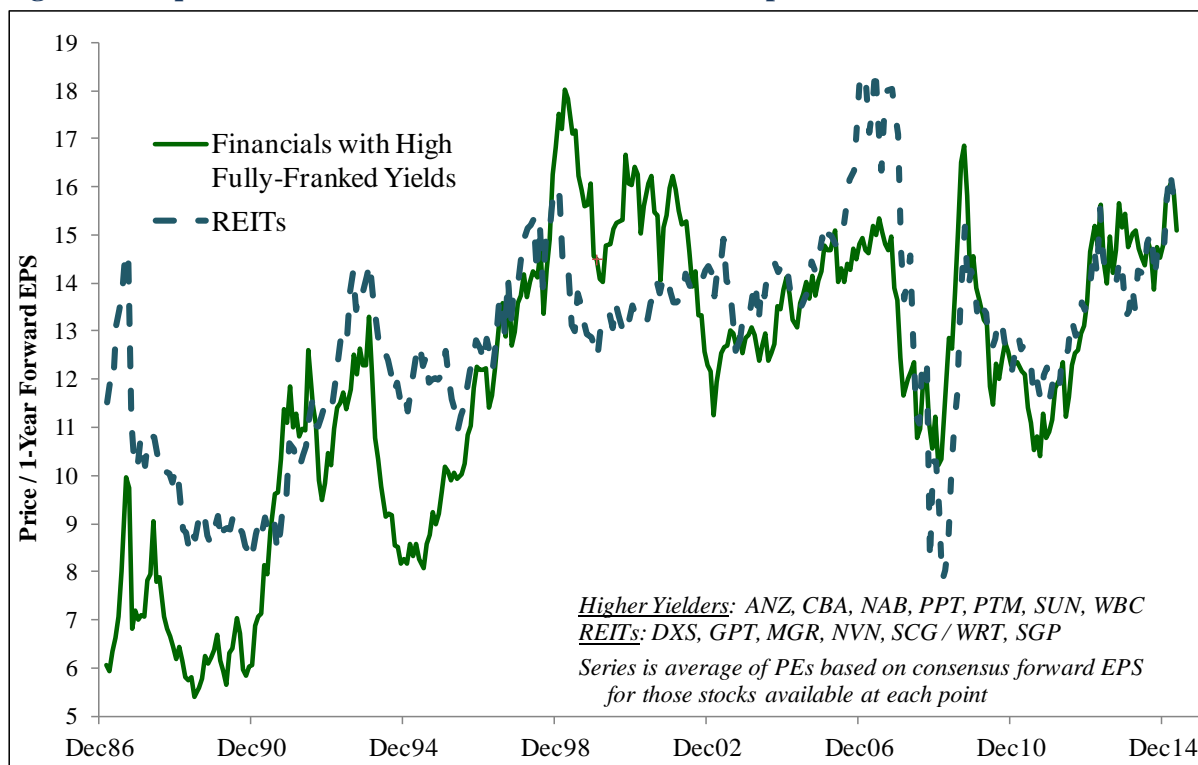
A related issue is whether the pricing of imputation may change over time. Even if imputation credits were not priced in the past, two recent developments suggest this *might* be changing. First is the increasing focus on after-tax investing as discussed above, albeit in its formative stage. Second, the market has been hungering for yield in the post-GFC environment, where interest rates have dropped sharply. To the extent that imputation credits are considered a component of yield, stocks paying high imputation credits may have been re-rated, implying a reduction in expected returns.

On the possibility of recent re-pricing, we present two mixed pieces of evidence. First, Ross (2015) finds that drop-off ratios have increased in recent years, reaching 92% of the gross dividend in the first half of 2015 versus a 15-year average of about 70%. Second, we generate Figure 6 to gauge whether there may have been pricing shifts related to imputation credits, as against a pure preference for high yield. The chart compares the average PE ratios for selected financial stocks paying fully-franked dividends with that for REITs (which also pay high yields that are largely unfranked, and may be considered a class of financial stock). The analysis is rough, and at best provides circumstantial evidence, given that PEs can be explained by a wide range of factors. Nevertheless, no sign emerges that stocks paying high, fully-franked dividends have recently benefited from additional re-rating.<sup>19</sup>

---

<sup>19</sup> Interestingly, there are hints of a re-rating in the period after imputation was introduced. However, this was largely driven by the banks, where a significant change in profitability occurred after the early-1990s recession.

**Figure 6: Required Market Returns Under Removal of Imputation**



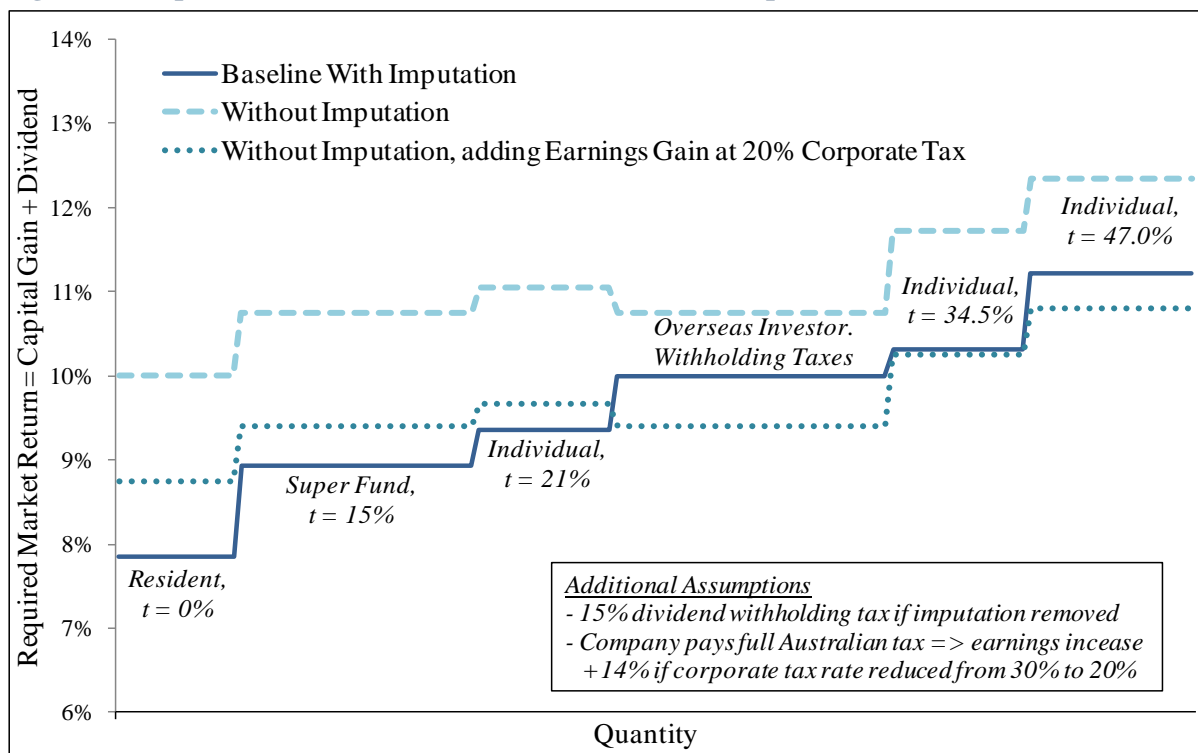
Source: Datastream, I/B/E/S

#### 4.4. What If Imputation Was Removed?

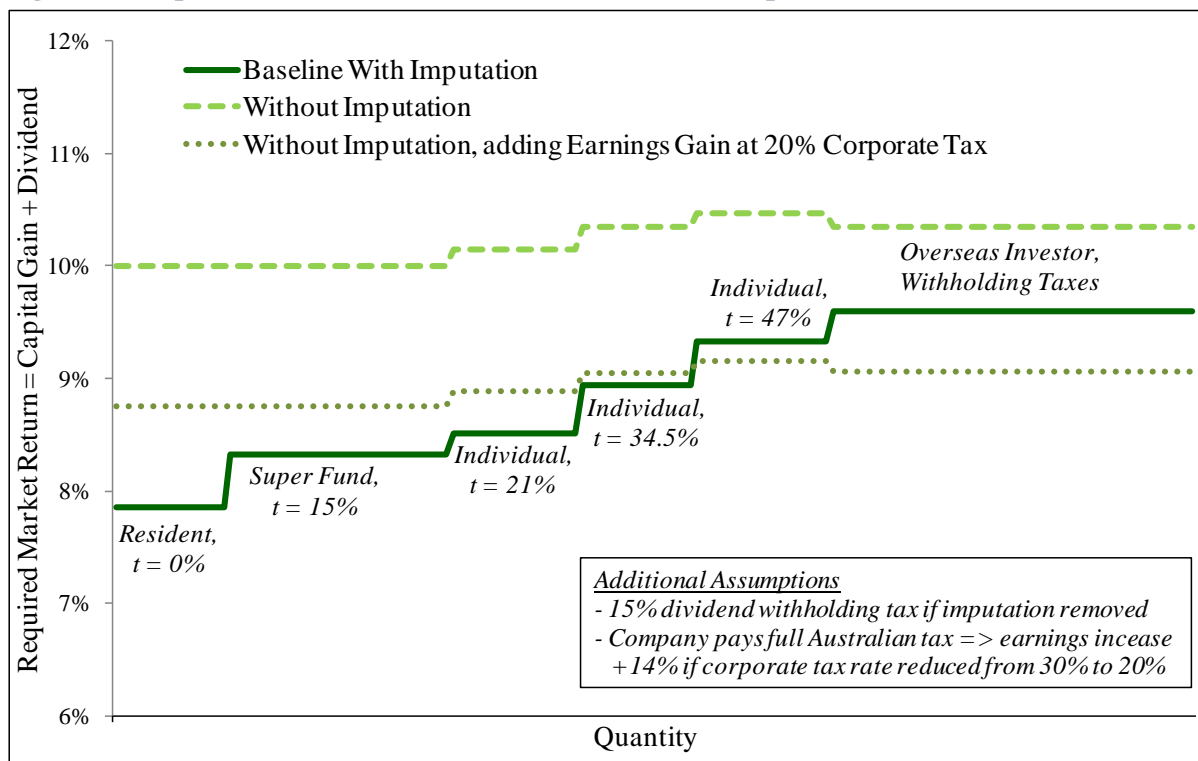
The potential effect of removing imputation on share prices and required returns is hard to anticipate. Much depends on whether imputation is priced to start with, which is open to conjecture, as discussed above. The context under which any alteration to the system occurs is also relevant, particularly whether any concurrent change is made to the corporate tax rate. We aim to highlight the factors to consider, rather than predict what will happen. The bottom line is that removing imputation may or may not impact pricing and required returns over the long term; but is highly likely to result in some sort of market reaction, even if this is not sustained.

Figure 7 and Figure 8 below set the background by illustrating how the removal of imputation might change required market returns on a stock paying fully-franked dividends for various investors. The upper dashed line in both charts reveals that required market returns would be higher for most investors. This includes overseas investors, if it is assumed that the 15% withholding tax they would then pay becomes an additional tax at the margin. The lower dotted line makes an adjustment for the effect of a concurrent reduction in the corporate tax rate to 20%. The effect is depicted notionally by adjusting the required return downwards for the increase in earnings. This line indicates the net pass-through of pre-tax corporate earnings to various investors, after accounting for both corporate and investor income taxes. From this perspective, Figures 7 and 8 suggest that overseas investors would be net 'winners' from such a combination of changes. Meanwhile, many local investors would be net 'losers', except those on the top tax rate. This underscores how making such a change may be politically difficult, particularly if overseas investors are viewed as the primary beneficiaries. However, great care needs to be taken in interpreting these estimates, for reasons set out in the discussion that follows.

**Figure 7: Required Market Returns Under Removal of Imputation**



**Figure 8: Required Market Returns Under Removal of Imputation (Rf Taxed)**





The nature of the effects on *share prices* of changes to corporate tax rates and imputation need to be distinguished. As corporate taxes are borne by the company, they impact on the cash flows and earnings available to all shareholders. A reduction in the corporate tax rate hence boosts the numerator in the net present value equation. It should result in an unambiguous, one-off upward adjustment in share prices, without any subsequent shift in expected returns going forward. However, the effects of changes to imputation are borne differently by various shareholders, and can be better understood as a change in the discount rate. To the extent that the removal of imputation imposes additional tax on the marginal investor, this may raise the required return that the market needs to deliver. This increase in the discount rate will place downward pressure on share prices. After the adjustment, expected returns would then be higher on a go-forward basis. The upper dashed lines in Figures 7 and 8 indicate what might happen to the discount rate. The net share price adjustment would depend on the balance of the corporate tax and imputation effects (and is roughly captured by the lower dotted lines in Figures 7 and 8, remembering that the two elements are of a different nature).

With this background, it is clear that the market response to removal of imputation depends on whether imputation is priced to begin with; and whether the corporate tax rate is reduced at the same time. If imputation were removed in isolation, it would amount to a tax increase for some investors. The range of possible reactions would extend from no response, through to higher required market returns and lower share prices for stocks paying franked dividends. If the corporate tax rate were reduced at the same time, the range of potential reactions broadens. The net impact will depend on the balance between any negative effect from increases in required market return, and the positive effect of a lower corporate tax rate on company earnings. The propensity would probably be towards positive share price responses, to the extent that any EPS revisions would be fully recognised and imputation credits appear to be partially priced at best. However, this depends on the relative magnitudes. Note that the TDP stance that imputation is not priced implies a one-off upward share price adjustment related to any earnings change; no change in the required market return; but a reduction in the pre-tax return that companies need to earn to satisfy the market on a go-forward basis.

The discussion so far has considered share prices on average. There is also scope for re-pricings across companies. Differential effects could be felt by companies depending on where they sit on the franking spectrum, the extent to which they pay Australian corporate taxes, and the degree to which imputation was priced to begin with.

Regardless of where the market ultimately settles, scope exists for dynamic adjustment effects as investors rebalance their portfolios. The upshot of removing imputation is some holdings are likely to be transferred from local to overseas investors, as their respective *relative* expected returns shift. However, the associated path of prices may depend on whether imputation is removed in isolation, or in parallel with a reduction in the corporate tax rate. Two potential dynamics, whereby those more impacted by the changes respond initially, followed by a response from other investors, are as follows:

- *Imputation is removed => some locals sell => share prices fall => overseas investors enticed to buy => price recovers (perhaps partially)*
- *Corporate tax rate reduced => earnings increase => overseas investors buy => share prices rise => some local investors sell => price pulls back (perhaps partially)*

Finally, to the extent that any adjustments are capitalised immediately into prices, a substantial portion of any effect is borne by existing owners. Hence it would be wrong to conclude that the entire burden of change is incurred by the investors directly impacted by the tax changes. A key dividing point in establishing whether effects are spread across all shareholders is what has changed relative to what is already reflected in the market. This leads us back to the issue of whether imputation is indeed priced.



## 5. Cost of Capital and Project Evaluation in Practice

The cost of capital is the counterpart of the return required by investors. It is the hurdle rate that a company needs to exceed on investments in order to create value, and boost the share price. Thus all the conceptual and empirical problems of identifying how imputation impacts on the required return as discussed in Sections 3 and 4 translate through to the cost of capital. In this section, we outline the evidence on whether imputation is taken into account in setting the cost of capital in practice, and its implications for both evaluating investment projects and regulation of utilities. The general finding is that imputation is ignored by most companies in formally estimating their cost of capital. The notable exception is for utilities regulation. Nevertheless, many companies clearly recognise that imputation credits are valuable to some shareholders, and this may influence their behaviour: a notion that is confirmed when considering the evidence on capital structure and payout policy in Sections 6 and 7. Imputation seems to be distinctive in this respect, as there are few signs that companies take other personal investor tax effects into account. This is unsurprising given that corporate tax and imputation are the only tax effects that a company can directly control.

### 5.1. Evidence from the Corporate World

Truong, Partington and Peat (2008) surveyed 87 listed companies in late-2004 on their practices in estimating cost of capital and capital budgeting. They find that 83% ignore imputation when evaluating projects. Where imputation credits are incorporated, there exists a wide range for the value attributed or ‘gamma’, with 50% being the most popular assumption. Of the reasons given for ignoring imputation, 37% of respondents cite the difficulty in estimating its value for all investors. Only 10% of respondents thought that imputation is not priced; although 25% said that the effects are likely to be small. These findings are consistent with a survey of valuation practices by KPMG (2013). They suggest that while imputation is only formally taken into account by a minority of companies, there are signs of awareness that imputation credits are of value to investors.

The other issue is whether it would make any significant difference to the investment decisions of companies if imputation was incorporated into cost of capital estimates (or project cash flows). This is a subset of the larger question of whether the analysis conducted in evaluating investments – including cost of capital estimates – are germane to project selection. Coleman, Maheswaran and Pinder (2010) survey and interview the chief financial officers of Australian listed companies. They find that subjective considerations dominate in making financial decisions. While discounted cash flow techniques are almost always used in evaluating investment decisions, their interviews suggest that these calculations are “merely a formality, and that decisions were dominated by qualitative, non-financial criteria”. Together this evidence suggests that imputation is not only often excluded from any formal financial analysis to start with; but in any event, formal analysis plays a supportive, rather than driving, role in the ultimate investment decision.

Dempsey and Partington (2008) show that the failure to account for imputation credits in project evaluation (assuming that they are priced) leads to two offsetting errors. The first is that the cost of capital (or alternatively the cash flow) is understated, which leads to undervaluation of projects. The second is that the cost of using retained earnings as a source of finance is understated, which leads to overvaluation of projects. These effects do not necessarily exactly offset each other. However, they do work to help mitigate the consequences of ignoring imputation.

## 5.2. Regulatory Practice

The treatment of imputation credits for regulatory purposes stands in stark contrast to the approach elsewhere. Regulators make explicit allowance for imputation in their regulatory decisions (e.g. see AER, 2015). The regulators employ the model of Officer (1994), where imputation is taken into account and other tax effects incurred by investors are ignored. The application involves reducing the cost of corporate tax by the ‘value of imputation credits’, which lowers the pre-tax return that utilities are allowed to earn on regulatory capital. This has the effect of limiting the prices that utilities are permitted to charge.

The regulators estimate the value of imputation credits as the product of the distribution rate (i.e. the portion of income that is assumed to be distributed to shareholders), and the utilisation rate. The latter parameter reflects an estimate of the value of imputation credits in the hands of investors. In a recent decision, the Australian Energy Regulator (AER) applied a value of 0.4 to imputation credits (AER, 2015). While this value was formed with reference to a range of estimates and measures, it roughly equates to the product of a 70% distribution rate and a 60% utilisation rate. That is, regulatory practice assumes that distributed imputation credits are worth about \$0.60 in the dollar.

A notable feature of the regulatory approach is the hierarchy that is applied in considering various estimates of the utilisation rate. The AER firstly relies on the proportion of Australian equities holdings held by domestic investors, which it indicates to be in the range of 0.56 to 0.68 for all equity, and 0.38 to 0.55 for listed companies.<sup>20</sup> They secondly consider the reported utilisation of imputation credits according to taxation statistics, suggesting a range for the utilisation rate for all equity of 0.4 to 0.6, with reference to analysis by Hathaway (2013). They place least reliance on what they call ‘implied market value studies’. Thus least weight is placed on the body of research aiming to extract the value of imputation credits from market prices and returns, as described in Section 4.1. Their reasons are that the equity holding and tax data provide more direct and simple evidence, meanwhile downplaying market-based studies based on their methodological limitations and variable estimates.<sup>21</sup>

## 5.3. What If Imputation Was Removed?

Removing imputation would probably have no major impact on the manner in which most companies estimate cost of capital and evaluate investments. Imputation is typically *not* built into the cost of capital for most companies. If it is considered, it is typically treated as a relatively minor, second-order effect. The incentive to invest in Australia relative to overseas might be reduced at the margin, to the extent that companies are mindful of generating imputation credits to pass on to those shareholders that value them. But in all probability, this effect would be marginal at best. Other considerations are more likely to dominate.

Nevertheless, the net effect of any alteration to the imputation system depends on any other concurrent changes, with any reduction in the corporate tax rate again the main issue. A key question is the extent to which company tax rates influence investment decisions. On one hand, any impact may be diluted to the degree that tax effects and cost of capital are second-order influences on investment decisions, relative to more subjective considerations. This equally applies to overseas companies contemplating investing in Australia, as well as domestic companies. On the other hand, unlike imputation, corporate

<sup>20</sup> AER (2015) cites analysis of national accounts data as their source. However, their quoted ranges for domestic ownership appear low relative to other evidence. Other estimates fall in the range of approximately 60%-80%, including Black and Kirkwood (2010), Handley (2014) and our own (unreported) analysis of CHES data.

<sup>21</sup> The discussion in Section 3.2 around how market equilibrium is determined is directly relevant to this issue. It raises some questions over the philosophy underpinning the regulatory approach.

tax has a direct effect on corporate cash flows and reported profits. This increases the chances that a tax rate reduction would make some difference. In reviewing the evidence, Griffith, Hines and Sørensen (2010) conclude: “while there is some evidence that taxes affect a firm’s location and investment decisions, it is not clear how big this effect is.” In conclusion, a reduction in the corporate tax rate in conjunction with removal of imputation is likely to lead to increased corporate investment. However, the magnitudes involved may be substantially diluted to the extent that tax considerations are a secondary influence on investment decisions.

Ending imputation has greater potential to impact on regulatory decisions. In isolation, removing imputation would increase the return that utilities are allowed to earn on their regulatory capital. This would raise the prices that utilities are permitted to charge. Here too, whether there is any concurrent change in the corporate tax rate matters, which could partially, or more than, offset the alterations to imputation (depending on how any changes are structured).

## 6. Capital Structure

Australian corporate leverage declined markedly in the early-mid 1990s, settling at much lower levels than observed prior to the introduction of imputation. The extent to which imputation was a key driver of this shift is an open issue. Not only does the theory of how tax links to capital structure remain unresolved; but many other influences were evident at the time which might explain the reduction in leverage. While it is likely that imputation has contributed something towards lowering corporate leverage, it is probable that it has only a minor and second-order influence on capital structure.

### 6.1. Theory

The theory of capital structure is far from settled. Myers (2001) identifies three theories, and notes the alternative hypothesis that capital structure doesn’t matter:

- **Tradeoff theory** – The tax advantage of debt is traded-off against costs associated with financial distress and agency, suggesting that some ‘optimal’ capital structure exists.
- **Pecking order theory** – There is an order of preference for funding capital expenditures, starting with internal cash flows, followed by debt, and lastly new equity issues. Thus capital structure reflects the cumulative need for external funds, i.e. it is path dependent.
- **Free cash flow theory** – This notion is rooted in agency theory. It views debt as a disciplining mechanism to limit over-investment. The theory is largely applicable to mature firms with high free cash flows.
- **Capital structure doesn’t matter** – This view aligns with the seminal work of Modigliani and Miller (1958), as well as the subsequent extension by Miller (1977) suggesting that investor clienteles and the relative cost of equity and debt adjust so that capital structure becomes irrelevant in equilibrium.

Myers (2001) offers the opinion that none of the capital structure theories provide a comprehensive description, although all help to explain behaviours under certain conditions. Our interest is how imputation fits into this landscape. Unfortunately, again the theory provides no clear guidance.

The prime theoretical reason to expect a relation between imputation and capital structure emerges under trade-off theory. The common view is that a substantial tax advantage to debt exists under a classical tax system due to the tax deductibility of interest. This tax advantage is reduced under

imputation, to the extent that imputation makes equity less ‘expensive’ relative to debt as a funding source by reducing the tax wedge on equity income relative to interest income for investors.

There are a number of counter-arguments. Miller (1977) suggests that any advantage to either equity or debt will be removed through the adjustment of investor clienteles and market returns, leaving no incentive to use either debt or equity at the margin. Note that Miller’s stance refers to equilibrium. It does not preclude the possibility that *changes* in capital structure might occur in response to changes in tax rates as part of a shift to a new equilibrium. Thus Miller’s stance is not inconsistent with shifts between debt and equity in response to adjustments to the tax system, including imputation, at least to the extent that imputation credits are sought by investors.

The other issue with the role of imputation under trade-off theory is its assumption that companies actually care about the tax effects incurred by investors when estimating the relative cost of equity versus debt. On one level, this requires companies to take into account that some shareholders may prefer equity over debt due to relative tax status; and for them to view imputation as a significant component of this preference. It is not a foregone conclusion that companies will perceive the world in this way. In this context, it is instructive that imputation does not appear to be incorporated into cost of capital estimates, as discussed in Section 5.1. On another level, other influences on capital structure may dominate. Both the pecking order and free cash flow theories suggest that capital structure decisions are made for reasons other than relative cost, let alone tax effects that are borne by shareholders. Graham (2003) reviews the evidence on the links between taxes and corporate finance, and concludes: “Many issues remain unresolved, however, including understanding whether tax effects are of first-order importance, why firms do not pursue tax benefits more aggressively, and whether investor actions are affected by investor-level taxes”.

Given that the theory is inconclusive and provides no clear direction on whether imputation influences capital structure, we turn to the empirical evidence.

## 6.2. Evidence

There is compelling evidence that a significant change occurred in the capital structures of Australian companies in the years following the introduction of imputation on 1 July 1987. Figure 9 (over) illustrates the marked and sustained reduction in corporate leverage that occurred in the first half of the 1990s, specifically following the recession of the early-1990s. The issue is to what extent imputation was responsible for deleveraging.

Two academic studies directly attribute these changes in capital structure to the imputation system, by comparing the behaviour of companies before and after imputation was introduced. Twite (2001) finds that following the introduction of imputation, the aggregate portion of debt in capital structures decreased; the portion of capital raised by external equity rose, while that from retained earnings fell; and that observed substitutions of equity for debt were related to the effective corporate tax rate. Pattenden (2006) conducts a more detailed examination using advanced econometric methods and measures of the expected effective corporate tax rate. She finds that the corporate tax rate influenced capital structures prior to the introduction of imputation, but not afterwards. She interprets the findings as consistent with the predicted change from a classical to an imputation system.

**Figure 9: Net Debt /Equity for Australian Non-Financial Corporations**



Source: Australian Bureau of Statistics, Cat No. 5232.0

Regarding the extent to which imputation was a primary driver for the observed reduction in leverage, a number of alternative influences can be identified that may not be fully captured by the controls used by Twite (2001) and Pattenden (2006). A range of other potential factors are listed by Mills, Morling and Tease (1993), including: a shift upwards in real borrowing costs; a potential decline in the cost of equity; changing attitudes towards gearing (as evidenced by the share market response to gearing levels and changes); forced restructurings for some firms; and the growing availability of alternative hybrid instruments such as convertible notes and preference shares. We can add other observations. The fact that excessive debt played a key role in propagating the 1990s recession probably compounded the aversion to gearing. Inflation also fell markedly in Australia following the 1990s recession. Inflation interacts with both the after-tax real cost of debt paid by a company, and the manner in which equities are rated on the market (e.g. price/earnings ratios), both of which may make equity funding appear more attractive. Finally, and most importantly, there were significant reductions in the statutory corporate tax rate and hence the tax shield of debt over the period. After being initially increased from 46% to 49% in 1987-8 in conjunction with the introduction of imputation, the corporate tax rate was subsequently reduced to 38% in 1988-9 and then 33% in 1994-5.<sup>22</sup>

With so much going on, it is hard to be confident that the introduction of imputation was a major driver in the reduction of corporate gearing that occurred in the early-mid 1990s. Nevertheless, the company-level results of Twite (2001) and Pattenden (2006) suggest that imputation probably had at least some influence.

<sup>22</sup> The corporate tax rate was subsequently increased to 36% in 1995-6, before being reduced to 34% in 2000-1 and eventually 30% from 2001-2.

### 6.3. What If Imputation Was Removed?

Viewed in isolation, any removal of imputation might help encourage some shift back to higher corporate leverage – at least to the extent that company management is influenced by tax effects that are borne by shareholders. However, whether there is any corresponding, offsetting reduction in the corporate tax rate matters quite a lot. A lower corporate tax rate unambiguously increases the after-tax cost of debt that is *directly* borne by the company itself, and hence manifests in corporate earnings. Companies are thus more likely to pay close attention to a reduced corporate tax rate. Meanwhile, how they view a change in the imputation system is less assured, in part because the effects are borne by shareholders. The net impact on leverage is difficult to anticipate, and depends on the overall structure of any tax package, and the manner in which companies decide their capital structure. Note that if there is an effect, it may occur as a one-off adjustment as markets transition to a new equilibrium.

## 7. Payout Policy

Dividend policy is one area where there is strong evidence that introducing imputation had a substantial impact, inducing higher payouts. From a policy perspective, the key issue is whether this matters. How dividend policy impacts on share prices remains open to debate. Nevertheless, we contend that the increase in payouts under the imputation system had a positive effect through placing a discipline on companies around how they deploy capital. Arguably this is one of the key benefits of imputation. The associated change in corporate behaviour has likely contributed to more efficient management of capital, to the advantage of both shareholders and the Australian economy at large.

### 7.1. Theory

Paralleling the debate over capital structure that was discussed in Section 6 is the issue of whether dividend payout policy matters, and if so, why. Again, there is no consensus. Allen and Michaely (2003) provide a comprehensive overview of the theory. They point out that the seminal work of Miller and Modigliani (1958) putting forward the ‘dividend irrelevance’ hypothesis is based on perfect market assumptions. It thus provides direction on situations where dividend policy may matter. Specifically, dividend policy may influence share prices under the following conditions:

- (i) *Differential taxes* on dividends versus capital gains, where investors cannot neutralize the effect through trading;
- (ii) *Asymmetric information*, such that dividends can be used to convey information;
- (iii) *Incomplete contracts*, under which paying dividends may discipline managers by reducing the amount of excess cash available for making poor investments;
- (iv) *Institutional constraints*, where some investors are precluded from investing in low or non-dividend paying stocks; and
- (v) *Transaction costs*, which can be reduced by making cash available to shareholders.

We will expand on points (i) and (iii), which are the most relevant for our discussion.

Regarding the first condition of differential taxes, Allen and Michaely (2003) point out that whether differential taxes have an effect can depend on the existence of ‘clienteles’. US-based research suggests that clientele effects do not dominate; and that dividends are consequently valued less than capital gains. The latter provides one reason for the relatively low level of dividends paid by US



companies, and the shift that occurred towards greater use of share repurchases for distributing earnings, most notably during the 1980s and 1990s.

As the US operates a classical tax system, the US findings need not translate to an Australian setting. Under Australia's current tax system, dividends are taxed at a lower rate than capital gains for most investors. Figure 10 compares the tax liability that is incurred by various Australian investors on a fully-franked dividend versus capital gains. The calculations assume that retained earnings translate into an equivalent capital gain, and the shareholder then sells their shares to be taxed at their long-term capital gains tax rate.<sup>23</sup> The calculations reveal that dividends are substantially tax-advantaged for all investors except those on the top marginal tax rate of 47%.<sup>24</sup>

**Figure 10: Tax Liabilities on Dividends versus Capital Gains for Australian Investors**

Use of Earnings		Tax Liability				
		Zero-Tax Payer	Superannuation Fund	Individual, low tax	Individual, medium tax	Individual, high tax
Investor						
<i>Tax Rates:</i>						
Income		0%	15%	21%	35%	47%
Capital Gains		0%	10%	10.5%	17.25%	23.5%
<b>100% Payout</b>						
Dividend Distribution	70					
Imputation Credit	30	-30	-30	-30	-30	-30
Gross Dividend	100	0	15	21	34.5	47
Capital Gain	0	0	0	0	0	0
<b>Total Tax Liability</b>		<b>-30</b>	<b>-15</b>	<b>-9</b>	<b>4.5</b>	<b>17</b>
<b>0% Payout</b>						
Dividend Distribution	0					
Imputation Credit	0	0	0	0	0	0
Gross Dividend	0	0	0	0	0	0
Capital Gain #	70	0	7	7.4	12.1	16.5
<b>Total Tax Liability</b>		<b>0</b>	<b>7</b>	<b>7.4</b>	<b>12.1</b>	<b>16.5</b>
<b>Difference in Tax Liability</b>		<b>-30</b>	<b>-22</b>	<b>-16.4</b>	<b>-7.6</b>	<b>0.6</b>

# The capital gain calculation assumes the share price rises in accordance with the value of retained earnings; that the shares are then sold; and that the additional capital gain is taxed at the long-term capital gains tax rate.

Regarding the third condition of incomplete contracts and the disciplining role of higher payouts, we believe this idea has much merit. The mechanism is that the act of paying out earnings in order to release imputation credits has three effects. First, it erodes the 'money burning a hole in our pockets' syndrome, whereby companies may feel they need to do something with any spare cash. Second, it increases the likelihood that companies will have to seek external funding for investments. As seeking external funding requires incurring costs and providing justification, this makes it more likely that only good investments are pursued. An alternative to seeking extra external funding is to expand dividend reinvestment plans (DRPs), and this has happened. In this case, a disciplinary effect arises in that

<sup>23</sup> This overstates capital gains tax to the extent that investors might defer the sale and hence the payment of capital gains tax, or have access to offsetting losses.

<sup>24</sup> The assumed individual tax rates incorporate the Medicare levy of 2%, but exclude the temporary budget repair levy of 2% which applies to incomes over \$180,000.

shareholders have to be convinced to participate. Third, by releasing cash, investors can then ‘recycle’ the funds back towards the most worthy investments.<sup>25</sup>

Allen and Michaely (2003) point out that it is difficult to test the proposition that dividends act as a disciplining mechanism. Nevertheless, there exists a range of circumstantial evidence. Robust and consistent evidence exists that share prices react positively to dividend increases and initiations, and negatively to decreases and omissions (see Allen and Michaely, 2003). Thus the market sees something positive in higher dividends, although there are various potential explanations. Stocks paying higher dividends have delivered higher earnings growth, not lower as would be expected if retention were converted into additional earnings (Arnott and Asness, 2003; Zhou and Ruland, 2006). Further, belief that higher payouts provide a source of discipline is expressed by a range of informed observers.<sup>26</sup> When taken as a body of evidence, it seems higher payouts appear to be good for shareholders; with companies that distribute more being both better regarded and having delivered better earnings.

How does imputation induce higher payouts? The fact that many investors are tax-advantaged by imputation credits can act as an incentive for company management to look to generate and then distribute imputation credits via a number of channels. The notion that moving to pay higher dividends has a positive impact on share prices can help encourage companies to pay out imputation credits, especially where management remuneration is tied to the share price. Distributing imputation credits can curry favour with shareholders who benefit, while sending a signal of concern for shareholder interests. This may garner some shareholder loyalty, and further support the share price at the margin. Also, if a company has excess imputation credits available (and is not capital constrained), the costs of distributing them is relatively minor. Taken together, increasing payouts in order to distribute imputation credits probably stacks up on a cost-benefit basis.

There is clear evidence from company behaviour that managers have paid attention to getting franking credits into the hands of shareholders, particularly shareholders who can use those credits. Examples include: dividend streaming in the early years of imputation; structured buybacks; and the surge in franking credits distributed in anticipation of changes to the corporate tax rate, which reduces the value of undistributed credits via an effective reduction in the rate applied to franking account balances. Consequently it is not difficult to believe that management is motivated to increase credits distributed by the simple expedient of paying higher dividends – a belief that the evidence below supports.

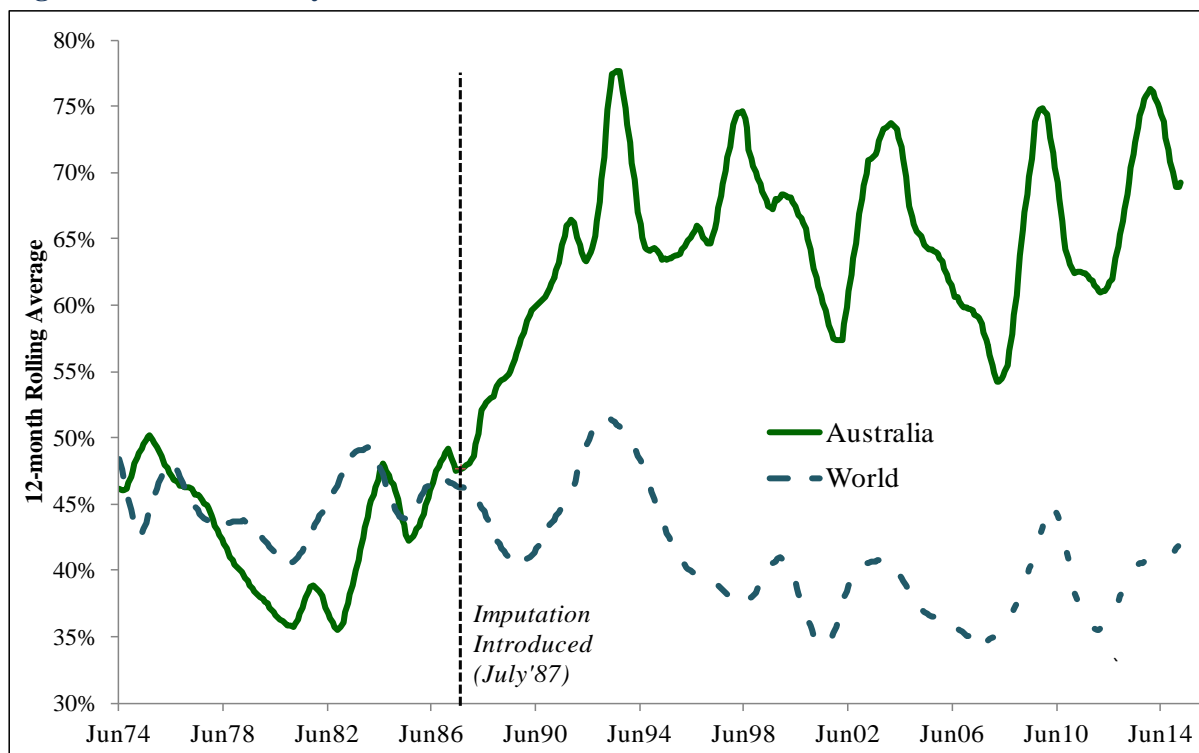
## 7.2. Evidence

There is strong evidence that imputation has encouraged higher payouts in Australia. Figure 11 compares the dividend payout ratios for the Australian and world equity markets. The divergence following the introduction of imputation is stark, and has been sustained.

<sup>25</sup> The argument is put forward by Kate Howitt from Fidelity, see *Australian Financial Review*, 7 April 2015, “*Why franking is good for the economy*”.

<sup>26</sup> For example, see Ross (2015); *Australian Financial Review*, 31 March 2015, “*Dividend credit debate splits business, investors*”, and 9-10 May 2015, “*Franking credits add stability, say fundies*”.

**Figure 11: Dividend Payout Ratio**



Source: Datastream

A number of researchers confirm the link between imputation and higher payouts in Australia. Callen, Morling and Pleben (1992) model the growth in real dividends between 1985-6 and 1990-1, and attribute 20% of the 38% rise to tax changes. Pattenden and Twite (2008) find that imputation led to higher gross and net dividends, as well as more dividend initiations. They also find that the increases in payouts were greater for companies with more imputation credits. Brown, Handley and O'Day (2015) provide further evidence of the influence of tax effects on dividend policy. They find that on-market share repurchases are used as substitutes for dividends, while this is not the case for off-market share repurchases. The latter is a mechanism by which imputation credits can be selectively distributed to shareholders who value them most. Off-market repurchases have become increasingly prevalent over recent years, consistent with companies being mindful of distributing imputation credits in the most effective manner. By contrast, Partington (1989) surveyed Australian companies about the influences on dividend policy prior to the introduction of imputation. He found that tax was ranked as the *least* important consideration. Imputation has clearly contributed to a sea change in the way in which Australian companies approach payout policy.

### 7.3. What If Imputation Was Removed?

Removing imputation would do away with a major driving force for higher payouts. The weight of evidence suggests that reversing the propensity towards higher payout ratios would be negative for shareholders and potentially the Australian economy, to the extent that it lowers the discipline around investment decisions. Cuts to dividend payouts are usually penalised by share price reductions, making management understandably reluctant to cut dividends (see Allen and Michaely, 2003). Some firms might make substantial cuts, perhaps using the tax change as justification. More likely, rather than cutting dividends, companies would slow the rate of increase. Thus any effects would probably be felt over the passage of time, with the payout ratio drifting lower as a smaller portion of any earnings increases find their way into distributions.

## 8. Investor Portfolios

We consider the impact of imputation on investor portfolios from two directions. First, we review the evidence for dividend clienteles operating in the Australian market. The existence of clienteles would suggest that imputation may have differing effects depending on the market situation. The key finding is that a clientele valuing imputation credits may operate in the smaller, domestic company segment. There is also some evidence that clienteles may be influencing trading and price behaviour around dividend events. Second, we discuss whether imputation may have influenced portfolio structures, and what this might mean. Although imputation may have led to some portfolios being skewed towards Australian equities, we argue that this should not be seen as a major policy concern.

### 8.1. Clienteles

There is no doubt that imputation creates a bias to Australian equities amongst domestic investors at the margin. Thus clienteles would be expected to exist to at least some degree. For instance, Jun, Gallagher and Partington (2011) find that Australian institutions prefer stocks paying fully-franked dividends. The issue is whether these clienteles are pervasive enough to dominate pricing. We are particularly interested in circumstances where the marginal investor may be a domestic investor that values imputation, such that imputation is priced. Two situations exist where there is evidence that this may be the case.

The first situation is with respect to smaller, domestic companies. As mentioned previously, Durand Limkriangkrai and Smith (2006) provide general evidence that larger Australian companies may be integrated with global capital markets, while smaller companies are not. Heaney (2011) extends this analysis into the realms of tax by examining the relation between share prices and franking credit balances, controlling for other influences. The manner in which franking credit balances are priced suggests that two tax clienteles exist: one for companies that are larger and integrated with global markets, which are priced by overseas investors; and another for smaller companies, which are priced by local investors. This research examines listed markets. It is even more likely that many unlisted Australian companies are owned primarily by domestic investors: a notion that is supported by the ownership data cited in AER (2015). Overall, there is a substantial class of smaller, local companies for which there appears to be a predominantly domestic shareholder clientele, and where imputation credits may be fully valued (at least in instances where franked dividends are paid). This class of companies is likely to be economically significant.

The second situation in which clienteles might dominate pricing is around dividend events. As this issue was raised and discussed in Section 4.1, we briefly relay some of the evidence. Ainsworth *et al.* (2010, 2015) examine the trading behaviour of institutional investors and associated price effects by drawing on reported trades and holdings data. The findings are consistent with tax-motivated trading behaviour, which in turn seems to differ for managed funds and superannuation funds. This evidence might be read alongside the contrasting price behaviour around dividend events in the ADR versus the domestic market, as highlighted by Jun and Partington (2014). Overall, this evidence is consistent with a limited form of clientele effect occurring around ex-dividend events.

### 8.2. Portfolios

It is difficult to get hard data on the extent to which imputation is responsible for skewing the portfolios of Australian investors towards Australian equities paying fully-franked dividends. Nevertheless, it is generally believed that this is the case, and discussion within the TDP implies as much. Perhaps the strongest evidence is for SMSFs, which hold 32% of their assets directly in listed

equities but only 0.4% in international equities.<sup>27</sup> For superannuation funds, Chant, Mohankumar and Warren (2014) report that balanced MySuper funds held roughly equal exposures to Australian and international equities at December 2013 of 26.7% and 25.4% respectively.

It is difficult to gauge the extent to which the desire to capture imputation credits is a prime driver of the bias towards Australian equities. Home bias is common across the world, and has a wide range of potential causes (see Lewis, 1999). It has also been proved persistent (see Levy and Levy, 2014). The exposure of SMSFs might be substantially explained by familiarity biases, perceived information advantages, or merely an artifact of Australian equities having significantly outperformed world equities on a currency-adjusted basis until recently. Indeed, there are anecdotal signs that interest in overseas equities is currently on the rise, following the recent outperformance of international equities, which is mainly due to A\$ weakness. Warren (2010) models the local-international equity mix of Australian superannuation funds, allowing for a mixture of legacy and peer risk effects, diversification benefits, and return expectations that are formed adaptively and allow for the benefit of imputation credits. The key point is that the allocation between local and international equities is best explained by taking a wide range of influences into account, of which imputation is but one.

Another issue is whether it matters that some portfolios are biased towards Australian equities, or concentrated in stocks that pay high, fully-franked dividends. The question is how much diversification is enough. Whether a portfolio of 50% Australian equities (or one-third bank stocks) is out of line with global market weightings or the available opportunity set is not the primary concern. Rather, the issue is whether such portfolios contain significant and unwarranted concentrations of idiosyncratic (diversifiable) risk. It has long been recognised that only 5-10 stocks may be sufficient to diversify away the great bulk of systematic risk (Evans and Archer, 1968). Hence portfolios containing only a relatively small subset of available stocks may be adequately, although not completely, diversified.

From this perspective, it is doubtful that the portfolios held by most institutional funds are substantially riskier than ones containing 97–98% world equities in line with market weights. The extreme home bias observed in SMSF portfolios may be of greater concern, as it contains a concentrated bet on the Australian economy. However, it is important to place this issue in context from a policy perspective, and balance any dangers from lower diversification against any benefits that might arise from portfolios that are concentrated in particular areas. Overall, we don't see the lack of diversification as a major concern. Even in the SMSF area, the chances of concentrated Australian equity exposures leading to losses that result in a large drain on the public purse seem remote.

### 8.3. What If Imputation Was Removed?

It is probable that removing imputation would result in some portfolio shifts. These are more likely to occur over time, to the extent that imputation is only one of many considerations in constructing portfolios and selecting stocks. We see a number of potential effects:

- The largest potential for an effect may be in any small, domestic companies that are being priced and funded by a clientele of investors which benefit from imputation credits. If imputation were removed in isolation, this class of company may suffer downward re-pricing, and could find it more difficult to attract funding going forward. However, any corresponding reduction in the corporate tax rate could offset these effects in whole or part.

<sup>27</sup> These estimates are based on data from the Australian Tax Office for June 2014. The data only refers to direct equity holdings. Some exposure to international equities may appear within the 'trusts' category. Listed trusts comprised 3.7% and unlisted trusts 8.8% of SMSF assets at June 2014.

- Removing access to imputation credits could lead some investors to shift their preference towards stocks producing capital gains, rather than fully-franked dividends, again depending on the overall nature of any revised tax arrangements.
- It is likely that the character of trading and associated price behaviour around dividend events may change, via altering the motivations and nature of investors who are active at the time.
- Price dynamics may occur as a consequence of investors repositioning their portfolios. We have already discussed this issue in Section 4.4, where it was noted that much depends on whether the corporate tax rate is reduced at the same time.
- Any improved diversification that occurs as a result of removing imputation would probably provide modest benefits at best. However, given that imputation is only one factor amongst many in setting portfolios, the impact on home bias and portfolio structures could be quite small.

## 9. Conclusion

We have investigated the financial implications of Australia's dividend imputation system, including its potential impact on share prices, costs of capital and project evaluation, capital structure, payout policy and investor portfolios. Along most of these dimensions, the effects of imputation are debatable both in theory and in practice. In particular, the extent to which imputation is reflected in share prices and impacts on the cost of capital is unclear, and the evidence is mixed and inconclusive. Further, the pricing afforded to imputation credits may vary with market circumstances, rather than being a universal constant. The relationship between tax effects and capital structure is similarly an unsettled matter. While imputation may have had some impact on portfolio structures through encouraging a bias towards domestic stocks that pay fully-franked dividends, it is not apparent whether this really matters. To confuse the issue further, imputation may be only a second-order consideration with marginal effects that are often hard to discern. The one area where imputation does appear to have a clear and substantial impact is on payout policy, through encouraging higher dividend payments and off-market buy-backs in order to release imputation credits.

Although the financial implications of imputation may be debatable, we can nevertheless offer some definitive statements about its consequences and what might happen if it were removed:

- The contribution of the imputation system to lifting payout ratios has been one of its key benefits, to the extent that this has contributed to more disciplined use of capital. From this perspective, dismantling the system could be detrimental to both shareholders and the Australian economy.
- The Tax Discussion Paper adopts the stance that imputation credits have not reduced the cost of capital, which it assumes is set in international capital markets. This is an extreme position. The evidence on this point is very mixed; and finance academics continue to debate the extent to which imputation is priced. A more even stance would be to start from the position that imputation *might* be priced, either partially or potentially fully in certain situations.
- A particularly important area where imputation probably does matter is small domestic companies, where local investors who value imputation credits determine prices and are chiefly responsible for providing funding. Any adverse impact from removing imputation is likely to be concentrated in this (economically significant) segment.
- Focusing on how imputation impacts on numbers such as cost of capital estimates is arguably less important than understanding the behaviours that imputation encourages. Many investors and company management do not build a value for imputation into their formal analysis of share price



valuations, cost of capital estimates, or evaluations of investment decisions. Nevertheless, the value of imputation credits to many shareholders is often acknowledged, and accordingly may impact on certain behaviours. Imputation can thus influence aspects such as portfolio structures, capital structure and (especially) payout policy. Policy makers might focus on whether the behaviours being encouraged are desirable, and how they might change if the imputation system was removed or adjusted.

- Regulation of utilities is a notable exception. This is one area where the value of imputation is explicitly built into the computations, and has real effects in terms of output prices. The impact of changes in imputation on utility prices should thus be given specific consideration.
- Many of the potential effects from removing or adjusting the imputation system are conditional on what happens to the corporate tax rate, which may provide anything between a partial to a more than offsetting impact. The major exception is payout policy, where reducing the availability of imputation credits to distribute would dull the incentive to distribute regardless. We also comment that the effect on investment of reducing the corporate tax rate may be much diluted to the degree that tax and cost of capital are second-order influences on investment decisions.

## References

- AER (2015), *FINAL DECISION: ActewAGL Distribution Determination, 2015-6 to 2018-9*, Attachment 4 – Value of Imputation Credits, Australian Energy Regulator (April)
- Ainsworth Andrew, Kingsley Fong, David R. Gallagher and Graham Partington (2010), “Taxes, Price Pressure and Order Imbalance around the Ex-Dividend Day”, *working paper*, Financial Management Association FMA Asian Conference, 2010
- Ainsworth, Andrew, Kingsley Y.L. Fong, David R. Gallagher, and Graham Partington (2015), “Institutional Trading around the Ex-Dividend Day”, *Australian Journal of Management* (forthcoming)
- Ainsworth, Andrew and Adrian D. Lee (2014), “Waiting Costs and Limit Order Book Liquidity: Evidence from the Ex-Dividend Deadline in Australia”, *Journal of Financial Markets*, 20, 101-128.
- Allen, Franklin, and Roni Michaely (2003), “Payout Policy”, in *Handbook of the Economics of Finance 1*, George M. Constantinides, Milton Harris and René Stulz (eds), Chapter 7, 337-429
- Arnott, Robert D. and Clifford S. Asness (2003), “Surprise! Higher Dividends = Higher Earnings Growth”, *Financial Analysts Journal*, 59(1), 70-87
- Auerbach, Alan J. (2005), “Who Bears the Corporate Tax? A Review of What We Know”, *NBER Working Papers*, No. 11686 (October)
- Beggs, David J., and Christopher L. Skeels (2006), “Market Arbitrage of Cash Dividends and Franking Credits”, *Economic Record*, 82(258), 239-252
- Bellamy, David E. (1994), “Evidence of Imputation Clienteles in the Australian Equity Market”, *Asia Pacific Journal of Management*, 11(2), 275-287
- Berk, Jonathan B (1995), “A Critique of Size-Related Anomalies”, *Review of Financial Studies*, 8(2), 275-286
- Black, Susan and Joshua Kirkwood (2010, “Overseas Ownership of Australian Equities and Corporate Bonds”, *Bulletin: September Quarter 2010*, Reserve Bank of Australia, 25-33

- Brennan, Michael J. (1970), "Taxes, Market Valuation and Corporate Financial Policy", *National Tax Journal*, 23(4), 417-427
- Brown, Christine, John Handley and James O'Day (2015), "The Dividend Substitution Hypothesis: Australian Evidence", *Abacus*, 51(1), 37-62
- Callen, Tim, Steven Morling and Jill Pleban (1992), "Dividends and Taxation: A Preliminary Investigation", *Reserve Bank of Australia*, Research Discussion Paper 9211 (October)
- Cannavan, Damien, Frank Finn and Stephen Gray (2004), "The Value of Dividend Imputation Tax Credits in Australia", *Journal of Financial Economics* 73(1), 167-197
- Chant, Warren, Mano Mohankumar and Geoff Warren (2014), "MySuper: A New Landscape for Default Superannuation Funds", *CIFR Research Report* (April)
- Chu, Hung and Graham Partington (2008), "The Market Valuation of Cash Dividends: The Case of the CRA Bonus Issue", *International Review of Finance*, 8(1-2), 1-20
- Coleman, Les, Krishnan Maheswaran and Sean Pinder (2010), "Narratives in Managers' Corporate Finance Decisions", *Accounting and Finance*, 50(3), 605-633
- Dempsey, Mike and Graham Partington (2008), "Cost of Capital Equations under the Australian Imputation Tax System", *Accounting and Finance*, 48(3), 439-460
- Durand, Robert B., Manapon Limkriangkrai and Gary Smith (2006), "In America's Thrall: The Effects of the US market and US Security Characteristics on Australian Stock Returns", *Accounting and Finance*, 46(4), 577-604
- Evans, John L. and Stephen H. Archer (1968), "Diversification and Reduction of Dispersion: An Empirical Analysis", *Journal of Finance*, 23(5), 761-767
- Financial System Inquiry: Final Report*, Commonwealth of Australia, November 2014
- Feuerherdt, Clinton, Stephen Gray and Jason Hall (2010), "The Value of Imputation Tax Credits on Australian Hybrid Securities", *International Review of Finance*, 10(3), 365-401
- Graham, John R. (2003), "Taxes and Corporate Finance: A Review", *Review of Financial Studies*, 16(4), 1075-1129
- Gray, Stephen (2008), "The Impact of Franking Credits on the Cost of Capital of Australian Firms", *SFG Consulting*, South Bank, Queensland
- Gray, Stephen, Jason Hall and David Costello (2011), "Dividend Drop-off Estimate of Theta", *SFG Consulting*, South Bank, Queensland
- Griffiths, Rachel, James Hines and Peter Birch Sørensen (2010), "International Capital Taxation", in: *Dimensions of Tax Design: the Mirrlees Review*, Oxford University Press, Chapter 10, 914-996
- Gruen, Nicholas (2006), "Tax Cuts to Compete: The Influence of Corporate Taxation on Australia's Economic Growth", *CEDA Information Paper 85*, Committee for Economic Development of Australia and Lateral Economics
- Handley, John C. (2014), "Report Prepared for the Australian Energy Regulator: Advice on the Value of Imputation Credits", *Report prepared for the Australian Energy Regulator* (29 September)
- Hathaway, Neville (2013), "Imputation Credit Redemption, ATO Data 1988-2011: Where Have All the Credits Gone?", *Capital Research Pty Ltd*, Melbourne, Victoria (September)
- Hathaway, Neville, and Robert R. Officer (2004), "The Value of Imputation Tax Credits", *Capital Research Pty Ltd*, Melbourne, Victoria
- Heaney, Richard A. (2011), "The Existence of Tax Clienteles: An Australian Setting", *working paper*, UWA Business School

Henry (2009), *Australia's Future Tax System: Report to the Treasurer*, Commonwealth of Australia, December 2009 ('Henry Tax Review')

Jun, Aelee, David R. Gallagher and Graham H. Partington (2011), "Institutional Dividend Clienteles under an Imputation Tax System", *Journal of Business Finance and Accounting*, 38(1-2), 198-224

Jun, Aelee and Graham H. Partington (2014), "Taxes, International Clienteles and the Value of ADR Dividends", *Journal of Business Finance and Accounting*, 41(9-10), 1337-1360

King, Mervyn A. and Don Fullerton (1983), "The Taxation of Income from Capital: A Comparative Study of the United States, the United Kingdom, Sweden, and Germany -- The Theoretical Framework --", *NBER Working Papers*, No. 1058 (January)

KPMG (2005), "Cost of Capital – Market Practice in Relation to Imputation Credits", *Report to Victorian Electricity Distribution Price Review, 2006-10* (August)

KPMG (2013), "Valuation Practices Survey 2013", *KPMG Report*

Lai, Evelyn, Andrew Ainsworth, Michael McKenzie and Graham Partington (2014), "The Value of Dividends: Evidence from Short-Sales", *working paper*, Proceedings of the European Financial Management Association 2014 Annual Meetings, Rome, Italy (28th June)

Lajbcygier, Paul and Simon M. Wheatley (2012), "Imputation Credits and Equity Returns", *The Economic Record*, 88, 476-494

Lally, Martin (2000), "Valuation of Companies and Projects under Differential Personal Taxation", *Pacific-Basin Finance Journal*, 8(1), 115-133

Lally, Martin, and Tony Van Zijl (2003), "Capital Gains Tax and the Capital Asset Pricing Model", *Accounting and Finance*, 43(2), 187-210

Levy, Haim and Moshe Levy (2014), "The Home Bias is Here to Stay", *Journal of Banking and Finance*, 47, 29-40

Lewis, Karen K. (1999) "Trying to Explain Home Bias in Equities and Consumption", *Journal of Economic Literature*, 37(2), 571-608

Lewis, Karen K. (2011), "Global Asset Pricing", *Annual Review of Financial Economics*, 3 (December), 435-466

Livingstone, Catherine (1977) "Sophistication and Sophistry in Company Taxation", *Honours Thesis*, Macquarie University

Lonergan, Wayne (2001), "The Disappearing Returns: Why Dividend Imputation Has Not Reduced the Cost of Capital", *JASSA*, 1, 8-17

Mackenzie, Gordon and Margaret McKerchar (2004), "Tax-aware Investment Management by Public Offer Superannuation Funds in Australia: Attitudes, Practices and Expectations", *Australian Tax Forum: A Journal of Taxation Policy, Law and Reform*, 29(2), 249-279

McKenzie, Michael and Graham Partington (2010), "Evidence and Submissions on Gamma", *Report to AER, SIRCA* (March 25)

McKenzie, Michael D. and Graham Partington (2011), "Selectivity and Sample Bias in Dividend Drop-Off Studies", *Finance and Corporate Governance Conference*

Mercer (2013), "Tax & Superannuation: Benchmarking Australia Against the World's Best Retirement Savings Systems", *Mercer* (February)

Miller, Merton H. (1977), "Debt and Taxes", *Journal of Finance*, 32(2), 261-275

Miller, Merton H. and Franco Modigliani (1961), "Dividend Policy, Growth, and the Valuation of Shares", *Journal of Business*, 34(4), 411-433

- Mills, Karen, Steve Morling and Warren Tease (1993), "Balance Sheet Restructuring and Investment", *Reserve Bank of Australia*, Research Discussion Paper 9308 (June)
- Minney, Aaron (2010), "The Valuation of Franking Credits to Investors", *Journal of Applied Finance*, 2, 29-34
- Modigliani, Franco and Merton H. Miller (1958), "The Cost of Capital, Corporation Finance and the Theory of Investment", *American Economic Review*, 48(3), 261-297
- Monkhouse, Peter H.L. (1993), "The Cost of Equity Under the Australian Dividend Imputation Tax System", *Accounting and Finance*, 33(2), 1-18
- Myers, Stewart C. (2001), "Capital Structure", *Journal of Economic Perspectives*, 15(2), 81-102
- Officer, Robert R. (1994), "The Cost of Capital of a Company under an Imputation Tax System", *Accounting and Finance*, 34(1), 1-17
- Partington, Graham H (1989), "Variables Influencing Dividend Policy in Australia: Survey Results", *Journal of Business Finance and Accounting*, 16(2), 165-182
- Pattenden, Kerry (2006), "Capital Structure Decisions Under Classical and Imputation Tax Systems: A Natural Test for Tax Effects in Australia", *Australian Journal of Management*, 31(1), 67-92
- Pattenden, Kerry and Garry Twite (2008), "Taxes and Dividend Policy under Alternative Tax Regimes", *Journal of Corporate Finance*, 14(1), 1-16
- Ramsay, Frank P. (1927), "A Contribution to the Theory of Taxation", *Economic Journal*, 37(145), 41-67
- Ross, Matthew (2015), "Franking Credits: Eating Away at the 'Free Lunch'", *Goldman Sachs Portfolio Strategy Research* (April 28)
- Siau, Shaun, Stephen Sault, and Geoffery J. Warren (2015), "Are Imputation Credits Capitalised Into Stock Prices?", *Accounting and Finance*, 55(1), 241-277
- Sørensen, Peter Birch (2014), "Taxation of Shareholder Income and the Cost of Capital in a Small Open Economy", *CESifo Working Papers*, No. 5091 (November)
- TDP, *Re:think: Tax Discussion Paper*, Commonwealth of Australia, March 2015
- Twite, Garry (2001), "Capital Structure Choices and Taxes: Evidence from the Australian Dividend Imputation Tax System", *International Review of Finance*, 2(4), 217-234
- Twite, Garry, and Justin Wood (2003), "The Pricing of Australian Imputation Tax Credits", *working paper*, Australian Graduate School of Management, University of New South Wales
- Truong, Giang, Graham Partington and Maurice Peat (2004), "Cost of Capital Estimation and Capital Budgeting Practice in Australia", *working paper*, University of Sydney
- Vo, Duc, Beauden Gellard and Stefan Mero (2013), "Estimating the Market Value of Franking Credits: Empirical Evidence from Australia", *working paper*, Economic Regulation Agency, Perth, WA (April)
- Walker, Scott and Graham Partington (1999), "The Value of Dividends: Evidence from Cum-Dividend Trading in the Ex-Dividend Period", *Accounting and Finance*, 39(3) 275-296
- Warren, Geoffrey J. (2010), "Equity Home Bias in Australian Superannuation Funds", *Australian Journal of Management*, 35(1), 69-93
- Zhou, Ping and William Ruland (2006), "Dividend Payout and Future Earnings Growth", *Financial Analysts Journal*, 62(3), 58-69