FOI 2404
Document 1

From: s22
To:
Subject: FW: ANU imputation credit paper - follow-up [SEC=UNCLASSIFIED]
Date: Wednesday, 10 October 2018 4:33:39 PM
Attachments: What Imputation Means for Retirees (Research Summary) October 2018.pdf
ANU Submission - Removing Imputation in Retirement - October 2018_06.10.pdf
Butt, Khemka and Warren__What Imputation Means for Retirees_October 2018.pdf
Imputation - Do Franking Credits Matter - CIFR, 1 June 2015.pdf

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This is the ANU submission. Do not worry about the do franking credits matter – it is the market segmentation paper

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From: Francis, Geoff
Sent: Wednesday, 10 October 2018 10:49 AM
To: s22
Subject: FW: ANU imputation credit paper - follow-up [DLM=For-Official-Use-Only]

From: s22
Sent: Wednesday, 10 October 2018 10:16 AM
To: s22
Cc: Francis, Geoff
Subject: FW: ANU imputation credit paper - follow-up [DLM=For-Official-Use-Only]

Circulating a submission that the Office has passed down

From: s22
Sent: Wednesday, 10 October 2018 10:12 AM
To: s22 Francis, Geoff
Cc: Processing Coordination; s22 Tsr DLOs
Subject: FW: ANU imputation credit paper - follow-up [DLM=For-Official-Use-Only]

Good morning all

For info, to circulate as necessary to those interested in Revenue Group, please see attached ANU academic Geoff Warren's submission to the House Standing Committee on Economics Inquiry into refundable franking credits.

s22

From: Geoff Warren [mailto:geoff.warren@anu.edu.au]
Sent: Wednesday, 10 October 2018 9:25 AM
To: s22
Cc: Gaurav Khemka; Adam Butt
Subject: ANU imputation credit paper - follow-up

Dear s22

You may recall that we provided you with a copy of our research paper on the value of imputation credits for retirees in late September. I thought Treasury might be interested in receiving the materials we just submitted to the House Standing Committee on Economics' "Inquiry into the Implications of Removing Refundable Franking Credits". This included three items

- Our submission 'letter', which includes some additional modelling of Labor's policy
- A revised version of the paper that we sent to you in September. We have updated Table 4 for an error we discovered in the estimation of the total franking credits claimed. We have also updated the research summary, which is attached.
- My own CIFR paper, which considers the implications of the imputation more generally, which was provided to the Committee as additional background.

Best regards
Geoff Warren

Associate Professor Geoff Warren
Fund Convenor, ANU Student Managed Fund

Research School of Finance, Actuarial Studies and Statistics
College of Business and Economics
The Australian National University

Mobile: +61 411 241 091
Email: geoff.warren@anu.edu.au

We develop leaders who **transform** business, society and economies
ANU College of **Business and Economics**

From: s22 @TREASURY.GOV.AU]
Sent: Tuesday, September 25, 2018 10:05 AM
To: Geoff Warren <geoff.warren@anu.edu.au>
Subject: RE: ANU imputation credit paper plus summary [SEC=UNCLASSIFIED]

Thanks very much, Geoff.

s22
Departmental Liaison Officer

The Hon Josh Frydenberg MP
Treasurer
p 02 6277 7340 | m s22 @treasury.gov.au

From: Geoff Warren [mailto:geoff.warren@anu.edu.au]
Sent: Tuesday, 25 September 2018 10:01 AM
To: Tsr DLOs
Subject: ANU imputation credit paper plus summary

Associate Professor Geoff Warren
Fund Convenor, ANU Student Managed Fund

Research School of Finance, Actuarial Studies and Statistics
College of Business and Economics
The Australian National University

Mobile: +61 411 241 091
Email: geoff.warren@anu.edu.au

RESEARCH SUMMARY

What Dividend Imputation Means for Retirement Savers

By Adam Butt, Gaurav Khemka and Geoff Warren
College of Business and Economics, The Australian National University

4 October 2018

The Australian Labor Party has proposed a change in policy under which imputation tax credits can only be offset against existing tax liabilities, with a few exceptions such as pensioners and charities. Retirees are the major group that would be impacted by this policy, given that most are untaxed and hence able to claim the full value of imputation credits as a tax refund. Such a policy change would effectively reduce the returns that such retirees receive from investing in Australian equities by the amount of imputation credits, which average 1.3%-1.4% per annum for the Australian market overall. This is a significant number, noting that the expected long-run equity market return might be in the order of 7%-8% per annum. It is no wonder this policy is a subject of heated discussion, and much consternation from those nearing or in retirement.

Our research addresses what full access to imputation tax credits means for Australian retirees in two ways. We first ask how imputation could affect how they might invest. Specifically, we find that retirees are justified in having a considerable bias toward Australian equities in their portfolio to capture the imputation credits. We then estimate how valuable imputation credits are to retirees. We confirm they are indeed quite valuable, potentially the equivalent of a 5%-6% increase in spending during retirement.

Our approach involves modelling rational behaviour for a retiree who is funding their retirement out of an account-based pension, and may access the age pension under existing eligibility rules. We model retirees with starting balances at age 65 ranging from $25,000 up to $1.6 million (i.e. the cap on tax-free retirement accounts), under the assumption that they form their portfolios and drawdown on their pension accounts to maximise their spending outcomes until they die. We also model two types of retirees with differing preferences. One type prefers a higher level of spending spread over the course of their retirement. The other type has a target spending level, based around either the ‘comfortable’ or ‘modest’ retirement spending standards of the Association of Superannuation Funds of Australia. (In technical terms, the first type is modelled using power utility, and the second using a reference dependent utility function). The model is run both excluding and including imputation credits, and the difference compared.

Our first finding is that access to imputation credits can support holding a portfolio with a considerable ‘home bias’ to Australian equities, largely at the expense of lower exposure to world equities. The exact portfolio breakdown depends on how the analysis is set up, including the assumed type of retiree, their starting balance, and their age. To illustrate the tenor of the results, consider a retiree starting with a balance of $500,000 at age 65, who targets spending at AFSA comfortable of $42,764 per annum. Excluding imputation credits, our modelling suggests that this retiree should divide their portfolio on average over the course retirement into 26% in Australian equities, 33% in world equities and 41% in fixed income. When imputation credits are included in the analysis, the portfolio breakdown comes out as 46% in Australian equities, 15% in world equities and 39% in fixed income – a notable home bias.

The reason for the sizable switch away from world equities under imputation is that Australian equities offer substantially higher returns for a retiree who can claim the full credits, but without a meaningful increase in overall portfolio risk. The limited impact on portfolio risk arises because Australian and world equities are substitutes to a large extent. The retiree is just swapping one form of equity market risk for another in order to improve their outcomes on a risk/return basis.

We then estimate the value to retirees of having access to the full tax refunds from imputation credits. We do this through converting the uplift in benefit (utility) arising from imputation into three measures that can be readily interpreted. Again, the exact estimates vary with modelling set-up, so we will convey broad averages across retiree types and starting balances. We find that imputation delivers equivalent value to an average 5%-6% increase in spending over the course of retirement; an 8%-9% larger superannuation fund balance at the point of retirement; or a 0.6%-0.8% per annum increase in returns on the portfolio during retirement. These not insignificant numbers underwrite the consternation among those in or nearing retirement about a potential change in policy.

Our study has a number of implications. First, it implies that the bias towards Australian equities often observed in portfolios in practice might be justified. Academics have tended to view home bias as a 'puzzle' to be explained. Our findings suggest that equity home bias might be at least partly explained as rational response to tax effects that lead to differential returns on investment choices which contribute similar amounts to overall portfolio risk.

Second, the insights from our study should be useful for policy makers. We have estimated the value that retirees receive from the imputation system. Given the significant magnitude of the benefit, its removal would likely have some substantive effects. To the extent that imputation credits supplement income in retirement, the loss of tax credits could exacerbate the problem of the adequacy of superannuation balances for supporting a reasonable level of retirement spending. To some extent, access to imputation credits in retirement might be seen as an alternative to making higher superannuation contributions while at work in order to generate retirement income. A change in policy might also result in retirees providing less support to Australian companies via the investments they make.

We also highlight the net cost to the government of providing access to imputation tax credits to retirees, accounting for the fact that there will be some offset through reduced age pension payments. For example, we estimate a total expected net cost per individual over the course of their retirement of about $20,000 for retirees that retire with a $100,000 balance, then rising to around $130,000 for those retiring with a balance of $1.6 million (in 2017-8 dollars). We also note that the largest benefit in dollar terms accrues to retirees with the largest initial balances, raising some questions around equity.

Australian National University

10 October 2018

College of Business and Economics (Building 26C)
The Australian National University
Canberra, ACT, 2601

Submission to House of Representatives Standing Committee on Economics: Inquiry into the Implications of Removing Refundable Franking Credits

Dear Committee Members,

We would like to offer input for the Committee's consideration of the potential impacts of removing access to refundable franking credits for those in retirement. Our submission comprises three items. The first is this letter, which sets out some thoughts on the potential effects of changing the policy. The second is our research paper titled "What Dividend Imputation Means for Retirement Savers" (revised on 4 October 2018), which focuses on the value of imputation credits to retirees and what it may mean for their portfolios. While this paper does not directly address the removal of access to refundable franking credits, by its design it is very relevant for the issue at hand. We also expand on this research within this letter, specifically using our model to estimate the potential implications of the policy proposed by the opposition Labor Party. Third, we provide a working paper titled "Do Franking Credits Matter? Exploring the Financial Implications of Dividend Imputation" (Centre for International Finance and Regulation, June 2015), which was authored by one of us along with some University of Sydney academics. This paper provides a comprehensive review of the literature and arguments regarding the financial implications of the imputation system. We thought it might be useful background material for the Committee.

A Quick Overview of Our Research Paper

Our working paper models both the value that an Australian single male retiree receives from having access to refundable franking credits, as well as potential impacts on asset allocation within their pension account. We do this by modelling the experience through retirement for a range of initial balances at age 65, allowing for access to the age pension and applying minimum drawdown rules. We model two types of retirees with differing preferences. One type has a target spending level, based around either the 'comfortable' or 'modest' retirement spending standards of the Association of Superannuation Funds of Australia (reference dependent utility). The other type does not have a target spending level, but prefers a higher level of spending spread over the course of their retirement (power utility). We initially model the optimal behaviour ignoring franking credits, repeat the modelling assuming that the retiree has access to refundable franking credits, and then compare the difference.

The first point that the Committee might take from our analysis is that the estimated value for retirees from having access to refundable franking credits is quite significant. We express our estimates in terms of three measures that can be interpreted in economic terms. While the results vary with the modelling set-up –including utility function, initial balance and age – the average value generated is equivalent to:

- An increase in total spending over the course of retirement of 5%-6%;
- Entering retirement at age 65 with an initial balance that is 8%-9% higher; which might equally be interpreted as requiring an 8%-9% lower balance to support the same level of spending;
- Being able to access an additional risk-free return of 0.6%-0.8% per annum over the course of retirement.

The second point to take from our analysis is that access to refundable franking credits makes it rational to hold a portfolio with a considerable 'home bias' to Australian equities, largely at the expense of lower exposure to world equities. Again, while the exact portfolio breakdown depends on the modelling set-up, the effects tend to be substantial. To illustrate the tenor of the results, take a retiree starting with a balance of $500,000 at age 65, who targets spending at AFSA comfortable of $42,764 per annum. Excluding imputation credits, our modelling suggests that this retiree should divide their portfolio on average over the course retirement into 26% in Australian equities, 33% in world equities and 41% in fixed income. When imputation credits are included in the analysis, the portfolio breakdown comes out as 46% in Australian equities, 15% in world equities and 39% in fixed income – a notable home bias.

It is important to note that this result comes out of modelling optimal behaviour, taking into account risk versus return. The main reason for the shift in asset weights is that refundable franking credits allow Australian retirees to earn substantially higher returns by substituting Australian equities for world equities, without a meaningful increase in overall portfolio risk. The limited impact on portfolio risk arises because Australian and world equities are substitutes to a large extent: one form of equity market risk is just being swapped for another. Basically, access in refundable franking credits allows retirees to build superior portfolios on a risk/return basis.

We also highlight the net cost to the government of providing access to imputation tax credits to retirees, accounting for the fact that there will be some offset through reduced age pension payments. We estimate a total expected net cost per individual over the course of their retirement of about $20,000 for those retiring with a $100,000 balance, with the net cost tending to grow with balance up to around $130,000 for those retiring with a $1.6 million balance (in 2017-8 dollars).

Impacts from Labor's Proposed Policy Under our Model

We have re-run our model under the proposed Labor policy, under which retirees have full access to franking credit refunds only if they are receiving at least a partial pension. We then compare these result with those under the case where all retirees have access to franking credit refunds. The table on the next page reports these results for initial balances at age 65 ranging from $200,000 to $1.6 million, noting that there is virtually no effect at balances less than $200,000. Underpinning our analysis is the assumption that retirees with higher balances may switch their portfolio towards Australian equities once they become able to access franking credit refunds if their balance declines below the pension eligibility threshold during their retirement journey. We have not accounted for any costs associated with such a switch; and it is entirely possible that older retirees in such a position may not make such as switch in practice. For these reasons, we may have underestimated the impacts, but probably only to a modest extent. Notable points to arise from this additional analysis include the following:

- Meaningful effects start to kick in at around an initial balance of $500,000, and build progressively as the initial balance increases. Virtually all the benefit of access to refundable franking credits is unwound for retirees with an initial balance of $1 million or more.

- Effects are felt *below* an initial balance of $700,000-$800,000 (the level above which access to any age pension is lost). This arises because, under our stochastic modelling, there are some states of the world where retirees with lower balances lose access to franking credit refunds if good investment returns happen to boost their balance above the pension threshold. Conversely, those starting above the pension threshold may at some stage gain access to the pension and hence franking credit refunds as their balance declines due to either drawdowns and/or poor investment performance. Hence the potential effects are somewhat 'fuzzy' along with a dynamic element, and do not just apply to those that retire with a balance above the pension eligibility threshold.

- We extract the average number of years sooner that retirees end up on the age pension as a consequence of losing access to refundable franking credits. This effect starts to kick at an initial balance of above $600,000, and peaks at around 3-4 years at a balance of $950,000. That is, a retiree staring with a balance of $950,000 at age 65 could end up claiming some pension 3-4 years earlier than they would have under the current policy.

- We estimate the average change in both the total amount of franking credit refunds claimed and age pension received per individual over the course of their retirement (constant 2017-18 dollars). As expected, the dollar reduction in credits claimed increases with initial balance. There is some modest offset in terms of increased pension income, which peaks in dollar terms at an initial balance of around $750,000 to $800,000. These estimates provide an indication of the dollar-value impact on individuals at various balances.

Average Impacts of Labor Imputation Policy per Initial Balance at Age 65

	CE Consumption		Equivalent Initial Balance				Equivalent Risk-Free Return		Years Sooner on Pension		Franking Credits Claimed		Pension Received	
Utilty Function	**Power Utility**	**Reference Dependent, Comfortable**	**Power Utility**		**Reference Dependent, Comfortable**		**Power Utility**	**Reference Dependent, Comfortable**	**Power Utility**	**Reference Dependent, Comfortable**	**Power Utility**	**Reference Dependent, Comfortable**	**Power Utility**	**Reference Dependent, Comfortable**
Units	***%***	***%***	***$***	***%***	***$***	***%***	***%***	***%***	***No. Years***	***No. Years***	***$***	***$***	***$***	***$***
Initial Balance:														
$200,000	0.0%	0.0%	-$19	0.0%	$0	0.0%	0.00%	0.00%	0	0	-$104	$0	$40	$0
$250,000	0.0%	0.0%	-$64	0.0%	$0	0.0%	0.00%	0.00%	0	0	-$390	-$5	$145	$2
$300,000	-0 1%	0.0%	-$179	-0.1%	$0	0.0%	-0.01%	0.00%	0	0	-$1,082	-$32	$366	$41
$350,000	-0 2%	0.0%	-$588	-0.2%	$0	0.0%	-0.01%	0.00%	0	0	-$2,460	-$104	$830	$106
$400,000	-0.4%	0.0%	-$1,474	-0.4%	-$44	0.0%	-0.03%	0.00%	0	0	-$5,100	-$446	$1,726	$427
$450,000	-0.8%	0.0%	-$3,612	-0.8%	-$177	0.0%	-0.06%	0.00%	0	0	-$9,753	-$1,528	$3,113	$1,450
$500,000	-1.4%	0.0%	-$6,862	-1.4%	-$894	-0.2%	-0.11%	-0.01%	0	0	-$17,112	-$4,652	$5,121	$3,371
$550,000	-2.4%	0.0%	-$12,983	-2.4%	-$5,650	-1.0%	-0.21%	-0.07%	0	0	-$33,312	-$15,026	$9,346	$9,312
$600,000	-3.0%	0.0%	-$18,239	-3.0%	-$8,525	-1.4%	-0.29%	-0.09%	0	1	-$45,489	-$24,714	$11,367	$11,175
$650,000	-3.7%	0.0%	-$24,262	-3.7%	-$11,663	-1.8%	-0.36%	-0.12%	1	1	-$58,092	-$35,471	$12,508	$12,787
$700,000	-4.4%	0.0%	-$30,465	-4.4%	-$14,129	-2.0%	-0.42%	-0.14%	2	2	-$70,371	-$47,780	$13,241	$13,410
$750,000	-4 9%	0.0%	-$36,829	-4.9%	-$18,926	-2.5%	-0.49%	-0.17%	2	2	-$82,223	-$62,293	$13,601	$13,210
$800,000	-5.4%	0.0%	-$43,074	-5.4%	-$25,071	-3.1%	-0.54%	-0.21%	2	2	-$93,602	-$79,161	$13,666	$12,470
$850,000	-5.8%	-2.0%	-$49,527	-5.8%	-$30,528	-3.6%	-0.58%	-0.25%	2	3	-$104,361	-$97,786	$13,564	$11,557
$900,000	-6 2%	-4.1%	-$55,912	-6.2%	-$37,612	-4.2%	-0.62%	-0.29%	2	3	-$114,546	-$117,482	$13,206	$10,608
$950,000	-6.6%	-5.6%	-$62,664	-6.6%	-$44,853	-4.7%	-0.65%	-0.32%	3	4	-$124,143	-$136,815	$12,745	$9,704
$1,000,000	-7 1%	-6.7%	-$71,252	-7.1%	-$51,732	-5.2%	-0.68%	-0.36%	2	3	-$133,288	-$156,102	$12,247	$9,054
$1,100,000	-7.8%	-7.9%	-$86,118	-7.8%	-$65,991	-6.0%	-0.75%	-0.43%	2	2	-$149,783	-$193,796	$11,238	$8,141
$1,200,000	-8 2%	-8.4%	-$98,075	-8.2%	-$79,290	-6.6%	-0.78%	-0.48%	2	2	-$164,285	-$229,799	$10,061	$7,468
$1,300,000	-8.4%	-8.7%	-$109,549	-8.4%	-$91,950	-7.1%	-0.80%	-0.52%	2	2	-$177,694	-$263,529	$8,943	$7,062
$1,400,000	-8.6%	-8.8%	-$120,638	-8.6%	-$103,849	-7.4%	-0.82%	-0.56%	2	2	-$190,171	-$294,674	$7,910	$6,699
$1,500,000	-8.8%	-8.7%	-$131,470	-8.8%	-$115,986	-7.7%	-0.83%	-0.59%	2	1	-$201,962	-$324,623	$6,959	$6,328
$1,600,000	-8 9%	-8.7%	-$141,658	-8.9%	-$128,671	-8.0%	-0.84%	-0.62%	2	1	-$213,219	-$353,363	$6,187	$6,056

The three measures to the left of the table are estimated with reference to the reduction in utility under Labor's policy, relative to the current policy. CE (certainty equivalent) consumption is the reduction in constant real spending over the course of retirement that arises from losing access to refundable franking credits. Equivalent initial balance is the reduction in balance at age 65 that has the same effect as losing access to refundable franking credits; or alternatively the additional balance required to generate the same utility during retirement. Equivalent risk-free return can be interpreted as the additional annual return required over the course of retirement to replace the reduced investment earnings from loss of access to refundable franking credits. Years sooner on pension is the number of years earlier that the retiree becomes eligible for at least some pension. The estimates to the right reflect the reduction in franking credits claimed and the increase in aged pension received in total over the course of retirement in constant (2017-8) dollars.

Potential Implications of Removing Access to Refundable Franking Credits

Given the significant magnitude of the benefit from refundable franking credits for some retirees, their removal would likely have some substantive impacts for those who are affected. Our analysis as reported above confirms that the impact of the proposed Labor policy will be greatest for retirees on larger balances, with significant effects occurring at initial balances at age 65 ranging from $800,000 up to the $1.6 million limit on tax-free retirement accounts. We offer the following observations about the proposed policy:

- As the impact will be greatest for wealthier retirees, arguably the main argument in favour of the policy relates to the notion that it may be inappropriate to provide tax credits to those who are already well-off. This is essentially an equity argument.

- The role of the imputation system might be placed in a broader context of overall policy objectives and settings. Removing access to franking credit refunds would grate against the broad thrust of policy in two main ways:

  - Government policy has been directed at encouraging people to save for their own retirement. There are a range of settings that work towards this end, including the Superannuation Guarantee (SG), and concessional tax rates on superannuation funds (at least for individuals on incomes above $37,000). Access to franking credit refunds contributes to this policy mix by providing a supplement to investment earnings during retirement. This makes it possible to achieve certain level of income with a lower balance (about 8%-9% lower, according to our estimates). Loss of access to franking credit refunds would cut against this policy objective, and/or reduce 'adequacy' in retirement. An alternative view is that franking credit refunds may be seen as a partial substitute for the need to increase the SG. A lower SG would have the benefit of increasing disposable income and hence potentially spending during the working phase.

  - Removing access to franking credit refunds for retirees would disrupt the purity and elegance of imputation system, which is underpinned by the principle that investors should be taxed on corporate earnings at their marginal tax rate. One class of investors would be singled out for differing treatment.

- Under the proposed Labor policy, the effects will largely apply to individuals with retirement balances of between about $800,000 and $1.6 million, recalling that those with more than $1.6 million are required to invest in a taxable account. We make two points about this situation. First, it creates a class of retirees sitting in the middle-upper wealth range that are unable to claim franking credit refunds, when those below and above are able to do so. Such discontinuities are usually unhelpful, and may give rise to uneven behaviours and incentives across the range of retirees that could have unintended consequences. Second, as the superannuation system matures, more individuals will be affected by the policy. A balance of $800,000 may be sizable at present, but a greater number of individuals may fall into this category over the course of time. For these reasons, the potential effects are much more complex than just a straightforward reduction in government support for currently-wealthy individuals.

- A change in policy would probably impact the investment behaviours of retirees to some degree. Some of those affected may be induced to decrease, or direct less funds towards, investment in Australian shares. This may reduce the funding available to Australian companies at the margin, although it is unlikely that the impact will be substantial as only one class of investor among many is being impacted. There will also be some inducement to rebalance portfolios as thresholds are crossed where access to the franking credit refunds becomes available or unavailable, with some cost and disruption being incurred. However, these effects are also unlikely to be major. Nevertheless, the ability to access franking credit refunds becomes considerably messier, which will only make portfolio management more complicated.

In summary, removing access to franking credit refunds would add to the overall complexity of the retirement savings system and could come with some adverse implications, with the major effects potentially related to singling out a particular group within the context of a broader policy agenda. Policy design of this type tends to impact adversely on efficiency. Hence the central issue seems to be how any negative impacts on efficiency is balanced against the equity implications of reducing government support for a group that is relatively well-off, which arises as a result of the lack of any tax on investment earnings on retirees with balances up to $1.6 million. If it were deemed appropriate to reduce support for the well-off, any change in policy might be better framed more holistically within the context of the broader policy agenda so as not to create uneven behaviours and incentives.

We trust this submission proves to be of value to the Committee in its deliberations.

Associate Professor Adam Butt
adam.butt@anu.edu.au
+61 2 6125 3580

Dr Gaurav Khemka
gaurav.khemka@anu.edu.au
+61 0439 549 999

Associate Professor Geoff Warren
geoff.warren@anu.edu.au
+61 411 241 091

FOI 2404
Document 4

What Dividend Imputation Means for Retirement Savers

Adam Butt[a], Gaurav Khemka[b] and Geoffrey J. Warren[c]

4 October 2018

Abstract

We use a stochastic life-cycle model to examine the implications for Australian retirees of full access to dividend imputation credits. We find that the availability of imputation credits can justify a significant bias towards Australian equities in retirement portfolios, largely at the expense of world equities. We also generate estimates of the value of imputation credits to retirees, finding it could potentially support increased consumption during retirement of 5%-6%, or the equivalent of a higher balance at retirement by 8%-9%. Our study enhances the understanding of equity home bias and provides insights relevant for public policy.

Keywords: Retirement, dividend imputation, life-cycle models, portfolio construction, home bias

[a]Associate Professor Adam Butt
ANU College of Business and Economics, The Australian National University, ACT 2601, Australia
Email: adam.butt@anu.edu.au; Ph: +61 2 6125 3580

[b]Dr Gaurav Khemka
ANU College of Business and Economics, The Australian National University, ACT 2601, Australia
Email: gaurav.khemka@anu.edu.au; Ph: +61 2 6125 4642

[c]Associate Professor Geoffrey J. Warren
ANU College of Business and Economics, The Australian National University, ACT 2601, Australia
Email: geoff.warren@anu.edu.au; Ph: +61 411 241 091

I. Introduction

An outstanding feature of the Australian investment environment is its dividend imputation system, which provides full tax credits to Australian residents. Under this system, investors on tax rates less than the corporate tax rate are able to claim a tax benefit which boosts their total return. This is particularly relevant for retirees, who may transfer their superannuation into a retirement savings account that is tax-free up to a balance of $1.6 million. At a corporate tax rate of 30%, imputation credits consequently increase the after-tax value of a fully-franked dividend by 42.8%.[1] Recently, the opposition political party has proposed a policy change under which imputation tax credits may only be offset against existing tax liabilities. Such a policy change could potentially end, or at least limit, access to imputation credits for Australian retirees. Against this backdrop, we address two questions. First, how valuable are imputation tax credits for Australian investors in the retirement phase? Second, how does the existence of imputation credits influence optimal portfolio formation for this class of investor? We address these two questions in the context of a life-cycle model of retirement savings. Our analysis reveals that imputation is quite valuable to retirement savers, for instance, supporting retirement spending increases of up to 5%-6%. Availability of imputation credits can also justify building a portfolio with significant bias towards Australian equities. These findings have implications for both public policy and understanding why home bias exists.

We consider the portfolio implications and value of dividend imputation for Australian retirees by modelling optimal asset allocation and drawdown/consumption decisions using stochastic dynamic programming techniques. The analysis applies two objective functions of power utility and reference dependent utility, the latter referencing target income based on the retirement spending standards of the Association of Superannuation Funds of Australia (ASFA). Asset return distributions are simulated by drawing from historical data for four asset classes of Australian equities, world equities, Australian fixed income and Australian cash, with the mean of the return series adjusted towards 'equilibrium' expected returns under an application of Black and Litterman (1992). The analysis takes account of eligibility for the age pension and the government minimum drawdown rules. While the analysis is characteristic rather than exact, it supports two clear findings.

The first finding is that the availability of imputation credits justifies skewing retirement portfolios towards

[1] Estimated as 30/70 = 0.428, with reference to a fully-franked dividend of 70 cents treated as being paid out of pre-tax earnings of $1 with 30 cents of tax 'pre-paid' by the company.

Australian equities, relative to a baseline excluding imputation credits where the optimal portfolio has world equity weightings that exceed those in Australian equities. While the exact percentages vary with aspects like the utility function, age and balance, the optimal weight in Australian equities under imputation is often a multiple of that in world equities. Thus, the additional returns from accessing imputation credits might support a marked home bias for Australian retirees. This suggests that the skew towards Australian equities, as observed in many portfolios, may be rational. Our analysis also highlights how a substantial home bias can emerge from shifts in return expectations. This outcome relates to the relatively high correlation between Australian and world equities (about 0.6 in our data), such that moderate changes in return expectations can optimally support relatively large shifts from global to local equities without a substantial increase in portfolio risk.

The second finding is that imputation credits are quite valuable in economic terms to Australian retirees. We compare the value of imputation to a baseline excluding imputation credits using three measures. Our estimates indicate that access to imputation credits of 1.37% per annum can support increases in consumption during retirement that average about 5%-6%. They also have an equivalent effect to increasing balances at age 65 by around 8%-9%, or lifting risk-free returns over the course of retirement to the order of 0.6%-0.8% per annum. While these estimates vary under sensitivity testing, the finding that imputation credits are quite valuable to retirees is robust. We also calculate the expected cost per individual to the government of providing full access to imputation credits and discuss some of the public policy implications in the concluding section.

Our research contributes to two strands of the literature. The first relates to the value of imputation credits, which remains a subject of considerable debate: see Ainsworth, Partington and Warren (2015, 2016) for a detailed overview. The second is home bias, which refers to the observation that weightings held by investors in their local market often far exceed market capitalisation weights. See Coeurdacier and Rey (2012) and Cooper, Sercu and Vanpee (2012) for reviews of the literature on this topic. One issue is the extent to which imputation credits are ‘priced’ into stock prices and returns. Our analysis proceeds under the assumption that imputation credits are *not* priced, implying that investors can access the associated tax benefits without incurring any offsetting reduction in pre-tax returns. We also consider the implications of imputation credits being partially priced under sensitivity testing. We find that the value of imputation credits to retirees reduces by around 40% when they are 50% priced. While we do not attempt to offer a complete explanation for the home bias puzzle, which is a global phenomenon with many potential causes, our findings demonstrate that an equity home bias may be rational for Australian retirement savers to the extent that imputation boosts their after-tax returns from Australian equities. This finding contributes to research that investigates reasons for home bias in Australia, including Mishra (2008), Warren (2010), and Daly and Vo (2013); as well as studies uncovering an empirical relation between taxation of dividends and portfolios, notably Christoffersen et al. (2005) and Mishra and Ratti (2013, 2014). It also underlines the potential sensitivity of home bias to comparatively modest shifts in return expectations.

Our study draws on the wide body of literature that considers optimal portfolio formation for an individual investor under a life-cycle model, which stems from the seminal work by Samuelson (1969) who used dynamic programming to make sequential portfolio decisions in a discrete-time framework. While there is considerable research in this area, work in an Australian context is limited. Examples include Khemka and Butt (2017), who consider the effect of the distribution of Australian returns on optimal portfolio choice. The unique nature of the Australian age pension has led to related research, such as Hulley et al. (2013), Ding (2014) and Andreasson and Shevchenko (2017). Other life-cycle modelling in an Australian context includes Iskhakov, Thorp and Bateman (2015) who address optimal annuity purchases; and Andreasson, Shevchenko and Novikov (2017) who examine the impact of age pension means testing on housing decisions.

This paper is arranged as follows. Section II outlines the method and data. Section III reports our estimates of the impact of imputation credits on optimal asset allocation, and the value of imputation to retirees. Section IV discusses the implications and concludes.

II. Method and Data

Our analysis is conducted in three steps. First, we estimate the optimal investment and drawdown/consumption strategy for Australian retirees excluding imputation credits. This provides a baseline for comparison. Second, we repeat the calculations including imputation credits. Third, we compare the two sets of estimates in terms of optimal asset weights, and estimate the value created by imputation credits under three measures which translate the uplift in utility into metrics with economic meaning. We start by outlining the stochastic dynamic programming technique in (i), and the utility functions in (ii). We then describe how historical asset returns are calibrated so that results are based on plausible expected returns in (iii), as well as the data in (iv). This section closes by defining our measures of the value of imputation in (v).

(i) Stochastic Dynamic Programming Model

Our model is similar to Andreasson and Shevchenko (2017), although simplified by removing changing family states to isolate the impact of imputation. We model a retired male homeowner of age 65 who earns no further income from labour and is eligible for the Australian means-tested age pension. Consumption needs in retirement are met through drawdowns on the retirement balance and age pension receipts. This individual is assumed to obtain utility from consumption only, has no time preference for consumption, and places no value on a bequest. They make their drawdown and portfolio allocation decisions so as to optimise utility. At any given time *t*, the problem is defined as follows:

$$\max_{D_t,\alpha_t}\left[U_{i,t} + \mathrm{E}_{t+1}\left[\sum_{s=1}^{45-t} {}_{s}p_{65+t}U_{i,t+s}\right]\middle| B_t\right] \quad (1)$$

where D_t *is* retirement drawdown; α_t is the vector of portfolio weights; $U_{i,t}$ is utility function of type *i* (see (iii)); ${}_sp_x$ is the probability that an individual aged *x* will be alive at age *x*+s; and B_t is the retirement balance.

Mortality is based on the male rates in the Australian Life Tables 2010-12 (Australian Government Actuary, 2014) with no mortality improvement. Individuals are assumed to die with certainty at age 110. Portfolio weights are constrained on the [0,1] interval. The following relations apply between model variables:

$$B_{t+1} = (B_t - D_t)\left(1 + R_{B,t}\right) \quad (2)$$

$$C_t = D_t + P_t \quad (3)$$

where $R_{B,t}$ is percentage return on the balance, which is a weighted average of the asset class returns (see equation (8)) with α_t representing the weights; C_t is the consumption; and P_t is the age pension received, which is dependent on B_t. Age pension eligibility is determined based on means testing arrangements applicable in 2017-18 for a home owner, assuming that B_t is the only other asset held by the individual, and is calculated as follows:

$$P_t = \begin{cases} 21{,}481 & \text{if } B_t < 157{,}570 \\ 21{,}481 - 0.01625(B_t - 157{,}570) & \text{if } 157{,}570 \le B_t < 279{,}061 \\ 19{,}507 - 0.078(B_t - 279{,}061) & \text{if } 279{,}061 \le B_t < 529{,}150 \\ 0 & \text{if } B_t \ge 529{,}150 \end{cases} \quad (4)$$

Optimal decisions at each age are determined recursively under a dynamic programming framework using the

Bellman equation arising from (1). The balance state variable is discretised in $1,000 increments. As the recursive utility values are concave and monotonic, shape-preserving Schumaker splines (Schumaker, 1983; Judd, 1998) are used for interpolation. The assets and their return distribution are described in (iv). Optimisation calculations are undertaken using R with the DEoptim package. Once optimisation is performed, simulated output (10,000 simulations) are generated using the optimal decision rules described above, with linear interpolation of optimal decisions between balance increments. Asset class returns are drawn with replacement from the same data used for optimisation, assuming that returns between periods are independent.

(ii) Utility Functions and Parameters

Two utility functions are examined. The first is power utility, which is broadly used within the academic literature. Equation (5) describes the functional form:

$$U_{PU,t} = \frac{C_t^{(1-CR\quad)}}{1-CRR} \tag{5}$$

where $U_{PU,t}$ represents power utility; C_t is consumption; and *CRRA* is the coefficient of relative risk aversion.

We use *CRRA* of 4 as a baseline. This suggests relatively high risk aversion, but sits within the range used in the literature (e.g. Ameriks et al., 2011; Yogo, 2016). Higher and lower *CRRA* is examined under sensitivity testing.

The second is a reference dependent utility function, which reflects the value function component[2] in the prospect theory of Kahneman and Tversky (1979) and Tversky and Kahneman (1992). This function has been used to evaluate investment outcomes by Blake, Wright and Zhang (2013) and Levy (2016), among others. The function is described by equation (6), which defines utility over the difference between consumption (*C*) and target consumption (*C**). While equation (6) provides for the target to vary with time, we model in real terms and assume that the target level of real consumption is constant over time. The deviation between projected and target consumption is moderated by curvature parameters (α, β), and losses are multiplied by a weighting parameter (λ) which captures loss aversion.

$$U_{RDU,t} = I_{(C_t > C_t^*)}(C_t - C_t^*)^{\propto} - I_{(C_t < C_t^*)}\lambda\left((C_t^* - C_t)^{\beta}\right) + I_{(C_t = C_t^*)}0 \tag{6}$$

[2] Prospect theory entails a broader framework than the value function, including an 'editing' stage, as well as the application of decision weights that transform the probabilities attached to outcomes.

where $U_{RDU,t}$ represents reference dependent utility; C_t is consumption; C_t* is target consumption; I is an indicator function which equals one when the condition is satisfied, zero otherwise; α is the curvature parameter on gains ($C > C^*$); β is the curvature parameter on losses ($C < C^*$); and λ is the weighting parameter on losses ($C < C^*$).

The baseline parameters for reference dependent utility follow those used by Blake et al. (2013), including a curvature parameter on gains (α) of 0.44, a curvature parameter on losses (β) of 0.88, and a weighting parameter on losses (λ) of 4.50. The impact of changing these parameters is investigated under sensitivity testing.

We conduct analysis on two consumption targets, following the ASFA retirement standards for single retirees at March 2018 (ASFA, 2018). The first corresponds with 'ASFA comfortable', which stands at $42,764 per annum. These results are reported in the main paper. We also estimate results for 'ASFA modest', which is a lower target standing at $27,368 per annum. We report these results in the Appendix and discuss them in the main paper where appropriate. We note that ASFA modest is more relevant for retirees with lower balances, while ASFA comfortable is more appropriate for higher balances (say $500,000 or above).

(iii) Calibrating the Expected Returns

When using optimisation techniques to form portfolios, the high sensitivity of weights to input assumptions, in particular expected returns, is a well-recognised problem: see Kolm, Tütüncü and Fabozzi (2014). Extreme portfolio weights tend to arise when the expected returns for assets are out of alignment with their contributions to portfolio risk. The propensity for extreme and non-intuitive portfolio weights can be heightened when inputs are estimated from historical return data, as realised returns over a sample period can bear little resemblance to expected returns looking forward. Of particular relevance for the current study is that Australian equities happened to have delivered relatively high returns over our sample period (see Table 1 in (iv)), with little evidence these higher returns are associated with higher risk.[3] Inputting historical data directly into a portfolio optimisation is likely to lead to a substantial 'overweighting' of Australian equities in the baseline portfolio, both relative to portfolios typically observed in practice, and relative to weightings that may be justified on *ex ante* grounds. In addition, historical returns on fixed income and cash (see Table 1) differ substantially from current interest rates.

We deal with this issue by employing a variation of the 'Black-Litterman' method to impose plausible expected

[3] Based on quarterly $A returns over the period December 1984 to December 2017, the annualised standard deviation for Australian equities at 16.3% was similar to world equities of 15.9%, with an estimated beta on world equities of only 0.54.

returns on the asset return data used in the portfolio optimisation. This approach is widely used in practice, and is outlined by Black and Litterman (1992), He and Litterman (1999) and Kolm et al. (2014). The method involves estimating expected returns for a specified market universe of assets as a blending of equilibrium expected returns or 'implied views', and 'investor views'. Our application imposes expected returns that reflect equilibrium returns or implied views with respect to a reference portfolio of assets, without invoking any investor views. The asset universe and reference portfolio incorporate a representative set of four assets, including Australian equities (AE), world equities (WE), Australian fixed income (AFI) and Australian cash (AC). The reference portfolio weights are based on those reported for Australian MySuper (i.e. default) superannuation funds,[4] with weights adjusted to reflect the use of a subset of the assets held by these funds. Our reference portfolio weights are: AE of 35%, WE of 35%, AFI of 23% and AC of 7%.

Equilibrium expected returns are formed by conditioning on the covariance matrix implicit in the historical asset return data.[5] We then impose the equilibrium expected returns on the data by mean-adjusting the historical return series for each asset. The result is a set of adjusted asset return series that preserve the underlying covariance structure, but where the series mean has been recalibrated in line with equilibrium expected returns for a particular reference portfolio. The method of calculating equilibrium expected returns implicitly assumes that imputation credits are not priced, which would be consistent with a situation where the marginal investor is one that does not value imputation credits, such as an overseas investor.

Steps in the preparation of the asset return series under our variation on the Black-Litterman approach are as follows. First, the historical total return index series for the assets are adjusted for inflation, and 12-month rolling real returns calculated for each asset and the reference portfolio. Second, a 'beta' (β_A) for each asset is estimated by regressing the asset returns on the reference portfolio returns and taking the slope coefficient. These betas reflect the contribution of each asset to the variance of the reference portfolio. Third, a notional real risk-free

[4] Data for MySuper 'balanced' funds at September 2017 is sourced from the Australian Prudential Regulation Authority, available at: http://www.apra.gov.au/Super/Publications/Pages/superannuation-fund-level-publications.aspx. This data reveals the following average asset weights: Australian listed equities 25.9%; international listed equities 26.1%; cash 5.7%; fixed income 17.7%; other assets 24.8%.

[5] This approach implicitly assumes that asset expected returns are determined by the market in accordance with a model similar to the CAPM, where the reference portfolio proxies for a market portfolio which is assumed to be mean-variance optimal. As the utility functions we use differ from the mean-variance criteria, the baseline optimal portfolio for the investor may deviate from the reference portfolio. This occurs because the available assets are being evaluated by an investor who may have a preference structure that differs to the marginal investor that determines market prices and expected returns.

return (*Rf*) is specified, representing the return on an asset with zero correlation with the reference portfolio. As our analysis spans the retirement phase, *Rf* is intended to proxy a long-term equilibrium real return. We assume 1.0% per annum, in line with recent estimates for the 'neutral' real interest rate by McCririck and Rees (2017). Fourth, a market risk premium (*MRP*) is specified, which represents the expected return on the reference portfolio in excess of the risk-free rate. We assume 4.0% per annum, noting that the MRP is intended to represent the expected return premium for a portfolio containing 70% equities and 30% fixed income and cash. A *MRP* of 4% broadly aligns with an equity risk premium of about 5½%. The latter compares with a premium in excess of bills over the period 1900-2010 as reported by Dimson, Marsh and Staunton (2011) of 6.7% for AE and 4.5% for WE based on geometric returns. Fifth, equilibrium expected returns are estimated for each asset using equation (7), which is counterpart to the well-known Capital Asset Pricing Model (CAPM) formula:

$$E[R_A] = Rf + \beta_A * MRP \quad (7)$$

where $E[R_A]$ is the expected return on asset *A*; *Rf* is the risk-free return; β_A is the beta of asset *A* on the reference portfolio; and *MRP* is the market risk premium for the reference portfolio.

Finally, each asset return series is mean-adjusted following equation (8), so that the mean of the series equals the equilibrium expected return. This gives rise to the asset return series used in the analysis.

$$Radj_{A,t} = R_{A,t} + E[R_A] - \sum_{t=1}^{n} \frac{R_{A,t}}{n} \quad (8)$$

where $Radj_{A,t}$ is the adjusted return on asset *A* during period *t*; $R_{A,t}$ is the observed return on asset *A* during period *t*; and *n* is the number of periods in the sample.

(iv) Data

Asset return and inflation time series from December 1984 to December 2017 expressed in Australian dollars are sourced from Datastream. The S&P/ASX300 Accumulation Index is used for AE, the MSCI World Index Excluding Australia with gross dividends reinvested for WE, and the Citi Australian Bond Accumulation Index for AFI. For AC, a monthly accumulation index is constructed from 90-day bank bill yields (dealer middle rate, month-end), by assuming a 90-day bill is purchased and then sold after 30 days, and the proceeds reinvested into another 90-day bank bill. The Consumer Price Index from the Australian Bureau of Statistics is used as a proxy for inflation and is converted into monthly values by linear interpolation between quarterly index values. Real return series are created through deflating the nominal return indices by the Consumer Price Index. Table 1 reports key summary statistics for the historical real return data and the mean-adjusted series, for the four asset classes and the reference portfolio.

Table 1: Asset and Reference Portfolio Returns – Summary Statistics

Real Returns, Rolling 12-month	Australian Equities (AE)	World Equities (WE)	Australian Fixed Income (AFI)	Australian Cash (AC)	Reference Portfolio
Historical, Dec'1984-Dec'2017					
Mean	8.32%	6.93%	6.47%	3.49%	7.07%
Standard Deviation	16.75%	18.89%	4.84%	2.59%	11.49%
Reference Portfolio Weights	35.0%	35.0%	23.0%	7.0%	100%
Beta on Benchmark	1.26	1.50	0.14	0.04	1.00
Mean-Adjusted					
Mean	6.05%	6.98%	1.56%	1.14%	5.05%
Standard Deviation	16.75%	18.89%	4.84%	2.59%	11.65%
Risk Premium	5.05%	5.98%	0.56%	0.14%	**4.00%**
Risk-Free Rate					**1.00%**

Table 1 reports key statistics for the four asset classes and the reference portfolio. Statistics are reported for both the historical data over the period December 1984 to December 2017, and for the mean-adjusted series following the implied views approach of Black-Litterman. All returns are in Australian dollars and real terms.

The magnitude of available imputation credits is specified as an imputation credit yield. In practice, the imputation credit yield is not fixed, and can vary with factors such as movements in AE market pricing, the level of franked dividends paid by Australian companies, and the corporate tax rate. The baseline assumption for the imputation credit yield is set at 1.37%, as deemed by the Australian Tax Office[6] (ATO) at December 2017. The ATO deemed imputation yield series is available since June 1998. The estimated mean and median of this series both stand at 1.37%, with a range from 1.06% to 1.91%. Under sensitivity testing, we produce results for imputation credit yields of 1.17% and 1.53%, which represent the 10^{th} and 90^{th} percentiles for this series.

(v) Measures of Value Generated by Imputation Credits

Our three measures of the value generated by imputation credits are based around estimates of average lifetime utility (see equation (1)). For each of the 10,000 simulations, utility across all ages is summed. Average lifetime utility is then formed by averaging across these 10,000 simulated lifetime utilities. Estimates of average lifetime utility both including and excluding imputation credits are then converted into the following three measures of the value of imputation credits that are interpretable in economic terms:

[6] Figures were sourced at the time of writing from: https://www.ato.gov.au/Rates/Company-tax---imputation--average-franking-credit---rebate-yields/?page=1#List_of_yields.

- *Gain in certainty equivalent (CE) consumption* – CE consumption is estimated as the constant real amount of consumption across all ages that generates the same utility as the average lifetime utility calculated under the simulation analysis. The gain in CE consumption is the percentage change in this consumption stream when imputation credits are included, relative to when they are excluded.
- *Extra initial balance* – This is the increase in dollar value of initial balance at age 65 under the case excluding imputation credits that delivers the same average lifetime utility as arising when imputation credits are included.
- *Equivalent extra risk-free return* – This the annual risk-free return that needs to be added to the optimal portfolio returns (see equations (7) and (8)) under the case excluding imputation credits, to generate the same average lifetime utility as arising when imputation credits are included.

III. Results

Our results highlight that dividend imputation makes a significant difference to retirement savers, both in terms of how they might structure their portfolios, and the value that it generates. We start by reporting the impact on optimal asset allocation in (i), followed by the estimates of the value of imputation under our three measures in (ii). We then provide estimates of the net cost per individual to the government in (iii). Finally, sensitivity of the estimates to changes in input assumptions is investigated in (iv). We selectively report results to bring out the main findings and provide additional detail in the Appendix.

(i) Impact on Asset Allocation

Our estimates of optimal asset allocation vary considerably with age, balance and utility function. Nevertheless, the consistent finding is that optimal AE weights increase substantially in the presence of imputation credits, relative to when imputation credits are excluded. The increase in AE weights occurs to a large extent at the expense of WE, although AFI and AC weights also tend to decrease marginally. The upshot is that imputation credits engender a clear equity home bias towards AE versus WE.

Our analysis generates optimal equity weights from age 65 through to age 109 for retirees with balances ranging up to $1.6 million, which reflects the recently established cap on the amount held in tax-free retirement savings accounts. Figure 1 provides four charts of optimal weights from the optimisation procedure. Panel A plots optimal asset weights at age 65 across a range of balances under power utility, while Panel B plots the same for reference dependent utility under the ASFA comfortable target. Panel C and Panel D present heat maps of the changes in optimal AE weights across a range of ages and balances under power utility and reference dependent utility respectively. Table 2 reports average optimal asset weights from the simulation procedure at selected initial balances at age 65 both excluding and including imputation credits, as well as the change in these weights. The estimates reflect an average of asset weights for each initial balances over 10,000 simulations from age 65 to age 109, and are weighted by the post-consumption balance and the probability of survival at each age. A grand average across all ages and balances up to $1.6 million appears at the top of Table 2, providing a broad indication of the asset weights and how they shift in response to the availability of imputation credits. This grand average should be interpreted carefully, bearing in mind that a majority of retirees will have initial balances towards the lower end of the range.

The consistent result from Figure 1 and Table 2 is that optimal weights in WE exceed those for AE when imputation credits are excluded, but the reverse applies when they are included. However, the magnitude of both the relative weights and the shift in weights when imputation is included vary with the utility function and initial balance. Under power utility, Panel A of Table 2 reports changes in the grand average weight (i.e. across all ages and balances) comprising a +36.9% increase in AE from 33.2% to 70.1%, coupled with a -34.3% decrease in WE from 57.7% to 23.4%, and decreases in AFI of -2.6%. (AC remains unchanged at 0% weight.) The shift in weights from WE toward AE are less in magnitude as initial balance increases. This relates to the influence of the age pension, which is effectively an option on a real annuity that guarantees a minimum level of income, and thus acts like a risk-free asset and a hedge against losses in the retirement savings account. The pension asset has greater relative value for retirees with low balances, making them more capable of accepting exposure to assets that offer higher return but greater risk. Further discussion of this phenomenon can be found in Andreasson and Shevchenko (2017). As a consequence, overall equity exposure is higher at lower balances, and the switch from WE to AE when imputation is included is more aggressive.

Under reference dependent utility, AE are again preferred over WE under imputation. For instance, Panel B of Table 2 reveals average optimal weights of 60.0% in WE and 19.4% in AE when imputation credits are excluded, which switches to 16.2% in WE and 67.9% in AE when imputation credits are included. Average optimal weights in AFI and AC also decline by -2.7% and -2.0% respectively when imputation credits are included. However, both the optimal weights and the shift in those weights when imputation credits are included is quite variable and non-linear across the range of initial balances. In particular, equity weights follow a u-shaped pattern, which is clearly seen in Panel B of Figure 1. The influences at play are explained in the next two paragraphs.

Figure 1: Optimal Asset Weights Excluding and Including Imputation Credits

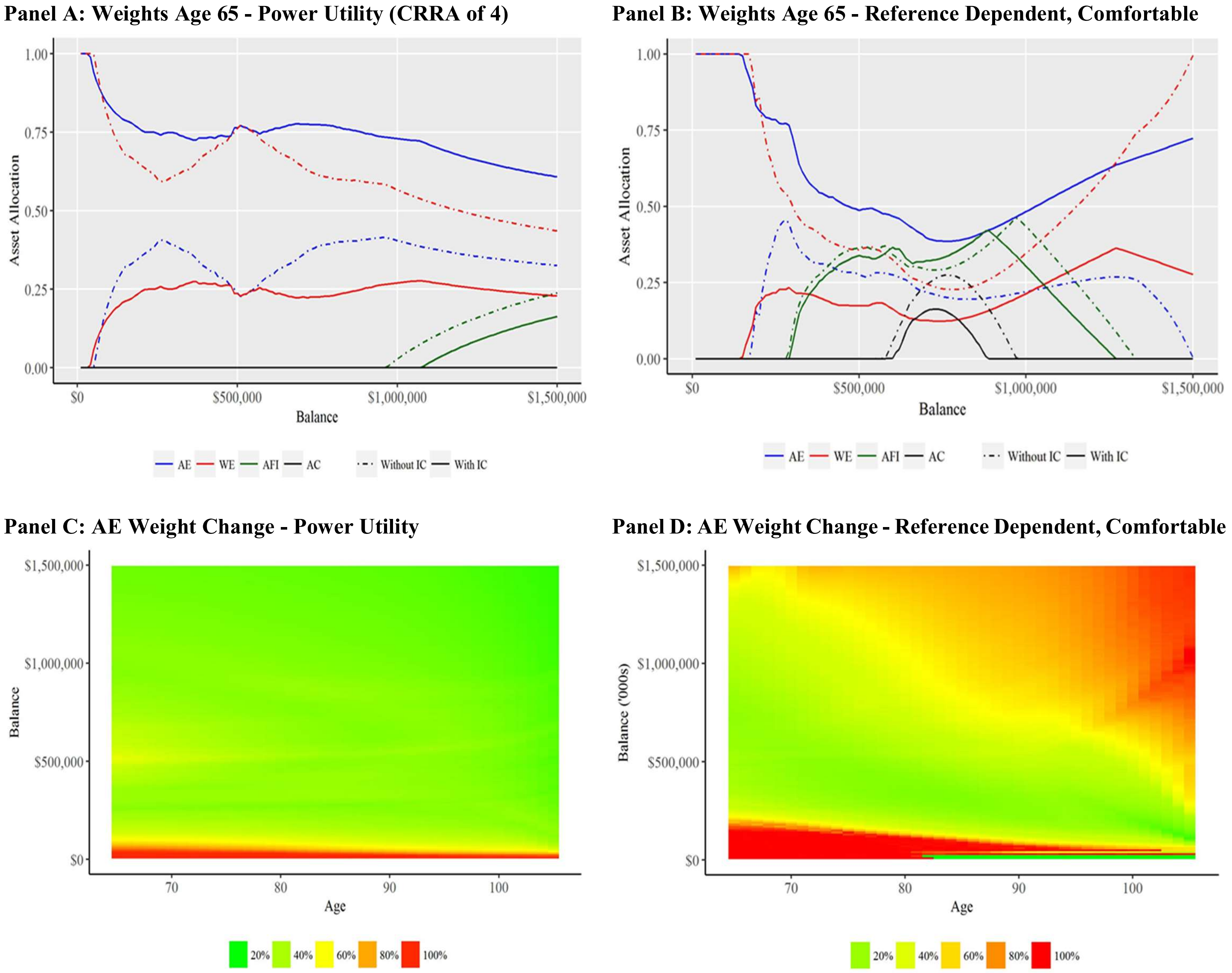


Figure 1 compares optimal assets weights from the optimisation procedure both including and excluding imputation credits at an imputation credit yield of 1.37%. Panel A and Panel B respectively plot optimal weights at age 65 under power utility and reference dependent utility with an AFSA comfortable income target, across a range of balances for the four asset classes. AE is Australian equities, WE is World Equities, AFI is Australian Fixed Income and AC is Australian Cash. Panel C and Panel D plot heat maps of the difference in AE optimal weights including and excluding imputation credits across balance (y-axis) and age (x-axis), under power utility and reference dependent utility with an AFSA comfortable income target respectively.

Table 2: Average Optimal Asset Weights Excluding and Including Imputation Credits

Panel A: Power Utility (CRRA of 4)

Average Across Age 65 to 109	Excluding Imputation Credits				Including Imputation Credits				*Change in Weights*			
	AE	WE	AFI	AC	AE	WE	AFI	AC	AE	WE	AFI	AC
Grand Average	**33.2%**	**57.7%**	**9.1%**	**0.0%**	**70.1%**	**23.4%**	**6.5%**	**0.0%**	**36.9%**	**-34.3%**	**-2.6%**	**0.0%**
At Initial Balance:												
$25,000	2%	98%	0%	0%	98%	2%	0%	0%	96%	-96%	0%	0%
$50,000	8%	92%	0%	0%	91%	9%	0%	0%	83%	-83%	0%	0%
$75,000	17%	83%	0%	0%	86%	14%	0%	0%	69%	-69%	0%	0%
$100,000	23%	77%	0%	0%	82%	18%	0%	0%	59%	-59%	0%	0%
$150,000	31%	69%	0%	0%	79%	21%	0%	0%	48%	-48%	0%	0%
$200,000	34%	65%	0%	0%	76%	24%	0%	0%	42%	-42%	0%	0%
$250,000	36%	63%	1%	0%	75%	25%	0%	0%	39%	-39%	-1%	0%
$300,000	36%	63%	1%	0%	75%	25%	0%	0%	38%	-38%	-1%	0%
$350,000	36%	63%	1%	0%	74%	26%	0%	0%	38%	-37%	-1%	0%
$400,000	35%	64%	1%	0%	74%	26%	0%	0%	39%	-38%	-1%	0%
$450,000	34%	64%	1%	0%	74%	26%	0%	0%	39%	-38%	-1%	0%
$500,000	34%	65%	1%	0%	74%	26%	0%	0%	40%	-39%	-1%	0%
$600,000	35%	63%	2%	0%	73%	26%	1%	0%	39%	-37%	-1%	0%
$700,000	36%	60%	4%	0%	73%	25%	2%	0%	37%	-35%	-2%	0%
$800,000	37%	58%	6%	0%	71%	25%	4%	0%	35%	-32%	-2%	0%
$900,000	37%	55%	8%	0%	69%	25%	6%	0%	33%	-30%	-3%	0%
$1,000,000	36%	53%	11%	0%	68%	25%	8%	0%	31%	-28%	-3%	0%
$1,200,000	35%	49%	17%	0%	64%	24%	12%	0%	29%	-25%	-4%	0%
$1,400,000	33%	45%	22%	0%	61%	23%	16%	0%	28%	-23%	-5%	0%
$1,600,000	32%	43%	26%	0%	58%	21%	20%	0%	27%	-21%	-5%	0%

Panel B: Reference Dependent Utility, ASFA Comfortable

Average Across Age 65 to 109	Excluding Imputation Credits				Including Imputation Credits				*Change in Weights*			
	AE	WE	AFI	AC	AE	WE	AFI	AC	AE	WE	AFI	AC
Grand Average	**19.4%**	**60.0%**	**15.7%**	**5.0%**	**67.9%**	**16.2%**	**13.0%**	**3.0%**	**48.5%**	**-43.8%**	**-2.7%**	**-2.0%**
At Initial Balance:												
$25,000	0%	100%	0%	0%	100%	0%	0%	0%	100%	-100%	0%	0%
$50,000	1%	99%	0%	0%	99%	1%	0%	0%	98%	-98%	0%	0%
$75,000	3%	97%	0%	0%	97%	2%	0%	0%	94%	-95%	0%	0%
$100,000	6%	93%	1%	0%	95%	4%	1%	0%	89%	-89%	0%	0%
$150,000	12%	85%	3%	1%	88%	9%	3%	1%	75%	-75%	0%	0%
$200,000	19%	76%	4%	1%	81%	14%	4%	1%	62%	-62%	0%	0%
$250,000	28%	61%	9%	2%	72%	17%	9%	2%	44%	-45%	0%	0%
$300,000	30%	51%	16%	3%	63%	17%	16%	4%	33%	-33%	0%	0%
$350,000	29%	44%	22%	5%	56%	17%	22%	5%	27%	-27%	0%	0%
$400,000	28%	38%	27%	6%	51%	16%	26%	6%	23%	-22%	0%	0%
$450,000	27%	35%	30%	8%	48%	15%	29%	8%	21%	-20%	-1%	-1%
$500,000	26%	33%	31%	10%	46%	15%	31%	8%	20%	-17%	-1%	-2%
$600,000	24%	30%	32%	14%	45%	16%	31%	9%	21%	-15%	-1%	-5%
$700,000	23%	31%	30%	16%	47%	17%	27%	9%	24%	-14%	-3%	-8%
$800,000	22%	37%	28%	13%	53%	19%	23%	5%	31%	-18%	-5%	-8%
$900,000	22%	46%	24%	7%	60%	20%	17%	2%	38%	-26%	-7%	-5%
$1,000,000	22%	56%	19%	3%	66%	21%	11%	1%	45%	-35%	-8%	-2%
$1,200,000	18%	71%	9%	1%	75%	19%	5%	1%	57%	-52%	-4%	-1%
$1,400,000	14%	81%	4%	1%	81%	17%	2%	0%	67%	-64%	-2%	0%
$1,600,000	11%	86%	2%	0%	84%	15%	1%	0%	73%	-72%	-1%	0%

Table 2 compares average optimal assets weights for four assets including and excluding imputation credits, at an imputation credit yield of 1.37%. Panel A reports average projected weights under power utility. Panel B reports the equivalent under reference dependent utility with an AFSA comfortable income target. Estimates are reported for selected initial balances at age 65 ranging from $25,000 and $1.6 million, as well as a grand average across all balances and ages. The estimates reflect an average of asset weights over 10,000 simulations from age 65 to age 109, which are weighted by the post-consumption balance and the probability of survival at each age. AE is Australian equities, WE is World Equities, AFI is Australian Fixed Income and AC is Australian Cash.

First, reference dependent utility functions induce a preference for higher returning assets over longer horizons as they decrease the probability of shortfall. The upward 'shift' in the overall distribution as a consequence of higher returns interacts with the manner in which gains and losses are asymmetrically evaluated under reference dependent utility functions to generate an increasing preference for the highest returning asset as horizon lengthens, notwithstanding the possibility that holding more of this asset may be associated with higher volatility. This aspect is discussed by Benartzi and Thaler (1995), Bierman (1998) and Levy and Levy (2017). The effect is to enhance the sensitivity of asset weights to returns under reference dependent utility, with the fact that including imputation credits results in AE supplanting WE as the highest returning asset playing an influential role.

Second, non-linearity with respect to balance arises in the presence of an income target, as reflected in u-shaped equity weights. Fixed income (AFI and AC) features more strongly in the optimal portfolio at initial balances of around $500,00-$800,000, as these balances support achieving the income target with reasonable probability. Fixed income is attractive in this region because it de-risks the portfolio and helps secure the target. At lower balances, shortfall versus target income becomes more likely, and it becomes optimal to favour the highest returning asset as it increases the probability of attaining the target. A preference for higher returning assets also occurs at larger balances, as the prospect emerges of gaining even more income without greatly increasing the risk of falling short of target. This is a familiar pattern under reference dependent utility, and can be seen in Blake et al. (2013). These two effects manifest in increased overall equity weightings and a larger shift from WE to AE at both lower and higher balances. The impact of these effects is even more extreme under an AFSA modest target (see Appendix), although in that case overall fixed income weights reach their maximum at an initial balance of around $150,000.

Two main messages emerge from the estimates of optimal weights for Australian retirement savers. The first is that the overall optimal asset allocation can be sensitive to assumptions regarding aspects such as balance, age and the utility function. Second, and most important given the aims of this study, the availability of imputation credits can have a significant impact on optimal portfolios for retirees, giving rise to a substantial home bias.

(ii) Value Generated by Imputation Credits

We gauge the value generated by imputation credits for retirees by comparing results including and excluding dividend imputation. Figure 2 charts the median estimates from the simulations for both consumption and balance from age 65 to age 109 at an initial balance at age 65 of $500,000, with results under power utility plotted in Panel A and reference dependent utility with an ASFA comfortable target in Panel B. A balance of $500,000 is close to the average for those aged 60-64 with over $100,000 in superannuation, which stood at $505,000 for males and $426,000 for females; and compares with estimates that a balance of $545,000 is required to support a comfortable lifestyle (Clare, 2017). Charts for an initial balance of $100,000 under both power utility and reference dependent utility with an ASFA modest target appear in the Appendix. A $100,000 balance broadly represents the current median at age 60-64, which in 2015-6 stood at $110,00 for males and $36,000 for females (Clare, 2017).

Figure 2: Median Consumption and Balance Excluding and Including Imputation for Initial Balance of $500,000

Panel A: Power Utility **Panel B: Reference Dependent Utility, ASFA Comfortable**

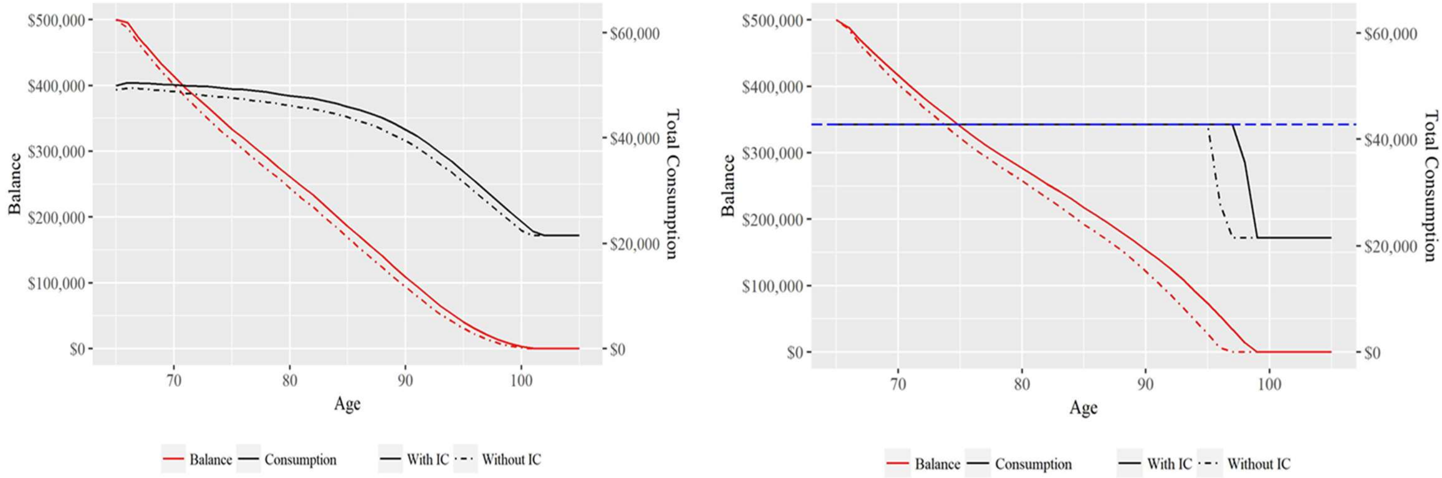


Figure 2 compares the projections for the median optimal balance and consumption from age 65 to age 109 both including and excluding imputation credits at an initial balance of $500,000 at age 65, for an imputation credit yield of 1.37%. Panel A plots the estimates under power utility, while Panel B plots them under reference dependent utility with an AFSA comfortable income target.

Figure 2 reveals that imputation improves both consumption and balances over the retirement phase. However, the way that this is achieved differs for power utility and reference dependent utility. Under power utility, gains are evenly spread across retirement, until an older age when the balance is depleted, and the median retiree ends up on the age pension. Under reference dependent utility, the retiree spends their income target earlier in retirement phase, with imputation credits supporting the accumulation of a larger balance over time. The benefit of imputation then emerges as an extension of the number of years that consumption can be sustained at the target level before the balance runs out and the retiree ends up consuming the age pension.

Table 3 presents estimates of the value generated by imputation credits using the three measures outlined in Section II(v). Averages across all ages are reported for a selection of initial balances at age 65 ranging from

$50,000 up to $1.6 million, with an overall average across all initial balances and ages appearing at the top. The potential value is economically meaningful, with the average across all balances and ages equating to a gain in CE consumption of 5%-6%; an increase in initial balance at age 65 of 8%-9%; or an increase in the risk-free return of 0.6%-0.8% (see top row in Table 3).

Table 3: Average Value of Imputation Credits Under Three Measures

	Gain in CE Consumption		Extra Initial Balance		Extra Risk-Free Return	
Utilty Function	**Power Utility**	**Reference Dependent, Comfortable**	**Power Utility**	**Reference Dependent, Comfortable**	**Power Utility**	**Reference Dependent, Comfortable**
Average % Change	**4.9%**	**5.9%**	**9.1%**	**8.0%**	**0.84%**	**0.60%**
At Selected Balances:						
$50,000	0.8%	0.9%	$2,977	$2,707	0.57%	0.47%
$100,000	1.5%	1.5%	$6,776	$5,859	0.66%	0.54%
$150,000	2.1%	1.7%	$11,355	$9,260	0.72%	0.62%
$200,000	2.4%	1.7%	$16,540	$12,119	0.74%	0.67%
$250,000	2.7%	1.6%	$22,727	$17,247	0.77%	0.73%
$300,000	2.9%	1.3%	$31,113	$24,707	0.77%	0.71%
$350,000	3.0%	1.0%	$36,506	$30,298	0.76%	0.66%
$400,000	3.1%	0.7%	$40,386	$36,899	0.75%	0.64%
$450,000	3.2%	0.6%	$42,716	$42,185	0.73%	0.60%
$500,000	3.3%	0.4%	$43,069	$44,416	0.72%	0.57%
$600,000	3.7%	0.2%	$45,969	$45,870	0.73%	0.52%
$700,000	4.3%	0.1%	$55,051	$49,008	0.78%	0.48%
$800,000	4.9%	0.1%	$65,859	$57,327	0.82%	0.49%
$900,000	5.4%	7.2%	$78,945	$67,637	0.86%	0.52%
$1,000,000	6.0%	11.3%	$95,369	$79,436	0.91%	0.55%
$1,200,000	6.8%	12.5%	$121,787	$103,450	0.97%	0.62%
$1,400,000	7.3%	12.1%	$143,451	$128,296	0.98%	0.67%
$1,600,000	7.6%	11.5%	$162,902	$147,754	0.97%	0.70%

Table 3 reports estimates of the value generated for Australian retirees by imputation credits of 1.37% under three measures. Average estimates are reported for a selection of initial balances at age 65, with overall averages across all initial balances reported at the top. See Section II(v) for detailed descriptions of the three measures.

The measures differ across the range of initial balances for the two utility functions. Under power utility, the magnitude of all measures tends to increase with initial balance. This reflects the fact that the age pension accounts for a larger portion of consumption at lower balances, coupled with pension eligibility rules which prescribe a partial pension at balances above $157,570 and zero pension at balances above $529,150 for a single male. The gains in CE consumption starts at near 1% for low balances, before increasing to over 7% at high balances. Similarly, the extra initial balance increases notably with balance, although this also reflects that retirees with higher balances are able to access more imputation credits which converts to larger estimates for the extra initial balance in dollar terms. The estimates for extra risk-free return are comparatively stable across the range of balances, with some non-monotonicities related to the pension eligibility.

Under reference dependent utility, the extra initial balance again rises with initial balance. However, the gains according to the other two measures are more uneven. This mainly reflects non-linear effects arising from interactions between initial balance and the income target and hence optimal weights, as discussed above in (i). The pension eligibility rules also play a role, although mainly at lower balances. For example, the notable increase in the gain in CE consumption that occurs once initial balance moves above $800,000 arises because the additional income from imputation credits significantly increases the probability of achieving the AFSA comfortable income target at these levels. This leads to a substantial jump in utility, supported by the opportunity to shift towards an even higher returning portfolio at a lower balance than when imputation is excluded. This jump in utility then converts to a notable increase in CE consumption. The effect builds until an initial balance of around $1.2 million.

The estimates reported in Table 3 assume that the retiree holds optimal portfolios, depending on whether imputation credits are excluded or included. They thus embed the combined impact of direct access to imputation credits and the related shift in asset weights. Under the sensitivity testing reported below in (iv), we repeat the analysis by comparing the results both excluding and including imputation credits using a constant baseline portfolio in line with the reference portfolio in order to isolate out the direct impact from the imputation credits.

(iii) Net Cost to the Government

We use our model to provide indicative estimates of the expected net cost per individual to the government of providing full access to imputation credits during retirement, taking into account the age pension and life expectancy. To form our estimates, we calculate the dollar value of imputation credits claimed each year, and deduct the associated reduction in the cost of supplying the age pension due to higher investment income and account balances. The latter is estimated from the difference between the total age pension claimed including and excluding imputation. The values are then weighted by probability of survival, thus arriving at cost accounting for life expectancy, and then averaged across simulations. The estimates can be interpreted as the expected aggregate cost of providing access to imputation credits in constant dollars for a male retiring at age 65 in 2018.

Table 4 reports the estimates. The reduction in age pension payments only mitigates the cost of imputation to a moderate extent, peaking in dollar terms at an initial balance of $600,000 to $700,000, before declining due to reducing eligibility. The net cost of providing access to imputation credits grows in value with initial balance. This is unsurprising, as retirees with higher balances have greater capacity to access the credits. It means that wealthier individuals are benefitting from the tax credits to a much greater extent. For instance, the net expected cost for a retiree with an initial balance of $100,000 is estimated at around $20,000 under both utility functions. At a $500,000 initial balance, the net cost is $59,179 under power utility and $26,807 under reference dependent utility, with the reference dependent results influenced by lower AE weightings at that balance. The cost progressively increases to $132,008 and $124, 276 respectively at an initial balance of $1.6 million. The net expected cost as a percentage of initial balance is impacted by a combination of age pension eligibility and AE weights. It generally tends to decline with initial balance, standing at about 20% at $100,000, then reducing to 8% at a balance of $1.6 million under both utility functions.

Table 4: Estimated Expected Cost to the Government per Individual at Aged 65

$ per individual	Power Utility				Reference Dependent, Comfortable			
Balance at Retirement	Imputation Credit Claimed	Reduction in Age Pension	Net Cost	Net Cost as % of Balance	Imputation Credit Claimed	Reduction in Age Pension	Net Cost	Net Cost as % of Balance
100,000	19,089	-78	19,011	19%	21,489	-31	21,459	21%
200,000	33,626	-1,625	32,001	16%	29,861	-852	29,009	15%
300,000	45,877	-4,417	41,460	14%	35,362	-5,860	29,503	10%
400,000	56,857	-7,340	49,517	12%	37,695	-10,245	27,451	7%
500,000	69,792	-10,612	59,179	12%	41,954	-15,148	26,807	5%
600,000	77,294	-13,124	64,170	11%	46,183	-18,817	27,367	5%
700,000	85,830	-13,951	71,879	10%	51,849	-18,609	33,240	5%
800,000	94,819	-13,515	81,304	10%	58,819	-15,057	43,762	5%
900,000	103,838	-12,580	91,258	10%	67,704	-10,727	56,976	6%
1,000,000	112,693	-11,441	101,252	10%	79,405	-7,997	71,408	7%
1,200,000	121,284	-9,095	112,189	9%	93,896	-5,868	88,028	7%
1,400,000	129,524	-7,092	122,432	9%	110,656	-5,200	105,456	8%
1,600,000	137,400	-5,392	132,008	8%	128,864	-4,588	124,276	8%

Table 4 reports estimates of the expected net cost per individual to the government of providing full access to imputation credits during retirement. The estimates are generated for initial balances at age 65 ranging from $100,000 to $1.6 million. They reflect the sum of the imputation credits less the associated reduction in the cost of supplying the age pension from age 65, adjusted for the probability of survival.

(iv) Sensitivity to Input Assumptions

We estimate the sensitivity of the results to changes in selected inputs related to the utility parameters, asset weights, and the level and pricing of imputation credits. We first describe the input changes, before separately presenting the revised estimates for optimal asset weights and the value generated by imputation credits. We report grand average estimates across all ages and balances with the aim of characterising the broad changes.

For the utility parameters, we investigate the impact of both lower and higher risk aversion. For power utility, we examine CRRA of 3 and 5, relative to the baseline of 4. For reference dependent utility, under lower risk aversion we use the parameters of Tversky and Kahneman (1992), which include curvature parameters of 0.88 on both gains and losses, and a weighting parameter of 2.25 on losses. For higher risk aversion, we reduce the curvature parameter on gain to 0.33, and increase the weighting parameter on losses to 6.75. These compare with baseline curvature parameters of 0.44 on gains and 0.88 on losses, and a weighting parameter on losses of 4.50. To gauge the direct value of imputation credits abstracting from the effect of changing asset weights, we generate estimates under the assumption of constant weights applied both excluding and including imputation in line with the reference portfolio weights. This variation is relevant only for the estimates of the value of imputation, and not the analysis of optimal asset weights. With regard to assumed imputation credits, we re-run the analysis in two ways. First, we investigate differing levels of imputation yield, with values of 1.17% and 1.53% representing the 10th and 90th percentile observed historically, as compared to the baseline of 1.37%. Second, we mimic a situation where imputation credits are 50% priced. This is achieved by lowering AE returns both excluding and including imputation by half the imputation credit yield or -0.685%.[7] It is worth noting that this does not alter the return gap between AE excluding and including imputation credits, which remains at 1.37%.

Optimal Asset Weights – Sensitivity Results

Table 5 compares average optimal weights for all four assets excluding and including imputations credits across all ages and balances under differing input assumptions. Baseline average optimal weights are reported at the top for comparison. Changes in the risk aversion parameters have two effects. First, the overall equity weights are higher when risk aversion is lower, and vice versa. Second, lower risk aversion magnifies the increase AE weights when imputation credits are available, while higher risk aversion dampens it. A similar effect occurs in response to changing the assumed imputation credit yield, with the higher 1.53% yield magnifying the switch towards AE and the lower 1.17% yield dampening it. However, the average AE weights including imputation under the two alternative imputation credit yields and hence the change in weights differ from the baseline only modestly, within a range of ±4%-6%. Assuming that imputation credits are 50% priced reduces AE weights both including and excluding imputation, but the tendency for a substantial shift towards AE from WE including imputation remains a consistent feature. Under reference dependent utility, the AE weights including imputation at 50% priced are below those for WE, reflecting the impact of lower expected returns on AE on the weights both excluding and

[7] If imputation credits are priced, then stocks paying franked dividends should generate lower pre-tax returns in the market in recognition of the value attributed to the credits by the marginal investor. Imputation will thus reduce pre-tax returns, with the imputation credits still topping up the return after-tax by the same amount. Hence 50% pricing is modelled by lowering returns both excluding and including imputation credits by -0.685%, leaving the return gap between the two series at 1.37%.

excluding imputation. In summary, all input changes under sensitivity testing give rise to revised results that move in predictable directions, with the key finding that imputation can justify a home bias remaining largely intact.

Table 5: Sensitivity of Optimal Asset Weights to Input Assumptions

Utilty Function	Power Utility				Reference Dependent, Comfortable			
Assets	**AE**	**WE**	**AFI**	**AC**	**AE**	**WE**	**AFI**	**AC**
Baseline Weights								
Excluding Imputation	33.2%	57.7%	9.1%	0.0%	19.4%	60.0%	15.7%	5.0%
Including Imputation	70.1%	23.4%	6.5%	0.0%	67.9%	16.2%	13.0%	3.0%
Change	*36.9%*	*-34.3%*	*-2.6%*	*0.0%*	*48.5%*	*-43.8%*	*-2.7%*	*-2.0%*
Utility Parameters								
Less Risk Averse								
Excluding Imputation	31.5%	65.7%	2.9%	0.0%	3.5%	96.5%	0.0%	0.0%
Including Imputation	75.9%	22.6%	1.5%	0.0%	96.1%	3.9%	0.0%	0.0%
Change	*44.5%*	*-43.0%*	*-1.4%*	*0.0%*	*92.6%*	*-92.6%*	*0.0%*	*0.0%*
More Risk Averse								
Excluding Imputation	32.4%	51.1%	15.9%	0.6%	20.2%	49.5%	19.6%	10.7%
Including Imputation	64.8%	22.7%	12.3%	0 3%	59.9%	15.6%	16.9%	7.6%
Change	*32.4%*	*-28.5%*	*-3.6%*	*-0.3%*	*39.7%*	*-33.9%*	*-2.7%*	*-3.1%*
Imputation Credits								
Yield of 1.17%								
Excluding Imputation	33.2%	57.7%	9.1%	0.0%	19.4%	60.0%	15.7%	5.0%
Including Imputation	65.0%	28.2%	6.7%	0.0%	62.0%	21.3%	13.4%	3.3%
Change	*31.8%*	*-29.5%*	*-2.4%*	*0.0%*	*42.6%*	*-38.6%*	*-2.3%*	*-1.7%*
Yield of 1.53%								
Excluding Imputation	33.2%	57.7%	9.1%	0.0%	19.4%	60.0%	15.7%	5.0%
Including Imputation	73.9%	19.8%	6.4%	0.0%	71.7%	12.8%	12.6%	2.8%
Change	*40.7%*	*-37.9%*	*-2.7%*	*0.0%*	*52.3%*	*-47.1%*	*-3.0%*	*-2.2%*
Imputation 50% Priced								
Excluding Imputation	15.9%	72.5%	11.6%	0.0%	9.3%	67.5%	17.0%	6.1%
Including Imputation	51.9%	40.7%	7.5%	0.0%	36.3%	45.3%	14.4%	4.0%
Change	*36.0%*	*-31.8%*	*-4.2%*	*0.0%*	*26.9%*	*-22.1%*	*-2.6%*	*-2.2%*

Table 5 reports how the optimal asset weights excluding and including imputation respond to changes in input assumptions under power utility and reference dependent utility with an ASFA comfortable income target. Grand average optimal weights across all balances and ages are reported, where AE is Australian equities, WE is World Equities, AFI is Australian Fixed Income and AC is Australian Cash. Baseline average optimal weights as reported in Table 2 appear at the top, followed by the average revised weights and the changes from baseline. Lower (higher) risk aversion under power utility uses *CRRA* of 3 (5), compared to a baseline of 4. Under reference dependent utility, for lower risk aversion we use the parameters of Tversky and Kahneman (1992), which include curvature parameters of 0.88 on both gains and losses (baseline 0.44 on gains, 0.88 on losses), and a weighting parameter of 2.25 on losses (baseline 4.5). For higher risk aversion, we reduce the curvature parameter on gain to 0.33, and increase the weighting parameters on losses to 6.75. Imputation credit yields of 1.17% and 1.53% represent the 10^{th} and 90^{th} percentile observed historically, versus a baseline of 1.37%. The imputation 50% priced scenario involves reducing AE returns both excluding and including imputation credits by half of the imputation credit yield or -0.685%, taking the AE expected return excluding imputation to 5.36%.

Estimated Value of Imputation – Sensitivity Results

Table 6 reports estimates of the value of imputations credits averaged across all ages and balances under differing input assumptions. The original baseline estimates are reported at the top, and the changes versus baseline reported below the revised estimates.

Table 6: Sensitivity of Value of Imputation Credits to Input Assumptions

Utilty Function	Gain in CE Consumption		Extra Initial Balance		Extra Risk-Free Return	
	Power Utility	Reference Dependent, Comfortable	Power Utility	Reference Dependent, Comfortable	Power Utility	Reference Dependent, Comfortable
Baseline Estimates	**4.9%**	**5.9%**	**9.1%**	**8.0%**	**0.84%**	**0.60%**
Utility Parameters						
Less Risk Averse						
Revised	4.6%	4.3%	8.0%	6.3%	0.76%	0.59%
Difference	*-0.3%*	*-1.6%*	*-1.2%*	*-1.7%*	*-0.08%*	*0.00%*
More Risk Averse						
Revised	4.9%	5.1%	9.9%	7.4%	0.89%	0.52%
Difference	*0.0%*	*-0.8%*	*0.8%*	*-0.6%*	*0.05%*	*-0.07%*
Constant Asset Weights						
Revised	3.0%	4.2%	5.6%	6.3%	0.50%	0.48%
Difference	*-1.9%*	*-1.7%*	*-3.5%*	*-1.7%*	*-0.34%*	*-0.12%*
Imputation Credits						
Yield of 1.17%						
Revised	3.9%	4.5%	7.2%	6.2%	0.67%	0.46%
Difference	*-1.0%*	*-1.4%*	*-1.9%*	*-1.8%*	*-0.17%*	*-0.14%*
Yield of 1.53%						
Revised	5.8%	6.8%	10.8%	9.3%	1.00%	0.69%
Difference	*0.9%*	*0.9%*	*1.7%*	*1.3%*	*0.16%*	*0.10%*
Imputation 50% Priced						
Revised	2.8%	3.3%	4.9%	4.6%	0.45%	0.33%
Difference	*-2.1%*	*-2.6%*	*-4.2%*	*-3.4%*	*-0.39%*	*-0.26%*

Table 6 reports how the estimates of the value of imputation respond to changes in input assumptions under both power utility and reference dependent utility with an ASFA comfortable income target. Average estimates across all balances and ages are reported for the three measures described in Section II(v). Baseline estimates as reported in Table 3 are presented at the top, followed by the revised estimates and changes from baseline. Lower (higher) risk aversion under power utility uses *CRRA* of 3 (5), compared to a baseline of 4. Under reference dependent utility, for lower risk aversion we use the parameters of Tversky and Kahneman (1992), which include curvature parameters of 0.88 on both gains and losses (baseline 0.44 on gains, 0.88 on losses), and a weighting parameter of 2.25 on losses (baseline 4.5). For higher risk aversion, we reduce the curvature parameter on gain to 0.33, and increase the weighting parameters on losses to 6.75. The constant asset weight scenario estimates the value of imputation credits where weights both excluding and including imputation are set in line with the reference portfolio at 35% for both AE and WE, 23% for AFI, and 7% for AC. Imputation credit yields of 1.17% and 1.53% represent the 10th and 90th percentile observed historically, versus baseline of 1.37%. The imputation 50% priced scenario involves reducing AE returns both excluding and including imputation credits by half of the imputation credit yield or -0.685%, taking the AE return excluding imputation to 5.36%.

Changing the risk aversion parameters gives rise to a mixed set of changes to the estimates, reflecting some complex interactions.[8] Nevertheless, the key finding is that the changes are small in magnitude, confirming that our estimates of the value of imputation are not dependent on the risk aversion assumption. The estimates formed under the assumption of constant asset weights remove the impact of the change in optimal asset weights in response to the availability of imputation credits. Under this case, imputation credits deliver a gain in CE consumption of around 3%-4%, equivalent value to an extra initial balance of about 6%, and the equivalent of an

[8] Altering the risk aversion parameters affects the overall level of overall equity weights, as well as the shift in weights when imputation is introduced, which interacts with the age pension and the income target in a non-linear manner. Marginal gains in utility relative to the baseline case are also constrained by the 100% weighting cap under lower risk aversion, and by the impact of lower overall equity weightings and hence lower consumption under higher risk aversion.

extra risk-free return of 0.5%. The estimates are relatively consistent across all utility functions, including reference dependent with a modest income target (see Appendix). Thus, when constant asset weights are assumed, the magnitude of the value measures versus the baseline decline in percentage terms by 38%-41% under power utility, and 19%-29% under reference dependent with a comfortable income target. This suggests that the majority of the value can be directly attributed to the imputation credits in isolation, with the shift in optimal asset weights acting as a magnifier. Adjusting the imputation credit yield alters the estimated value of imputation in a predicable direction. For instance, a lower (higher) imputation credit yields of 1.17% (1.53%) both lead to changes in both CE consumption and extra initial balance that differ to the baseline estimates by ±1%-2%. Finally, assuming that imputation credits are 50% priced reduces the measures of the value of imputation by around 40%, to about 3% for CE consumption, 5% for extra initial balance and 0.4% for extra risk-free return. In summary, the conclusion that imputation credits are of substantial value to retirees is robust to changing the input assumptions over a plausible range, although the magnitude of the benefit varies, and the roughly 40% decline in value when imputation is 50% priced is noteworthy.

IV. Implications and Conclusions

Our analysis highlights two implications of the current imputation system for retired investors. First, availability of imputation credits can justify biasing retirement portfolios towards Australian equities at the expense of world equities. Second, imputation delivers considerable value to retirees. It potentially increases consumption over retirement in the order of 5%-6%, and is equivalent to increasing balance at retirement by around 8%-9%. While the specific magnitude of these effects varies with age, balance, utility function and input assumptions, sensitivity testing reveals the broad tenor of the findings to be robust. We are confident that the findings would survive other changes to the set-up, such as modelling a multi-person rather than a single-person household, inclusion of other household assets, allowing for social security benefits such as health, and incorporating a bequest motive. One element that might alter the results would be to explicitly model a primary residence as an asset that generates imputed rent. We surmise that adding a family home, which does not impact on pension eligibility, would lead to even higher optimal equity weights and hence could amplify the benefit of imputation to retirees. Such a result would further confirm our findings.

Our analysis has implications for understanding equity home bias. We find that a significant bias to local equities can emerge rationally under a stochastic life-cycle model in the presence of imputation credits. The emergence of an 'optimal' home bias relates to the notion that access to additional returns dominate the extra portfolio risk from holding a more concentrated portfolio. To a large extent, this stems from a relatively high correlation between Australian and world equities (about 0.6), which makes them substitutes in terms of contribution to overall portfolio risk. Switching from world equities to Australian equities to capture imputation credits thus adds a meaningful amount to expected returns without increasing risk substantially. This effect is lessened if imputation credits are partially priced, highlighting that the extent to which imputation is incorporated into market prices may be influential for the degree of home bias. Nevertheless, the implication is that relatively modest differences in expected returns – be it for reasons of taxes, or perhaps an expectation of higher returns in the local market due to better information – could potentially explain and justify a significant home bias.

Our research also has implications for public policy. The finding that imputation credits are valuable to retirees must be pitched against the cost to the public budget and hence taxpayers of providing access to those credits. After accounting for the offset from the age pension, we estimate that the total expected net cost per individual over their retirement phase is about $30,000 for retirees with a $100,000 balance at retirement, and around $80,000 for those with a $500,000 balance (in 2017-8 dollars). While this may seem relatively 'expensive', it also offers social benefits. First, it either raises potential consumption during retirement at a given balance, or alternatively reduces the amount needed to be placed into superannuation during the working phase thus increasing potential consumption prior to retirement. Access to imputation credits in retirement therefore helps address the issue of adequacy and reduces the need for a higher superannuation guarantee levy. A further implication is that the home bias encouraged by imputation credits might make equity funding more readily available to Australian companies, either in terms of supply, or lower cost of capital (the latter only *if* imputation credits are partially priced). Removal of full access to imputation credits in retirement could unwind the benefits mentioned above and would undoubtedly solicit significant political backlash from retirees. Finally, we note that the largest benefit in dollar terms accrues to retirees with the largest initial balances, raising some questions around equity.

References

Ainsworth, A., Partington, G. and Warren, G. (2015), "Do Franking Credits Matter? Exploring the Financial Implications of Dividend Imputation", *CIFR Research Working Paper*, No. 058/2015. Available from: https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2613186

Ainsworth, A., Partington, G. and Warren, G. (2016), "The Impact of Dividend Imputation of Share Prices, the Cost of Capital and Corporate Behaviour", *JASSA*, **1** (March) 2016: 37-44

Andreasson, J. and Shevchenko, P. (2017), "Assessment of Policy Changes to Means-Tested Age Pension Using the Expected Utility Model: Implication for Decisions in Retirement", *Risks*, **5**: 47

Andreasson, J., Shevchenko, P. and Novikov, A. (2017), "Optimal Consumption, Investment and Housing with Means-Tested Public Pension in Retirement", *Insurance Mathematics and Economics*, **75**: 32–47

Ameriks, J., Caplin, A., Laufer, S. and Van Nieuwerburgh, S. (2011), "The Joy of Giving or Assisted Living? Using Strategic Surveys to Separate Public Care Aversion from Bequest Motives", *The Journal of Finance*, **66**(2) (April): 519–561

Australian Government Actuary (2014), *Australian Life Tables 2010-12*. Commonwealth of Australia.

ASFA (2018), "ASFA Retirement Standard: Detailed Budget Breakdowns, March 2018", *The Association of Superannuation Funds of Australia* (March). Available from: https://www.superannuation.asn.au/resources/retirement-standard (accessed in May 2018)

Benartzi, S. and Thaler, R.H. (1995), "Myopic Loss Aversion and the Equity Premium Puzzle", *The Quarterly Journal of Economics*, **110**(1) (February): 73–92

Bierman Jr, H. (1998), "A Utility Approach to the Portfolio Allocation Decision and the Investment Horizon", *The Journal of Portfolio Management*, **2**(1) (Fall): 81-87

Black, F. and Litterman, R. (1992), "Global Portfolio Optimization", *Financial Analysts Journal*, **48**(5) (September/October): 28-43

Blake, D., Wright, D. and Zhang, Y. (2013), "Target-Driven Investing: Optimal Investment Strategies in Defined Contribution Pension Plans under Loss Aversion", *Journal of Economic Dynamics and Control*, **37**(1) (January): 195-209.

Christoffersen, S.E., Geczy, C.C., Musto, D.K. and Reed, A.V. (2005), "Crossborder Dividend Taxation and the Preferences of Taxable and Nontaxable Investors: Evidence from Canada", *Journal of Financial Economics*, **78**(1): 121-144

Clare, R. (2017), "Superannuation Balances by Age and Gender", *ASFA Research and Resource Centre* (October). Available from: https://www.superannuation.asn.au/ArticleDocuments/359/1710_Superannuation_account_balances_by_age_and_gender.pdf.aspx?Embed=Y (accessed May 2018)

Coeurdacier, N. and Rey, H. (2012), "Home Bias in Open Economy Financial Macroeconomics", *Journal of*

Economic Literature, **51**(1): 63–115

Cooper, I. Sercu, P. and Vanpee, R. (2012), "The Equity Home Bias: Survey and Synthesis", *Foundations and Trends in Finance*, **7**(4): 289–416

Daly, K. and Vo, X.V. (2013), "The Determinants of Home Bias Puzzle in Equity Portfolio Investment in Australia", *International Review of Financial Analysis*, **27**: 34-42

Dimson, E., Marsh, P. and Staunton, M. (2011), "Equity Premiums Around the World", Appearing in: Hammond, P.B Jr., Leibowitz, M.L, and Siegel L.B. (eds), *Rethinking the Equity Risk Premium*, Research Foundation of the CFA Research Institute: 32-52

Ding, J. (2014), "Essays on Post-Retirement Financial Planning and Pension Policy Modelling in Australia", Ph.D. Dissertation, *Macquarie University*, Sydney, Australia

He, G. and Litterman, R. (1999), "The Intuition Behind Black-Litterman Model Portfolios", *Goldman Sachs Asset Management*, (December). Available from: https://papers.ssrn.com/sol3/papers.cfm?abstract_id=334304

Hulley, H., Mckibbin, R. Pedersen, A. and Thorp, S. (2013), "Means-Tested Public Pensions, Portfolio Choice and Decumulation in Retirement", *Economic Record*, **89**: 31–51

Iskhakov, F., Thorp, S. and Bateman, H. (2015), "Optimal Annuity Purchases for Australian Retirees", *Economic Record*, **91**: 139–54

Judd, K. L. (1998), *Numerical methods in economics*. MIT press.

Kahneman, D. and Tversky, A (1979), "Prospect Theory: An Analysis of Decision Under Risk", *Econometrica*, **47**(2) (March): 263-292

Khemka, G. and Butt, A. (2017), "Non-Parametric Integral Estimation using Data-Clustering in Stochastic Dynamic Programming: An Introduction using Lifetime Modelling", *Risks*, **5**(4): 57

Kolm P.N., Tütüncü, R. and Fabozzi, F.J. (2014), "60 Years of Portfolio Optimization: Practical Challenges and Current Trends", *European Journal of Operational Research*, **234**(2) (April): 356-371

Levy, H. (2016), "Aging Population, Retirement, and Risk Taking", *Management Science*, **62**(5) (May): 1415-1430

Levy, H. and Levy, M. (2017), "Prospect Theory and Investment Horizon", *Working paper* (22 October), Hebrew University of Jerusalem. Available from: https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3056969

McCririck, R and Rees, D. (2017), "The Neutral Interest Rate", *Reserve Bank of Australian Bulletin*, (September): 9-18. Available from:
https://www.rba.gov.au/publications/bulletin/2017/sep/pdf/bu-0917-2-the-neutral-interest-rate.pdf

Mishra, A.V. (2008), "Australia's Equity Home Bias", *Australian Economic Papers*, **47**(1): 53-73

Mishra, A.V. and Ratti, R.A. (2013), "Home Bias and Cross Border Taxation", *Journal of International Money and Finance*, **32**: 169-193

Mishra, A.V. and Ratti, R.A. (2014), "Taxation of Domestic Dividend Income and Foreign Investment Holdings", *International Review of Economics and Finance*, **31**: 218-231

Samuelson, P. A. (1969), "Lifetime Portfolio Selection by Dynamic Stochastic Programming", T*he Review of Economics and Statistics*, **51**(3): 239-246

Schumaker, L. I. (1983), "On shape preserving quadratic spline interpolation", *SIAM Journal on Numerical Analysis*, **20**(4): 854-864

Tversky, A. and Kahneman, D. (1992), "Advances in Prospect Theory: Cumulative Representation of Uncertainty", *Journal of Risk and Uncertainty*, **5**(4) (October): 297-323

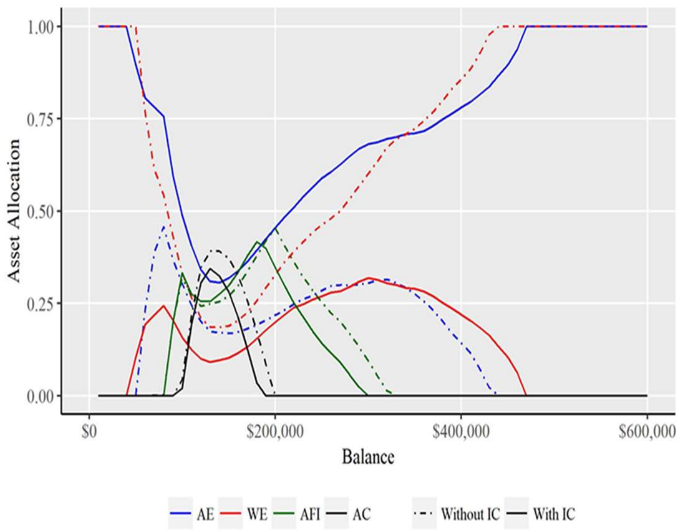
Warren, G.J. (2010), "Equity Home Bias in Australian Superannuation Funds", *Australian Journal of Management*, **35**(1): 2010, 69-93

Yogo, M. (2016), "Portfolio Choice in Retirement: Health Risk and the Demand for Annuities, Housing, and Risky Assets", *Journal of Monetary Economics*, **80** (June): 17-34

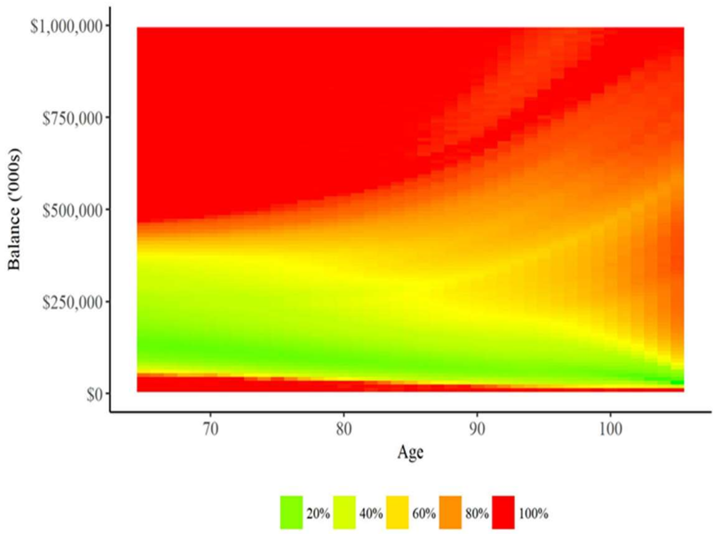
APPENDIX

Optimal Asset Weights Excluding and Including Imputation Credits: Reference Dependent Utility, ASFA Modest

Panel A: Weights Age 65



Panel B: AE Weight Change



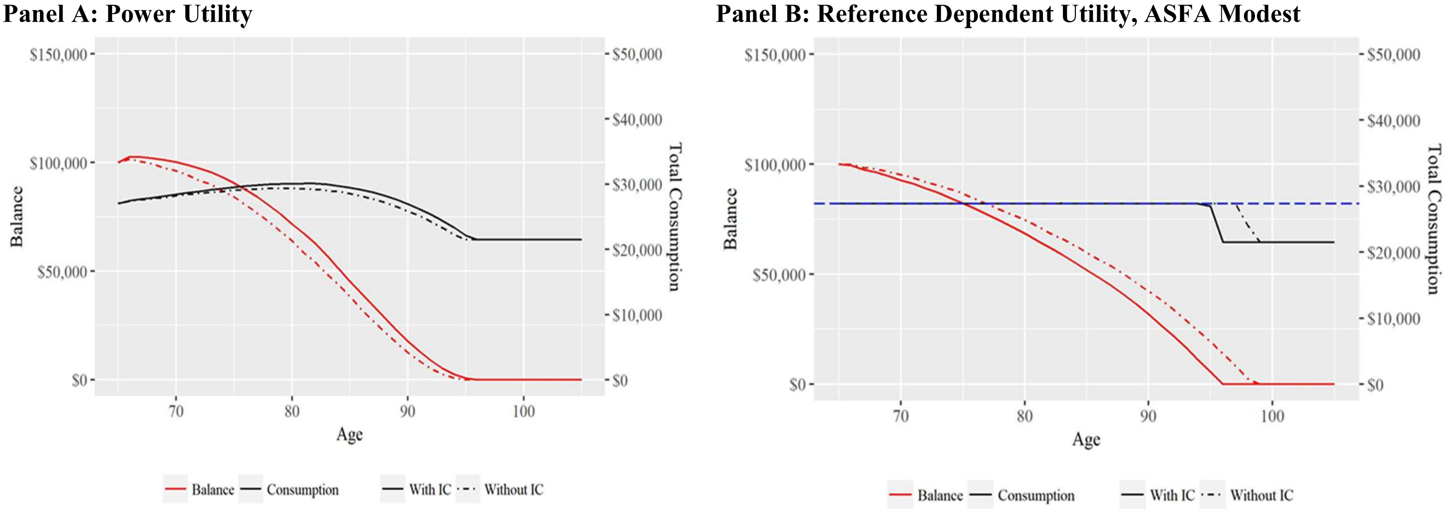
This figure compares optimal assets weights from the optimisation procedure both including and excluding imputation credits at an imputation credit yield of 1.37% under reference dependent utility with an AFSA modest income target. Panel A plots optimal weights at age 65 across a range of initial balances for the four asset classes. Panel B plots a heat map of the difference in AE optimal weights including and excluding imputation credits across initial balance (y-axis) and age (x-axis). AE is Australian equities, WE is World Equities, AFI is Australian Fixed Income and AC is Australian Cash. Please note the balance ranges for this figure are lower than those reported in Figure 1.

Optimal Weights Excluding and Including Imputation Credits: Reference Dependent Utility, ASFA Modest

Average Across Age 65 to 109	Excluding Imputation Credits				Including Imputation Credits				*Change in Weights*			
	AE	WE	AFI	AC	AE	WE	AFI	AC	AE	WE	AFI	AC
Grand Average	**9.0%**	**85.3%**	**4.0%**	**1.7%**	**87.5%**	**8.3%**	**3.1%**	**1.2%**	**78.5%**	**-77.0%**	**-0.9%**	**-0.6%**
At Initial Balance:												
$25,000	5%	94%	1%	0%	96%	3%	1%	0%	91%	-91%	0%	0%
$50,000	17%	75%	5%	2%	80%	13%	5%	2%	62%	-62%	0%	0%
$75,000	28%	51%	14%	7%	62%	16%	15%	7%	34%	-34%	1%	-1%
$100,000	26%	33%	25%	16%	46%	14%	26%	14%	20%	-19%	1%	-3%
$150,000	20%	27%	29%	24%	42%	16%	27%	15%	22%	-11%	-2%	-9%
$200,000	25%	45%	25%	6%	57%	23%	17%	3%	32%	-21%	-8%	-3%
$250,000	27%	57%	14%	2%	66%	25%	8%	1%	39%	-31%	-6%	-1%
$300,000	26%	65%	8%	1%	70%	25%	4%	1%	44%	-40%	-4%	0%
$350,000	23%	71%	5%	1%	74%	23%	3%	0%	50%	-47%	-2%	0%
$400,000	20%	76%	4%	0%	77%	20%	2%	0%	58%	-56%	-2%	0%
$450,000	16%	81%	3%	0%	81%	17%	2%	0%	66%	-64%	-1%	0%
$500,000	13%	84%	2%	0%	85%	13%	1%	0%	72%	-71%	-1%	0%
$600,000	9%	90%	1%	0%	91%	9%	1%	0%	82%	-81%	-1%	0%
$700,000	6%	93%	1%	0%	94%	6%	0%	0%	88%	-87%	0%	0%
$800,000	4%	95%	1%	0%	96%	4%	0%	0%	91%	-91%	0%	0%
$900,000	3%	96%	0%	0%	97%	3%	0%	0%	94%	-93%	0%	0%
$1,000,000	2%	97%	0%	0%	97%	2%	0%	0%	95%	-95%	0%	0%
$1,200,000	2%	98%	0%	0%	98%	2%	0%	0%	96%	-96%	0%	0%
$1,400,000	1%	98%	0%	0%	98%	2%	0%	0%	97%	-97%	0%	0%
$1,600,000	2%	98%	0%	0%	98%	2%	0%	0%	96%	-96%	0%	0%

This table compares average optimal asset weights for four assets both including and excluding imputation credits at an imputation credit yield of 1.37% under reference dependent utility with an AFSA modest income target. Estimates are reported for four assets for selected initial balances at age 65 ranging from $25,000 and $1.6 million, as well as a grand average across all balances and ages. The estimates reflect an average of asset weights over 10,000 simulations from age 65 to age 109, which are weighted by the post-consumption balance and the probability of survival at each age. AE is Australian equities, WE is World Equities, AFI is Australian Fixed Income and AC is Australian Cash.

Median Consumption and Balance Excluding and Including Imputation Credits for Initial Balance of $100,000



This figure compares the projections for the median optimal balance and consumption from age 65 to age 109 both including and excluding imputation credits at an imputation credit yield of 1.37% for an initial balance of $100,000 at age 65. Panel A plots estimates for power utility, and Panel B for reference dependent utility with an AFSA modest income target.

Average Value of Imputation Credits Under Reference Dependent Utility, ASFA Modest

Utilty Function	Gain in CE Consumption	Extra Initial Balance	Extra Risk-Free Return
Average % Change	**4.9%**	**7.6%**	**0.62%**
At Selected Balances:			
$50,000	0.7%	$3,096	0.67%
$100,000	0.3%	$6,247	0.61%
$150,000	0.1%	$10,068	0.41%
$200,000	4.0%	$17,097	0.50%
$250,000	4.4%	$25,306	0.60%
$300,000	4.5%	$34,704	0.63%
$350,000	4.4%	$39,287	0.63%
$400,000	4.3%	$41,673	0.62%
$450,000	4.2%	$42,445	0.60%
$500,000	4.1%	$41,372	0.58%
$600,000	4.2%	$40,164	0.57%
$700,000	4.6%	$44,844	0.58%
$800,000	5.0%	$51,155	0.60%
$900,000	5.3%	$58,420	0.61%
$1,000,000	5.7%	$66,357	0.63%
$1,200,000	6.2%	$83,833	0.66%
$1,400,000	6.7%	$104,036	0.69%
$1,600,000	7.2%	$128,022	0.73%

This table reports estimates of the value generated for Australian retirees by imputation credits of 1.37% under reference dependent utility with an AFSA modest income target. Average estimates are reported for a selection of initial balances at age 65, with overall averages across all balances reported at the top. See Section II(v) for detailed descriptions of the three measures.

Sensitivity of Optimal Asset Weights to Input Assumptions: Reference Dependent, Modest

Utilty Function	Reference Dependent, Modest			
Assets	**AE**	**WE**	**AFI**	**AC**
Baseline Weights				
Excluding Imputation	9.0%	85.3%	4.0%	1.7%
Including Imputation	87.5%	8.3%	3.1%	1.2%
Change	*78.5%*	*-77.0%*	*-0.9%*	*-0.6%*
Utility Parameters				
Less Risk Averse				
Excluding Imputation	1.4%	98.6%	0.0%	0.0%
Including Imputation	98.5%	1.5%	0.0%	0.0%
Change	*97.1%*	*-97.1%*	*0.0%*	*0.0%*
More Risk Averse				
Excluding Imputation	9.3%	81.6%	6.0%	3.0%
Including Imputation	83.4%	9.9%	4.5%	2.3%
Change	*74.0%*	*-71.7%*	*-1.5%*	*-0.8%*
Imputation Credits				
Yield of 1.17%				
Excluding Imputation	9.0%	85.3%	4.0%	1.7%
Including Imputation	78.3%	17.3%	3.2%	1.2%
Change	*69.3%*	*-68.0%*	*-0.8%*	*-0.5%*
Yield of 1.53%				
Excluding Imputation	9.0%	85.3%	4.0%	1.7%
Including Imputation	89.8%	6.1%	3.0%	1.1%
Change	*80.8%*	*-79.2%*	*-1.0%*	*-0.6%*
Imputation 50% Priced				
Excluding Imputation	3.2%	90.3%	4.5%	2.0%
Including Imputation	36.2%	58.9%	3.5%	1.4%
Change	*32.9%*	*-31.4%*	*-1.0%*	*-0.6%*

This table reports how the optimal asset weights excluding and including imputation respond to changes in input assumptions under reference dependent utility with an ASFA modest income target. Grand average optimal weights across all balances and ages are reported, where AE is Australian equities, WE is World Equities, AFI is Australian Fixed Income and AC is Australian Cash. Baseline average optimal weights are presented at the top, followed by the average revised weights and changes from baseline. For lower risk aversion we use the parameters of Tversky and Kahneman (1992), which include curvature parameters of 0.88 on both gains and losses (baseline 0.44 on gains, 0.88 on losses), and a weighting parameter of 2.25 on losses (baseline 4.5). For higher risk aversion, we reduce the curvature parameter on gain to 0.33, and increase the weighting parameters to 6.75. Imputation credit yields of 1.17% and 1.53% represent the 10^{th} and 90^{th} percentile observed historically, versus a baseline of 1.37%. The imputation 50% priced scenario involves reducing AE returns both excluding and including imputation credits by half of the imputation credit yield or -0.685%, taking the AE return excluding imputation to 5.36%.

Sensitivity of Value of Imputation Credits to Input Assumptions: Reference Dependent Utility, ASFA Modest

	Gain in CE Consumption	Extra Initial Balance	Extra Risk-Free Return
Baseline Estimates	**4.9%**	**7.6%**	**0.62%**
Utility Parameters			
Less Risk Averse			
Revised	3.4%	5.1%	0.48%
Difference	*-1.6%*	*-2.4%*	*-0.14%*
More Risk Averse			
Revised	5.1%	7.4%	0.52%
Difference	*0.1%*	*-0.1%*	*-0.10%*
Constant Asset Weights			
Revised	3.5%	5.9%	0.48%
Difference	*-1.4%*	*-1.7%*	*-0.14%*
Imputation Credit Yield			
Yield of 1.17%			
Revised	3.7%	5.7%	0.47%
Difference	*-1.3%*	*-1.9%*	*-0.16%*
Yield of 1.53%			
Revised	6.0%	9.1%	0.75%
Difference	*1.1%*	*1.6%*	*0.13%*
Imputation 50% Priced			
Revised	2.5%	4.0%	0.32%
Difference	*-2.5%*	*-3.6%*	*-0.30%*

This table reports how the estimates of the value of imputation respond to changes in input assumptions under reference dependent utility with an ASFA modest income target. Average estimates across all balances and ages are reported for the three measures described in Section II(v). Baseline average optimal weights are presented at the top, followed by the revised estimates and changes from baseline. For lower risk aversion we use the parameters of Tversky and Kahneman (1992), which include curvature parameters of 0.88 on both gains and losses (baseline 0.44 on gains, 0.88 on losses), and a weighting parameter of 2.25 on losses (baseline 4.5). For higher risk aversion, we reduce the curvature parameter on gain to 0.33, and increase the weighting parameters on losses another notch to 6.75. The constant asset weight scenario estimates the value of imputation credits where weights both excluding and including imputation are set in line with the reference portfolio at 35% for both AE and WE, 23% for AFI, and 7% for AC. Imputation credit yields of 1.17% and 1.53% represent the 10^{th} and 90^{th} percentile observed historically, versus a baseline of 1.37%. The imputation 50% priced scenario involves reducing AE returns both excluding and including imputation credits by half of the imputation credit yield or -0.685%, taking the AE return excluding imputation to 5.36%.

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Document 5

CIFR
Centre for International Finance and Regulation
Towards Financial System Integrity

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

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Do Franking Credits Matter?
Exploring the Financial Implications of Dividend Imputation

May 2015

Dr Andrew Ainsworth
University of Sydney
andrew.ainsworth@sydney.edu.au

Assoc. Prof. Graham Partington
University of Sydney
graham.partington @sydney.edu.au

Dr Geoff Warren
Centre for International Finance and Regulation
geoff.warren@cifr.edu.au

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.

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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[1] 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

[1] 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,[2] 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.

[2] 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".[3] 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

[3] " 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

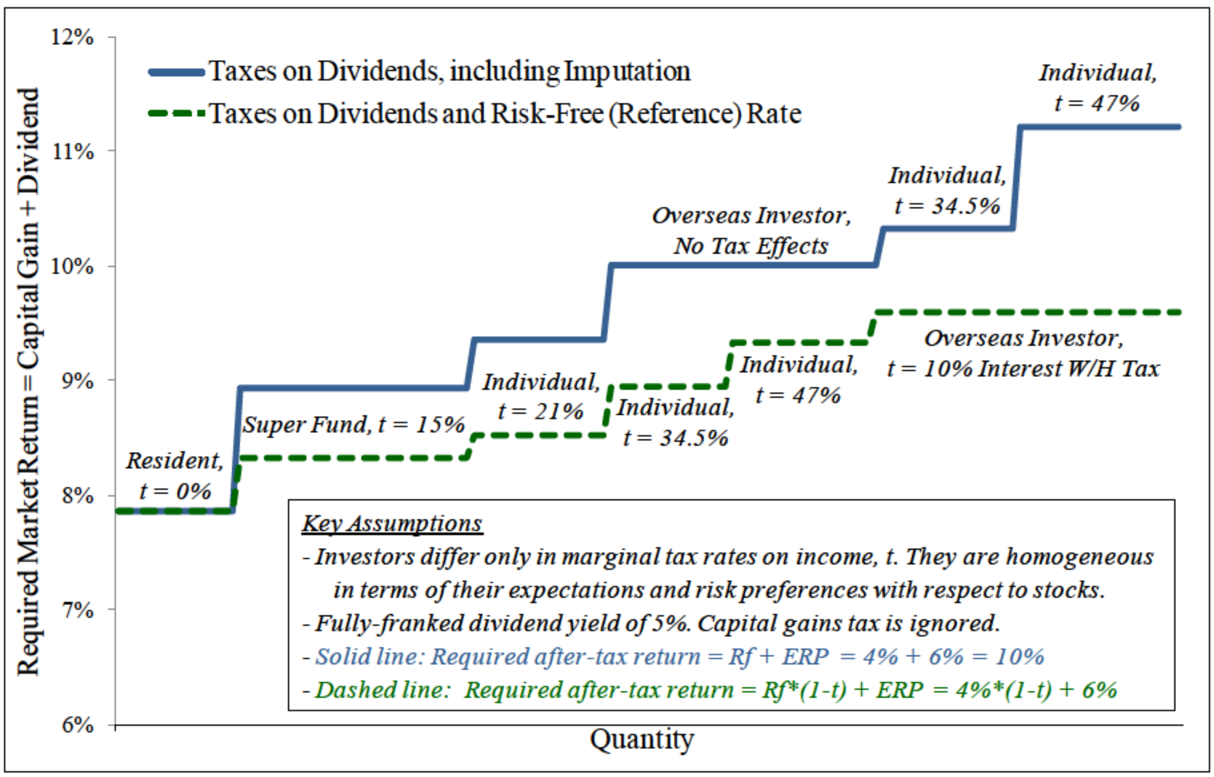
We commence by outlining how imputation and other tax effects impact on the post-tax returns for various investors. This sets up a basis for the discussion in Section 3.2 on the mechanism by which tax effects manifest in prices and required returns *in equilibrium*, and henceforth ultimately determine 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 (*Rf*). Applying tax to *Rf* 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%, *Rf* 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.[4]

Figure 1: Required Market Returns with Investor Income Taxes



[4] 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.

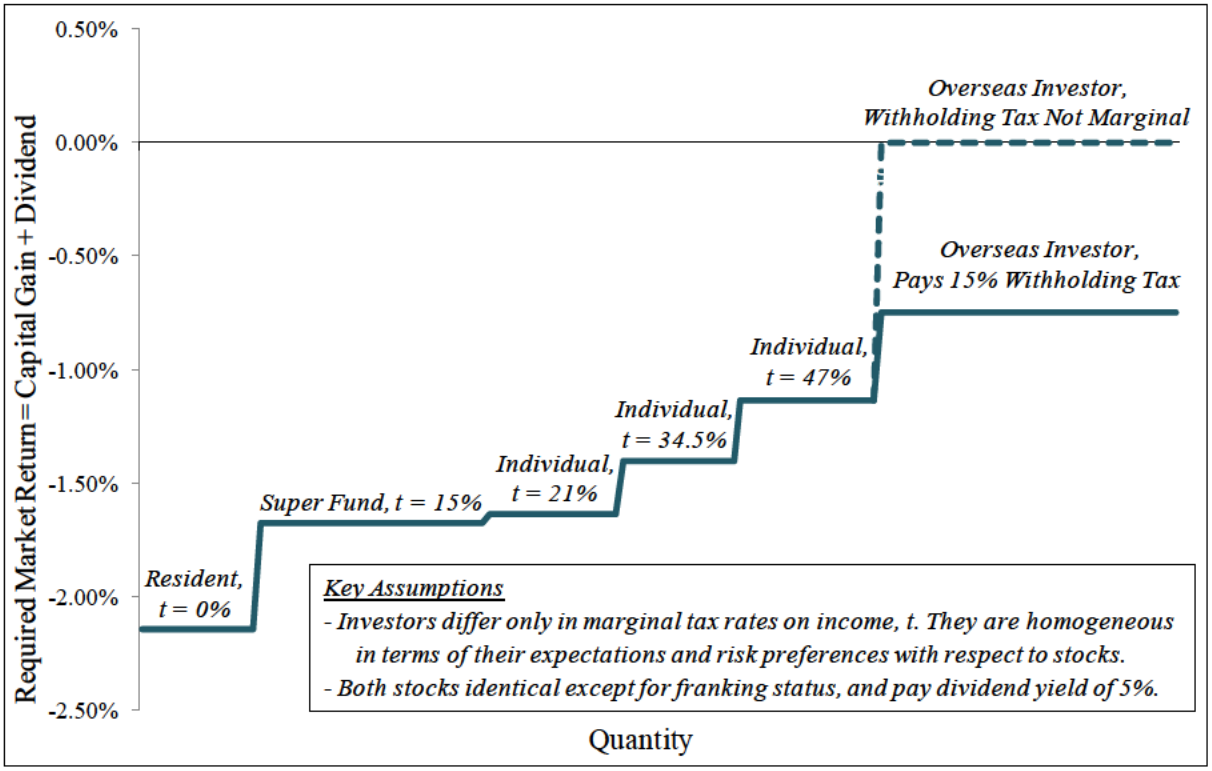
- Demsey and Partington (2008) focus on the value of dividends within the context of discounted cash flow models. They propose applying a multiplier (‘*q*’) to dividends that encapsulates the extent to which distributions are valued by investors. The multiplier potentially reflects any tax effects associated 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.

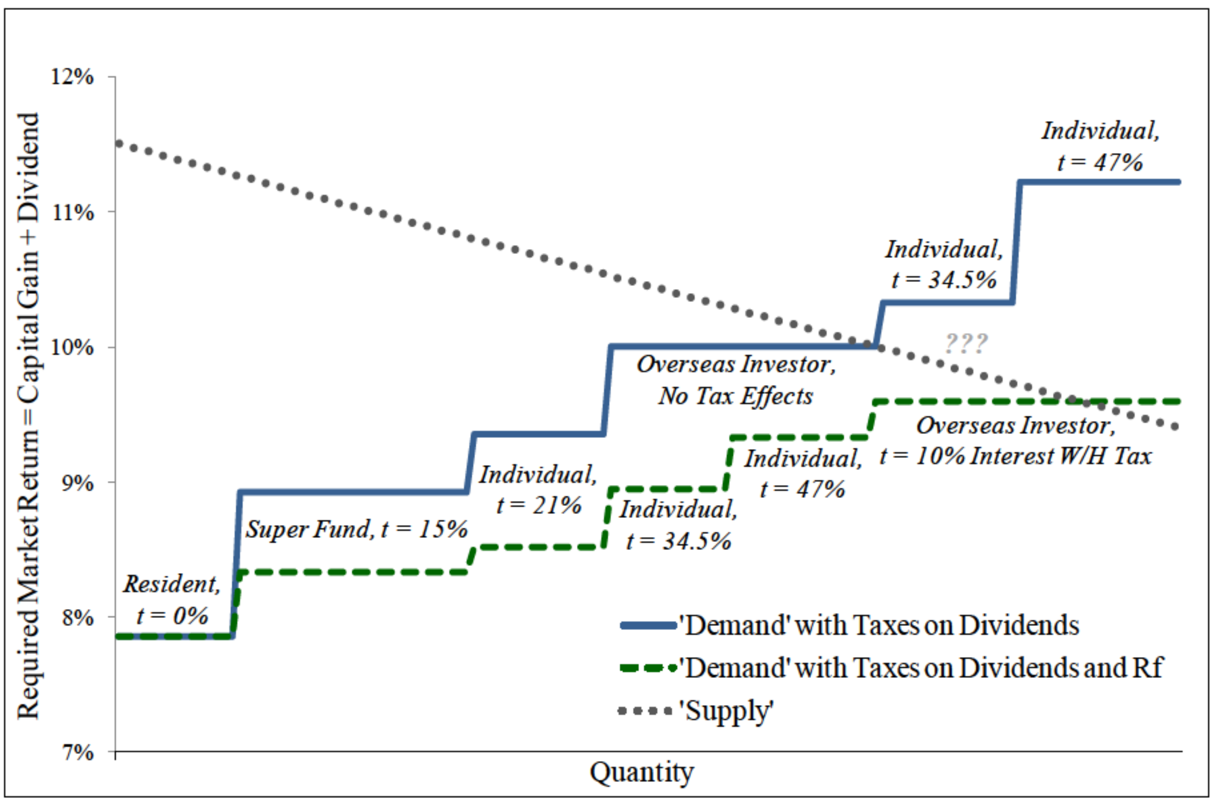
The aggregation approach implies that imputation must be partially priced. For instance, Black and Kirkwood (2010) estimate that approximately 60% of Australian equities are held by domestic investors, while Handley (2014) reports on data indicating that domestic investors own 71% of listed equities 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.[5]

Figure 3: Market Equilibrium Based on the Marginal Investor



[5] 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.[6] 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.[7] 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.[8] 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.

[6] Monkhouse (1993) explicitly states this assumption.

[7] 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.

[8] 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 is 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.[9] 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.

[9] 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).

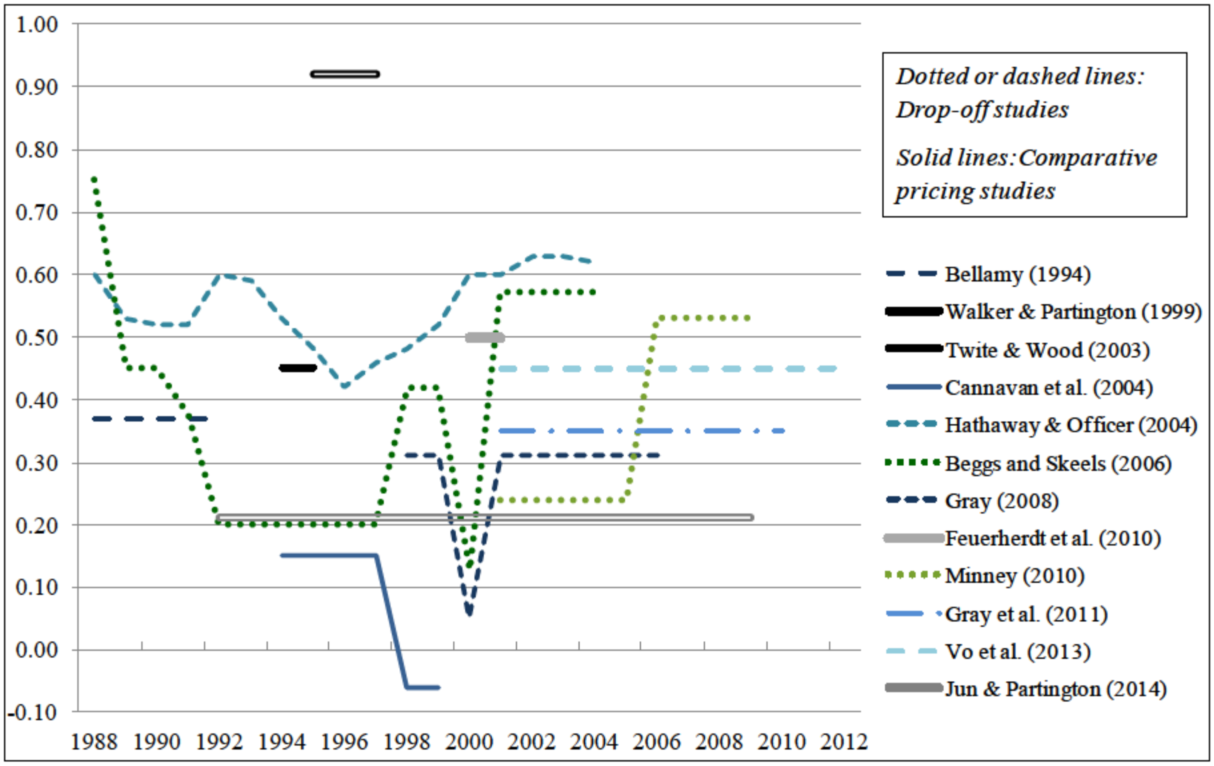
(iv) ***Examination of price levels*** – Saiu, Sault and Warren (2015) consider whether the presence of imputation credits is associated with higher stock prices under various valuation models, including a discounted cash flow model employing consensus analyst forecasts, a residual income model, and 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.[10] 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).

[10] 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.

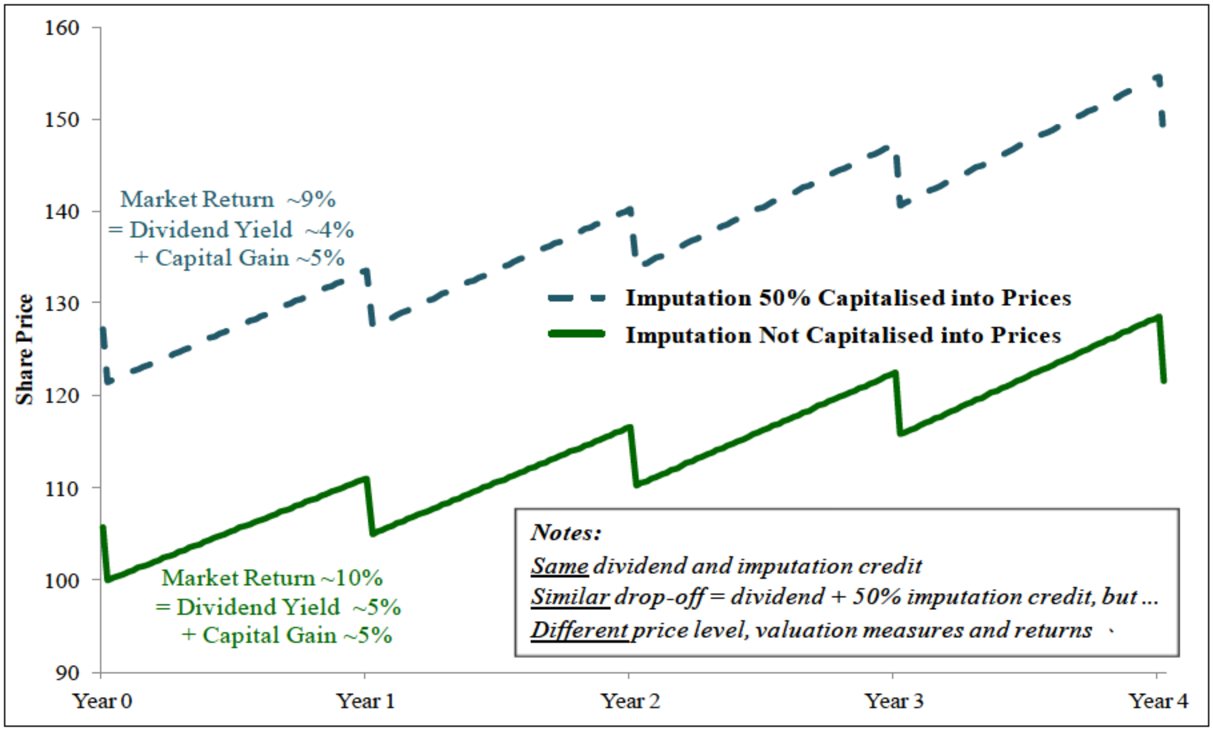
Figure 4: Empirical Estimates of Value of Imputation Credits Attached to Dividends



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[11] 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

[11] 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.[12] 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.[13] 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[14] 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[15] and superannuation funds,

[12] Ainsworth and Lee (2014) examine bid-ask effects around ex-dividend days in Australia.
[13] This is a similar argument to that raised by Berk (1995) around size and value factors.
[14] See http://www fsc.org.au/standards-guidance/the-investment-management-questionnaire.aspx.
[15] 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.[16] 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.[17] Work is also ongoing in building post-tax benchmarks,[18] 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.

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in-Australian-Shares; 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).

[16] Superannuation Industry Supervision Act (1993) (Cth) (SIS Act), Section 52(6)(a)(vi).

[17] 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.

[18] 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.

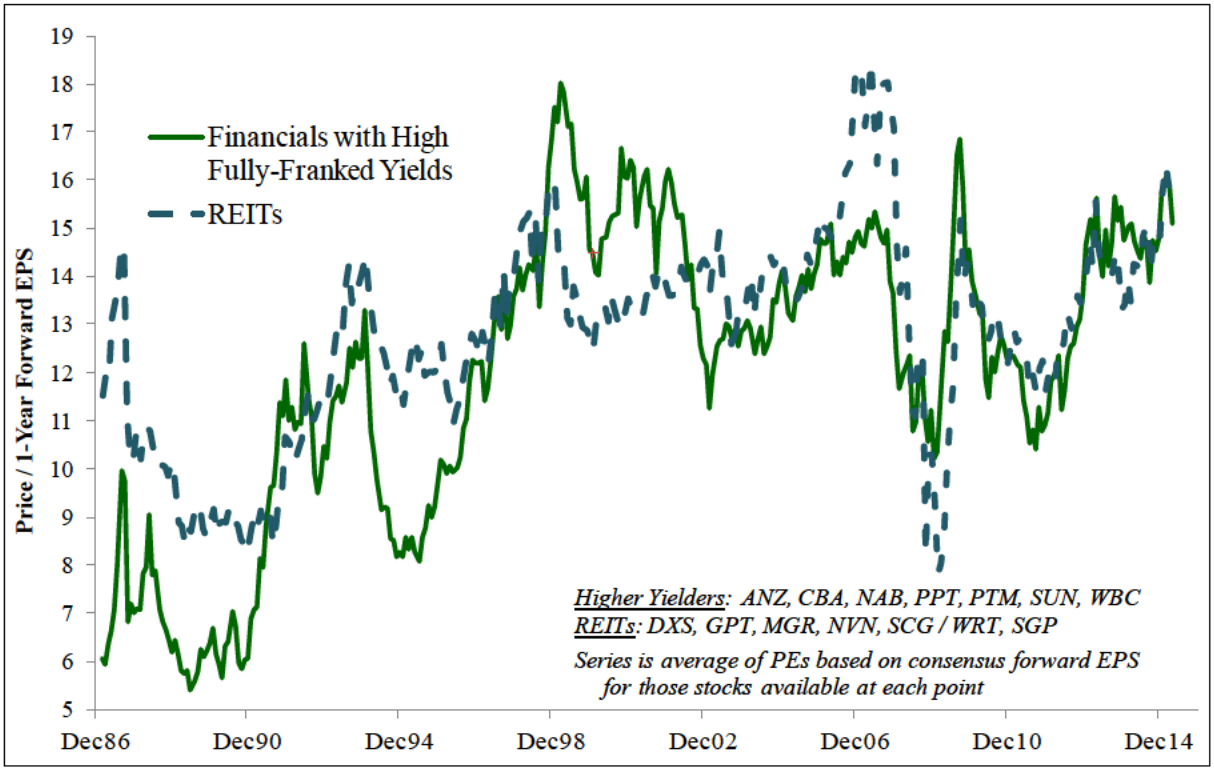
- ***Imputation as a second-order effect*** – There are many good reasons to suspect that imputation could be seen as a second-order effect when selecting stocks. Imputation credits offer an increment to income that mostly sits in the range of 0%-3% per annum. While this increment is potentially meaningful 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.[19]

[19] 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

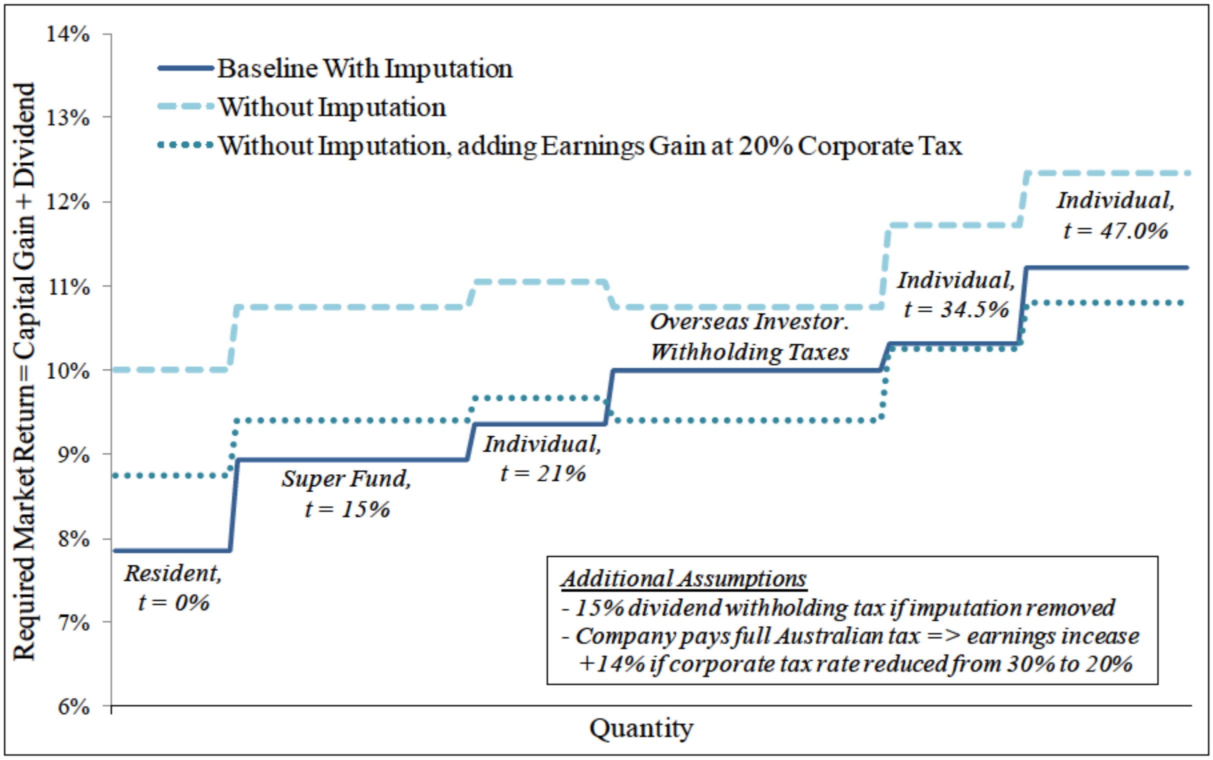
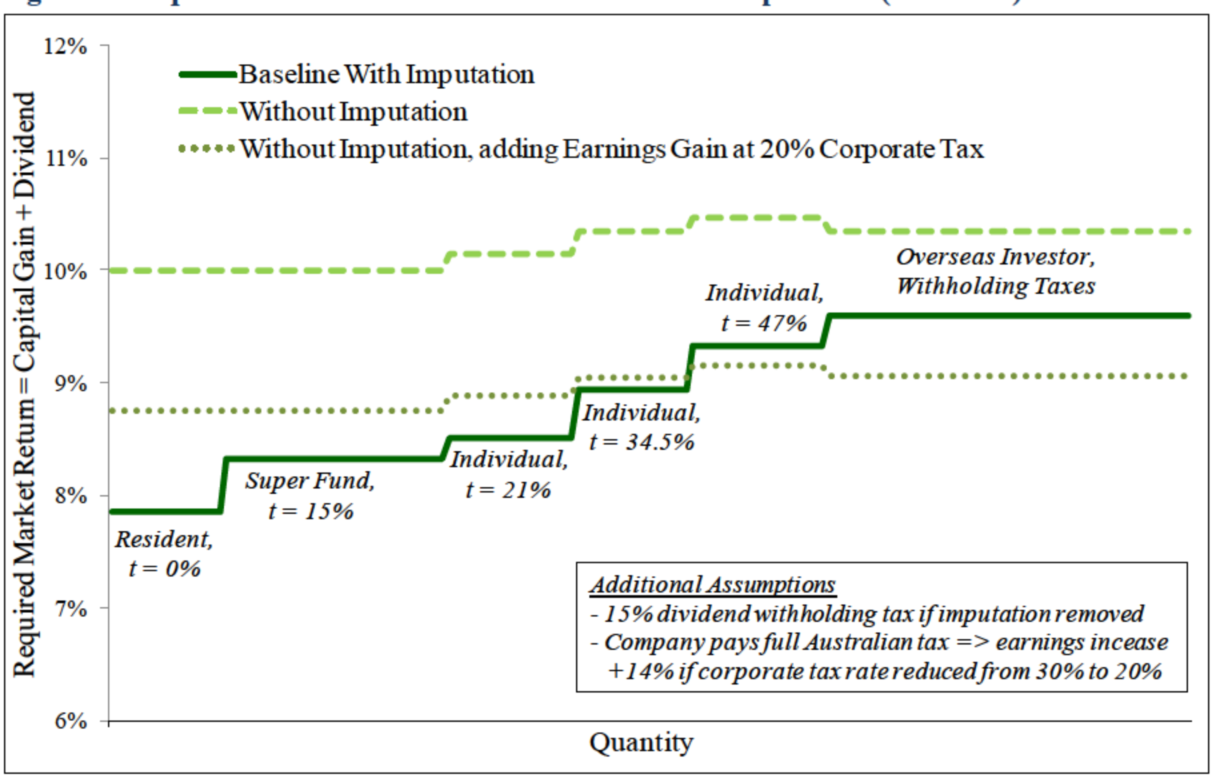


Figure 8: Required Market Returns Under Removal of Imputation (Rf Taxed)



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.[20] 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.[21]

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

[20] 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 CHESS data.

[21] 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".

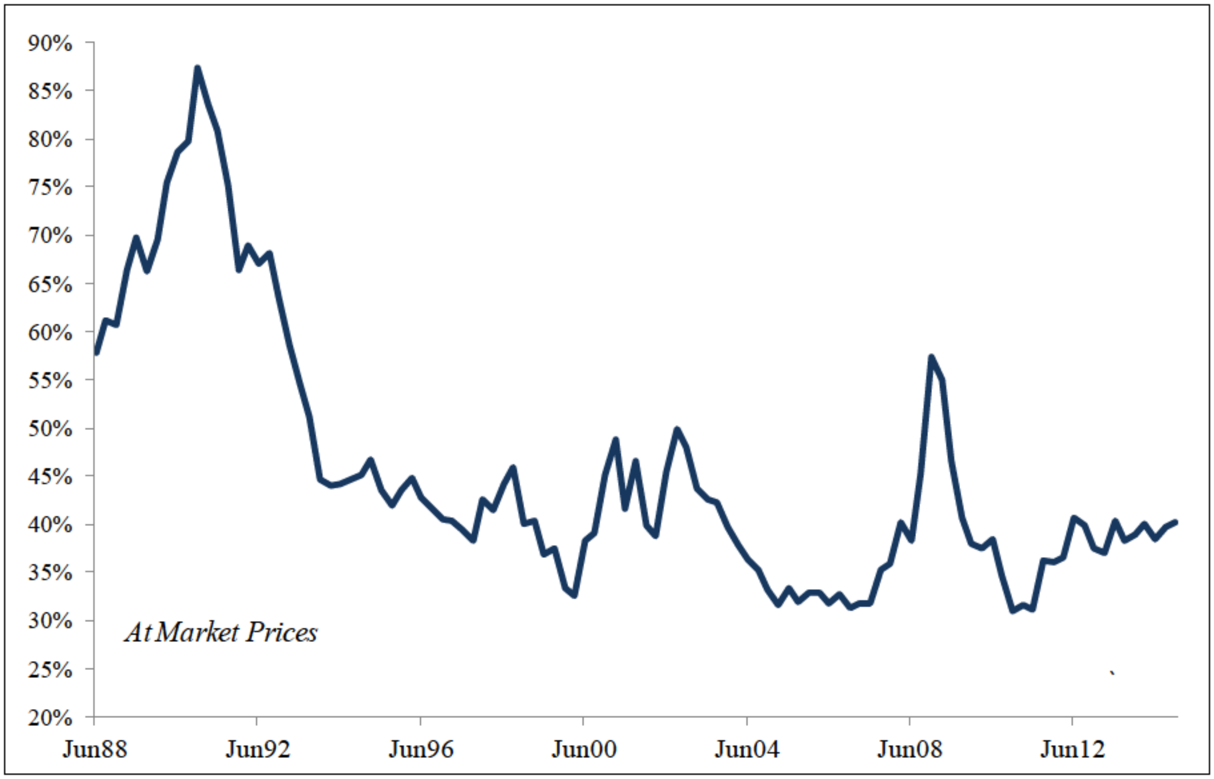
Given that the theory is inconclusive and provides no clear direction on whether imputation influences capital structure, we turn to the empirical evidence.

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.[22]

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.

[22] 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.[23] The calculations reveal that dividends are substantially tax-advantaged for all investors except those on the top marginal tax rate of 47%.[24]

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

	Use of Earnings	Tax Liability				
Investor		**Zero-Tax Payer**	**Superannuation Fund**	**Individual, low tax**	**Individual, medium tax**	**Individual, high tax**
Tax Rates:						
Income		0%	15%	21%	35%	47%
Capital Gains		0%	10%	10.5%	17.25%	23.5%
100% Payout						
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
Total Tax Liability		***-30***	***-15***	***-9***	***4.5***	***17***
0% Payout						
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
Total Tax Liability		***0***	***7***	***7.4***	***12.1***	***16.5***
Difference in Tax Liability		**-30**	**-22**	**-16.4**	**-7.6**	**0.6**

 # 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

[23] 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.
[24] 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.[25]

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.[26] 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.

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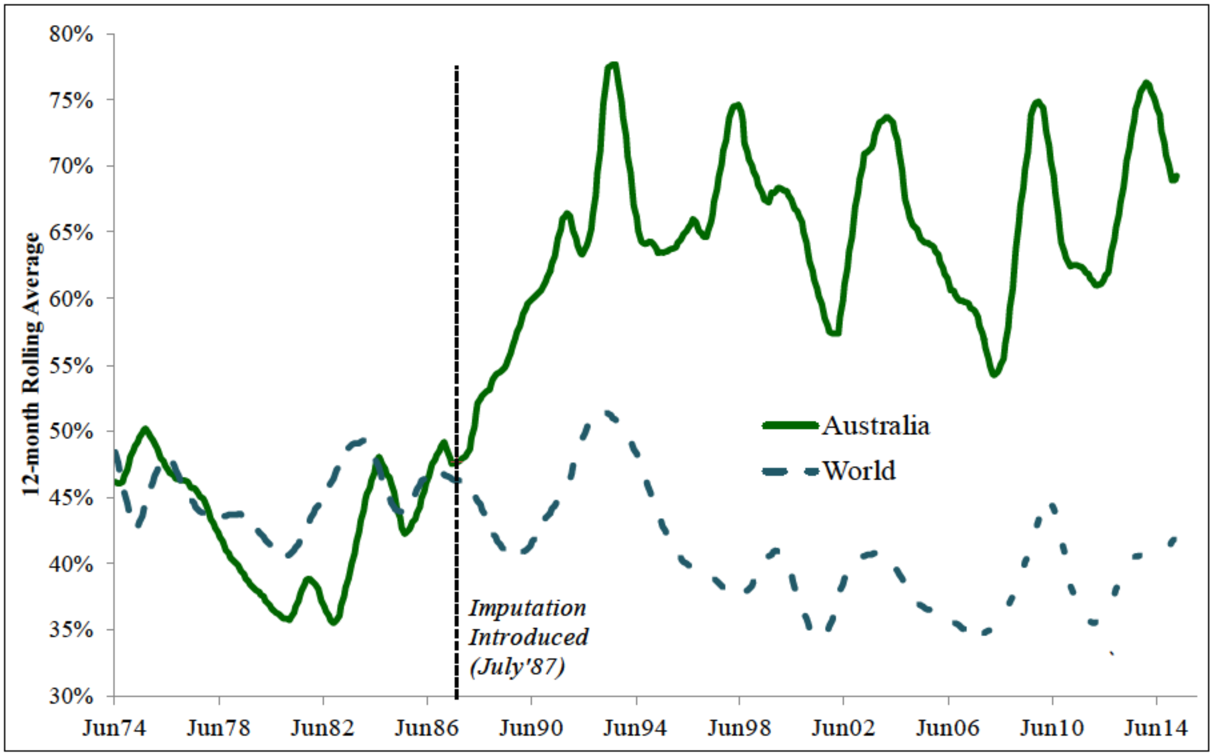
[25] The argument is put forward by Kate Howitt from Fidelity, see *Australian Financial Review*, 7 April 2015, "*Why franking is good for the economy*".

[26] 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 exists 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.[27] 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.

[27] 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 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 Pacic 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, Strpehen, 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

FOI 2404
Document 6

From: s22
To: s22 @aph.gov.au"
Cc: s22
s22
Subject: RE: Ley"s office franking credits telephone call [SEC=UNCLASSIFIED]
Date: Wednesday, 31 October 2018 6:05:35 PM
Attachments: Imputation primer with examples.docx

Hi s22

Thanks for arranging the call between us and s22

s22

As offered, we attach a factual note (for your consumption only) on imputation along with points from our standard words below:

Standard words

I understand you are concerned about the impact of the reduction in the company tax rate on the rate at which franking credits can be distributed in a given year.

As you know, the Government is backing small business to invest. It has legislated company tax cuts and the instant asset write-off to assist small business. The previous concession that allowed small companies to distribute franking credits at 30 per cent while facing a 28.5 per cent company tax rate has been discontinued. Allowing previously accrued franking credits to be distributed at the rate that applied when the relevant tax was paid would add significantly to the cost and complexity of the Enterprise Tax Plan.

The approach taken by the Government on this is consistent with other tax cuts following the introduction of imputation, including the last time that the general company tax rate was reduced, from 34 per cent to 30 per cent in 2001. [Or The Senate Economics Legislation Committee found that the Government's approach is broadly consistent with the approach taken when the corporate tax rate was reduced from 36 per cent to 34 per cent in 2000 and from 34 per cent to 30 per cent in 2001.]

Non-standard words discussed in our meeting

The recent passage of the *Treasury Laws Amendment (Enterprise Tax Plan Base Rate Entities) Act 2018* ensures that a corporate tax entity will not qualify for the lower corporate tax rate if more than 80 per cent of its assessable income is income of a passive nature. These companies can frank at the higher rate, reflecting the higher rate of tax paid on current income.

Australia with a full imputation system, and refundable imputation credits, provides a very high level of relief from double taxation. We are not aware of major economies that provide better protection.

Allowing companies to distribute more franking credits would be expensive and would not change the incentive companies face to invest in business assets, meaning that the economic benefits of such a change would be negligible.

Separate classes of dividends to match franking rates with rates of tax paid were abolished in the early 2000's because they there were too complicated.

The imputation system works most effectively when franking credits are distributed within a few years of accruing. This is because franking credits erode in value (in real terms) due to the impact of inflation. This provides an incentive to not hold franking credits for extended timeframes, even in the absence of any changes in tax rates. When the company tax rate is reduced it also generally reduces the rate at which accrued credits can be distributed, creating a further incentive for companies to distribute profits promptly.

If you have any further questions, please feel free to call me.

Kind regards,

s22

Policy Analyst
Large Corporates Unit
Corporate and International Tax Division
The Treasury | Langton Crescent | Parkes ACT 2600
Phone: +61 2 6263 s22
email: s22 @Treasury.gov.au

From: s22 (S. Ley, MP) [mailto:s22 @aph.gov.au]
Sent: Wednesday, 31 October 2018 9:17 AM
To: s22
Subject: RE: Franking credits- [SEC=UNCLASSIFIED]

Dear s22

Thank you kindly for getting in touch with me, and my apologies for the delayed response as I only work Wednesday-Friday- which I should have mentioned. This afternoon would work very well for me if s22 is still available, but any time today or tomorrow is excellent.

Kind Regards,

s22

s22
Office of THE HON SUSSAN LEY MP
Federal Member for Farrer
Assistant Minister for Regional Development and Territories
T 02 6021 s22 | **F** 02 6021 6620 | **E** s22 @aph.gov.au

From: s22 TREASURY.GOV.AU]
Sent: Monday, 29 October 2018 11:00 AM
To: s22 S. Ley, MP)
Cc: s22
Subject: RE: Franking credits- [SEC=UNCLASSIFIED]

Hi s22 [redacted]

Your query has been referred to Treasury, as we have policy responsibility for this issue. We would like Treasurer's Office tax adviser s22 [redacted] to be involved in the call. Would Wednesday afternoon work for a call for you – say 4pm?

Kind regards

s22 [redacted]
Departmental Liaison Officer

The Hon Josh Frydenberg MP
Treasurer
p 02 6277 7340 | m s22 [redacted] | e s22 [redacted]@treasury.gov.au

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From: s22 [redacted] (S. Ley, MP) [mailto:s22 [redacted]@aph.gov.au]
Sent: Wednesday, 24 October 2018 2:17 PM
To: Parliamentary Services
Subject: Franking credits-

Good afternoon,

I am writing to enquire after the status of franking credits under the now 'fast-tracked' company tax reduction. We have received an enquiry from a constituent with an agricultural business held in family trust, with around $8m in shareholder equity and eligible to pay the 25% rate as it is phased in. His concern is that if he takes cash out of the business in the form of franked dividends, the franking credit will now only be 25%- whereas historically that income was earned under a company tax rate of 30%. In this way, he sees this as a loss of 5% of the value of that historical portion of the balance sheet, and wonders if there is an option to continue voluntarily to pay the 30% rate in order to receive 30% franking credits.

Is the government currently looking at a way of addressing this issue, which in my understanding, seems to have a retrospective effect on the bulk of the equity that this constituent has built in their business? I have included the initial correspondence for reference below with names removed.

……………………………..

I have been and continue to be troubled by the Government's treatment of Company Tax relating to businesses with turnover less than fifty million dollars and its intention, now supported by Labor, to bring forward the reduction of this tax rate to 25%.

I have no problem with paying a rate of Company Tax of 25% except for its impact on franking credits and the value of retained earnings that currently resides on the Balance Sheets of private and family owned companies. BioAg Pty Ltd is a company that is owned by my Family Trust, with my wife Trudi, and me being the shareholders and directors of the corporate trustee. Now BioAg has shareholder's equity of around eight million dollars, entirely represented by retained earnings. As BioAg has been trading for nearly twenty years, founded on 25th March 1999, almost all of those retained earnings were taxed at 30%. In fact in the first few years they were taxed at 35% and 33%.

As we age and our business matures we are not necessarily wanting to continue to retain most of our earnings in BioAg and as part of our transition to retirement may well want to start to take excess cash out of the business in the form of franked dividends. If the current company tax rate has been reduced to 25% then under current tax law the associated franking credit will also be reduced to 25%. The consequence of this reduced franking credit is an additional 5% of personal tax will be imposed on us as beneficiaries. This becomes an effective devaluation of the value of the retained earnings on our company's Balance Sheet.

As a sensible proposal to alleviate this negative impact arising from lowering company taxes, I would like government to allow companies of turnover below the fifty million dollar threshold, the right to choose whether to pay tax at 30%, as large companies do, or the reduced rate, receiving franking credits at the rate of tax that they pay that same year or perhaps the year before. Generally dividends are paid on earnings made and taxed in the prior year or years.

The majority of companies turning over less than fifty million dollars will be private or family companies that are tightly held and controlled and owned by naturally coalition leaning voters. Surely the Government has no desire to punish this group, wittingly or otherwise.

Please convey my concerns and suggestions to Mr Frydenberg at your earliest convenience as it would be unfortunate if this were to become an issue that further erodes the coalition's traditional support base and delivers government to Shorten. I am more than happy to travel to Canberra to meet with Josh Frydenberg should that be of assistance.

I await your response and a satisfactory fix to this worsening problem.
……………………………………………………………

I would be very grateful for assistance in this matter.

Best

s22
Office of THE HON SUSSAN LEY MP
Federal Member for Farrer
Assistant Minister for Regional Development and Territories
T 02 6021 s22 **|** **F** 02 6021 6620 **|** **E** s22 @aph.gov.au

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Key points

- The imputation ensures that company profits passed to domestic shareholders are taxed at the shareholder's marginal rate if the profit is distributed in the same income year.
- For profits distributed in subsequent years the nominal value of franking credits held or distributed by a company is never eroded by a tax rate change, but credits may become harder to distribute if the tax rate decreases (which happened when the tax rate was cut to 30 per cent and will again with further reductions) and credits will lose their real value because of inflation even if the tax rate does not change (which provides an incentive not to retain profits for long periods, and should reduce the number of credits subject to trapping).
- Australia with a full imputation system, and refundable imputation credits, provides a very high level of relief from double taxation. We are not aware of major economies that provide better protection.
- Allowing companies to distribute more franking credits would be expensive and would not change the incentive companies face to invest in business assets, meaning that the economic benefits of such a change would be negligible.
- Separate classes of dividends to match franking rates with rates of tax paid were abolished in the early 2000's because there were too complicated.

How Imputation works

Company level

- For companies, the imputation system works in the following way:
  - **Accumulating franking credits** – Companies generate franking credits equivalent to the amount of tax they pay. So, on $1,000 of taxable profit, a company would pay $300 in tax and accumulate $300 in franking credits, which it can later be attached to distributions to shareholders.
  - **Distributing franking credits** – Franking credits can only be passed on to shareholders if they are attached to a dividend paid out by the company. Companies can only frank dividends up to the rate of tax they currently pay. That is, they can attach a $300 credit to $700 dividend ($1,000 of grossed up income) for a 30 per cent company tax and franking rate.
    - The effect of this is that the full $1,000 of company profit (or grossed up income) is distributed to the shareholder - $700 in the form of a cash dividend and $300 in the form of a tax credit.
    - But if the company rate (and therefore, the franking rate) reduces to say, 25 per cent, then suddenly the company can only attach $233.33 (not $300). Some of the company's franking credits have therefore potentially become 'trapped' (i.e. can't get out of the company to the individual shareholder). Remember the company has already paid tax at 30 per cent on previous income.

: For future income, the lower franking rate on distributions is offset by the lower company tax rate on the company profit to start with. Another way to think of it is that the company will have more post-tax profit to attach to its stock of franking credits (exactly making up for fewer franking credits to attach to each $1 of dividends).

Shareholder level

- After the company distributes the franked dividend, the individual applies their marginal rate to the grossed up income. Then the individual uses the franking credits to offset (reduce) their tax liability.
- The 3 examples illustrate how this works. Companies with large stocks of retained earnings (i.e. stores of income generated in earlier years that are already taxed) with little future income would be closest to the circumstance described in example 2.
  - **Example 1. Dividend income distributed before 2014-15** (i.e. before the 2015-16 small business tax cut): Company tax rate paid on income = 30 per cent, franking rate 30 per cent.
  - **Example 2. Corporate income generated in 2014-15 (or earlier), but distributed as dividend income after 2016-17** (i.e. when ETP took effect): Company tax rate paid on previous income = 30 per cent, current franking rate = 25 per cent.
  - **Example 3. Corporate income generated and distributed after lower rate comes into effect** (i.e. lower tax rate and franking rate applies to future income)**.** Company tax rate paid on future income = 25 per cent, franking rate = 25 per cent.

	Example 1	**Example 2**	**Example 3**
After-tax dividend income received by shareholder (i.e. company tax already applied to $1,000 of corporate income)	$700	$700	$750 (thanks to lower company tax rate of 25 per cent)
Franking rate	30 %	25 %	25 %
Maximum franking credit that can attach to the distribution*	$300	$233.33	$250
Total taxable income (or grossed up income)*	$1,000	$933.33	$1,000
Tax on gross income at shareholder marginal rate of 19 per cent	$190	$177.33	$190
Offset Franking credit	-$300	-$233.33	-$250
Tax refund	$110	$56.00	$60
Total after personal-tax dividend income	$700 + $110 **= $810**	$700 + $56 **=$756**	$750 + $60 **= $810**

* more detailed calculations are over the page

Example Details

Example 1: (higher company tax rate, but more franking credits to impute)

- Company tax rate (and franking rate) = 30 per cent
- Dividend income = $700 cash, $300 franking cr
- Individual's marginal rate = 19 per cent

- The calculation follows the legislated process and uses two separate steps; grossing up the dividend amount (using franking credits) and then apply the individual's marginal tax rate. (i.e. grossing up can be calculated by 700 + 700*(.3/.7) = $1000, then applying the marginal rate of 19 per cent means the tax liability will be $190.
- But $300 of tax has already paid by the company and needs to be compensated to the shareholder. So the tax owed becomes $190 - $300 franking credits = -$110 of tax owed (or a +$110 tax refund).
- The overall after tax income for the shareholder is $700 of dividend income + $110 tax refund = $810

Example 2: (higher company tax rate on previous income, and less franking credits to impute since the company tax rate, and therefore franking rate, subsequently fell)

- Company tax rate (and franking rate) = 25 per cent (but keep in mind the tax rate already paid on previous income is 30 per cent rate, so no increase in profits distributed)
- Dividend income = $700 cash (same as above), $233.33 franking cr (outcome of gross up formula)
- Individual's marginal rate = 19 per cent

- The calculation follows the same legislated process and uses two separate steps; grossing up the dividend amount (using franking credits) and then apply the individual's marginal tax rate. (i.e. grossing up can be calculated by 700 + 700*(.25/.75) = $933, then applying the marginal rate of 19 per cent means the tax liability will be $177.33.
- But $300 of tax has already paid by the company and needs to be compensated to the shareholder. So the tax owed is $177.33 - $233.33 (franking credits) = -$56.00 of tax owed by the shareholder (or a +$56.00 tax refund).
- The overall after tax income for the shareholder is $700 of dividend income + $56.00 tax refund = $756.00

Example 3: (lower company tax rate and less franking credits to impute)

- Company tax rate (and franking rate) = 25 per cent
- Dividend income = $750 cash, $250 franking cr

- Individual's marginal rate = 19 per cent

- The calculation follows the legislated process and uses two separate steps; grossing up the dividend amount (using franking credits) and then apply the individual's marginal tax rate. (i.e. grossing up can be calculated by 750 + 750*(.25/.75) = $1000, then applying the marginal rate of 19 per cent means the tax liability will be $190.
- But $300 of tax has already paid by the company and needs to be compensated to the shareholder. So the tax owed becomes $190 - $250 franking credits = -$60 of tax owed (or a +$60 tax refund).
- The overall after tax income for the shareholder is $750 of dividend income + $60 tax refund = $810.

FOI 2404
Document 8

From: Francis, Geoff
To: s22
Cc: s22
Subject: House Economics Committee: Inquiry into the implications of removing refundable franking credits, submission invitation [SEC=UNCLASSIFIED]
Date: Friday, 2 November 2018 1:29:48 PM

Hi s22

We are just informing the Office that Treasury has declined to put forward a submission to the House of Representatives Standing Committee on Economics inquiry into the implications of removing refundable franking credits.

That said, we have noted that we are happy to assist the Committee in its inquiry, including by appearing at any hearings that may be held, and providing other assistance that may be required.

Cheers

Geoff

FOI 2404
Document 9

From: s22
To: s22
Cc: RG TAD SES; s22
Subject: Re: refundable franking credits data request - due 3pm Thursday [DLM=For-Official-Use-Only]
Date: Thursday, 11 October 2018 8:01:23 AM

Hi s22

One other quick question.

Can you confirm whether the numbers below are publicly available through the tax stats publication/database online or whether they are non-published numbers that Treasury has sourced from 2015-16 ATO tax stats.

Thanks

s22

Sent from my iPad

On 10 Oct 2018, at 1:46 pm, s22 @TREASURY.GOV.AU> wrote:

> Hi s22
>
> We have inserted the 2015-16 figures for refundable franking credits in the list below, as requested.
>
> **<!--[if !supportLists]-->– <!--[endif]-->In 2015-16, $55.9 billion of franking credits were attached to dividends. This comprised of**
>
> **<!--[if !supportLists]-->: <!--[endif]-->**$ 14.8 billion going to 3.2 million Australian resident individuals,
>
> **<!--[if !supportLists]-->: <!--[endif]-->**$ 3.5 billion to 320,000 SMSFs,
>
> **<!--[if !supportLists]-->: <!--[endif]-->**$ 14.9 billion to 45,000 companies,
>
> **<!--[if !supportLists]-->: <!--[endif]-->**$ 4.5 billion to 2,400 super funds,
>
> **<!--[if !supportLists]-->: <!--[endif]-->**$ 1.2 billion to 5,000 tax exempt entities and
>
> **<!--[if !supportLists]-->: <!--[endif]-->**$ 17.0 billion to non-residents or unknown taxpayers
>
> as most non-residents are not required to lodge an Australian income tax return it is not possible to estimate the number receiving credits.
>
> **<!--[if !supportLists]-->– <!--[endif]-->In that same year, $6.3 billion of those franking credits were refunded, including to**
>
> **<!--[if !supportLists]-->: <!--[endif]-->**1.1 million Australian

individuals refunded $2.3 billion

<!--[if !supportLists]-->: **<!--[endif]-->**2,000 super funds refunded $0.3 billion

<!--[if !supportLists]-->: **<!--[endif]-->**210,000 SMSFs refunded $2.5 billion

<!--[if !supportLists]-->: **<!--[endif]-->**5,000 tax exempt entities refunded $1.2 billion

Please give s22 or me a call if you have any questions about the data provided.

Thank you

s22

Manager, Business and Indirect Tax Costings Unit
Tax Analysis Division
The Treasury, Langton Crescent, Parkes ACT 2600
P: +61 2 6263 s22 Treasury.gov.au

From: s22
Sent: Wednesday, 10 October 2018 11:15 AM
To: s22
Cc: RG TAD SES; s22
Subject: RE: refundable franking credits data request - due 3pm Thursday [DLM=For-Official-Use-Only]

Hi s22

Much appreciated.

s22

s22
Adviser (Tax and Commonwealth State Relations)
Office of the Hon Josh Frydenberg MP
Treasurer
02 6277 7340
s22

From: s22
Sent: Wednesday, 10 October 2018 11:03 AM
To: s22
Cc: RG TAD SES; s22
Subject: FW: refundable franking credits data request - due 3pm Thursday [DLM=For-Official-Use-Only]

Hi s22

Further to your phone conversation with Rob earlier this morning, just letting you know that the following data you requested is well progressed and we expect to send you the data early this afternoon, by 2pm or as soon as we finish QAing. Please let me know if this timeline is okay.

Thanks

s22

From: s22
Sent: Tuesday, 9 October 2018 4:56 PM
To: s22 ; RG TAD SES; s22
Cc: s22
Subject: refundable franking credits data request - due 3pm Thursday [DLM=For-Official-Use-Only]

Hi s22

As discussed with s22 can we please get the following data for 2015-16 as it relates to franking credits.

We will need this please by 3pm Thursday. If there is an issue with timing can you please let me know as soon as possible.

Thanks

s22

<!--[if !supportLists]-->– <!--[endif]-->In 2015-16, $xx billion of franking credits were attached to dividends. This comprised of

<!--[if !supportLists]-->: **<!--[endif]-->**$ x billion going to xx Australian individuals,

<!--[if !supportLists]-->: **<!--[endif]-->**$ x billion to xx SMSFs,

<!--[if !supportLists]-->: **<!--[endif]-->**$ x billion to xx companies,

<!--[if !supportLists]-->: **<!--[endif]-->**$ x billion to xx super funds,

<!--[if !supportLists]-->: **<!--[endif]-->**$ x billion to xx tax exempt entities and

<!--[if !supportLists]-->: **<!--[endif]-->**$ x billion to xx non-residents.

<!--[if !supportLists]-->– <!--[endif]-->In that same year, $x billion of those franking credits were refunded, including to

<!--[if !supportLists]-->: **<!--[endif]-->**Xx Australian individuals refunded $x billion

<!--[if !supportLists]-->: **<!--[endif]-->**Xx super funds refunded $x billion

<!--[if !supportLists]-->: **<!--[endif]-->**Xx SMSFs refunded $x billion

<!--[if !supportLists]-->: **<!--[endif]-->**Xx tax exempt entities refunded $x billion

s22
Adviser (Tax and Commonwealth State Relations)
Office of the Hon Josh Frydenberg MP
Treasurer
02 6277 7340
s22

FOI 2404
Document 10

From: s22
To: s22
Cc: s22 ; RG TAD SES
Subject: RE: refundable franking credit data from tax stats [SEC=PROTECTED, DLM=Sensitive]
Date: Monday, 15 October 2018 10:29:00 AM

Hi s22

The ATO are looking into this for us, the underlying data is a little complicated but we expect that we can provide some estimates by COB tomorrow. We will look to focus on employment organisations and the split between employer and employee organisations, but were there any other categories you had in mind?

Thanks
s22

BITU, TAD
6263 s22

From: s22
Sent: Monday, 15 October 2018 8:28 AM
To: RG TAD SES; s22
Cc: s22
Subject: refundable franking credit data from tax stats [SEC=PROTECTED, DLM=Sensitive]

Hi s22

Re the tax stat data on refundable franking credits, is there data available that disaggregates the refundable franking credits that tax exempt entities receive? In particular, is it possible to disaggregate employer organisations and can this also be broken down into its various types of employer organisations?

Grateful your advice this morning on what is available and the timing to provide it.

Thanks

s22
Adviser (Tax and Commonwealth State Relations)
Office of the Hon Josh Frydenberg MP
Treasurer
02 6277 7340
s22

FOI 2404
Document 11

From: s22
To: FG RIPD DEM
Subject: FW: For action - QTBs [SEC=UNCLASSIFIED]
Date: Monday, 15 October 2018 5:21:45 PM
Attachments: TSR - ALP"s position on franking credits and SMSFs.docx

---

FYI

From: s22
Sent: Monday, 15 October 2018 10:48 AM
To: QTB
Cc: s22 Tsr DLOs; s22
Subject: FW: For action - QTBs [SEC=UNCLASSIFIED]

Hi QTB team,

Attached, and saved in the Q drive, is a new QTB covering Labor and the Government's position on SMSFs (franking credits and limited recourse borrowing arrangements).

Happy to discuss.

Thanks,

s22

Analyst

Retirement Income Policy Division

The Treasury, Langton Crescent, Parkes ACT 2600

☎ +61 2 6263s22 s22@treasury.gov.au

From: Jeremenko, Robert
Sent: Friday, 12 October 2018 1:23 PM
To: FG RIPD DEM
Subject: FW: QTBs [SEC=UNCLASSIFIED]
Importance: High

Pls see re revisions/additions required for some of our QTBs.

Regards,

Robert

s22

Document 12 is a version of a question time brief. The purpose of this document is to assist the Treasurer and Treasury Ministers to respond to questions that are raised in Parliament. In practice, preparation of question time briefs generally involves Treasury providing background material, facts and figures, which Ministers and their Offices draw on when developing their talking points and accompanying lines of argument. This can often become an iterative process in which drafts are then exchanged with the Treasury also asked to insert additional facts as required and/or check factual material inserted by Ministerial offices. Treasury's role is to provide the Government with advice that is based on the best available evidence, before these products are finalised in the Offices of the Ministers.

ALP'S POSITION ON FRANKING CREDITS AND SMSFS

TOP LINES:

- Labor's retiree tax is a slamming indictment of this Opposition's economic credentials. Their 'sensible, well-targeted' policy lasted less than a fortnight – and still has holes right through it! This debacle is up there with the mining tax as far as Labor's greatest hits go.
- Labor's 'pensioner guarantee' does nothing to protect pensioners who benefit from franking credit refunds through an APRA-regulated super fund, or pensioners who become a member of a SMSF after 28 March 2018.
  - Despite their backflip, Labor are still reaching into the pockets of around 900,000 Australians, including low-income earners and self-funded retirees, who will miss out on refunds of their own tax.
- 96% of the individuals impacted by Labor's retiree tax have taxable income of less than $87,000.
- Labor's retiree tax will also punish aspirational, self-reliant Australians who have worked hard to support themselves, all but directing them to move on to the Age Pension.
- Bill Shorten has now announced more than $200 billion worth of higher taxes.
- The ALP's proposal will make qualifying for the Age Pension even more attractive for retirees, who will otherwise lose their refunds. Retirees who rely on franking credits as part of their retirement income strategy may be encouraged to restructure their affairs so they are eligible for the Age Pension, making the Age Pension more expensive for the Government.

COALITION ACTION:

- As then Treasurer Scott Morrison noted in his press release of 13 March 2018, the Government does not support Labor's policy to deny refundability of franking credits.
- On Wednesday, 19 September 2018, the Treasurer, the Hon Josh Frydenberg MP, asked the House of Representatives Standing Committee on Economics to inquire into the implications of Labor's policy to remove refundable franking credits. The Committee invites interested persons and organisations to make submissions by Friday, 2 November 2018.
- In 2000, the Howard Government changed the dividend imputation system to allow for imputation credits to be refunded - with ALP support. This meant taxpayers with marginal tax rates below the company tax rate could receive a refund of excess franking credits obtained from franked dividends.

KEY FACTS AND FIGURES:

- In total, around **900,000** Australians face losing their refunded franking credits as a result of the policy.
- Just **over 45%** of these individuals are **65 years or older**.
- The policy will also overwhelmingly hit low and middle income earners, with **84% of the individuals impacted on taxable incomes of less than $37,000, and 96% of the individuals impacted on taxable incomes below $87,000**.

QTB Number:	QB18-000327	QTB Category:	
Contact Officer:	s22	Date and time:	18/12/2018 11:09 PM
Contact Number:	(02) 6263 s22	Next update:	
Office Responsible	TSR	Office Adviser Initial and Date Cleared	

- In terms of value, whilst **74% of all franking credits are received by those in the top two income brackets, 82%** of the value of all **refunded** franking credits denied under Labor's policy go to **individuals on taxable incomes below $87,000**.

IMPACT ON INDIVIDUALS (*Treasury analysis of ATO 2015-16 data)*

Taxable Income	**Number of Individuals impacted^**	**Percentage of total individuals impacted**	**Franking Credits refunded ($AUD million)**
Less than $18,200	540,000	60%	470
$18,201 - $37,000	220,000	24%	605
$37,001 - $87,000	105,000	12%	590
$87,001 - $180,000	31,000	3.4%	230
$180,000+	5,000	0.6%	135
TOTAL	901,000	100%	2,030

^ These figures **exclude** pensioners consistent with Labor's 27 March 2018 policy announcement

IMPACT ON SMSFs AND OTHER SUPERANNUATION FUNDS (*Treasury analysis of ATO 2015-16 data)*

- Even excluding pensioners with SMSFs pre-28 March 2018, 200,000 SMSFs containing 365,000 member accounts will lose their refunded franking credits as a result of the policy.

- 2,013 APRA regulated superannuation funds containing 2.6 million member accounts will lose approximately $300 million a year in refunded franking credits as a result of the policy. This includes 50 large APRA regulated superannuation funds, of which 30 are retail funds and 2 are industry funds.

BACKGROUND

- When corporate tax entities distribute to shareholders profits on which income tax has already been paid – such as when a company pays a dividend to its shareholders – they have the option of passing on, or 'imputing', credits for the tax. This is called 'franking' the distribution. The franking credits are attached to the distribution and can be used by the recipients as tax offsets. For domestic investors, shareholders pay tax on dividend income at their marginal rate with refunds available, through franking credits, where shareholders' tax rates are below the corporate rate.
- Although the recipients are taxed on the full amount of the profit represented by the distribution and the attached franking credits, they are allowed a credit for the tax already paid by the corporate tax entity. This prevents double taxation – that is, the taxation of profits when earned by a corporate tax entity, and again when a recipient receives a distribution.
- On 13 March 2018, Labor announced that they would prevent individuals, super funds and self-managed super funds from being able to have excess franking credits refunded to them (tax exempt entities will continue to receive refunds). On 27 March 2018 Labour revised its policy, announcing that pensioners and SMSFs with members receiving the pension at the time of announcement will also continue to have access to refundable franking credits.
  - The ALP claim their policy will save $10.7 billion over the forward estimates and $55.7 billion over the decade, as costed by the Parliamentary Budget Office.

QTB Number:	QB18-000327	QTB Category:	
Contact Officer:	s22	Date and time:	18/12/2018 11:09 PM
Contact Number:	(02) 6263 s22	Next update:	
Office Responsible	TSR	Office Adviser Initial and Date Cleared	

– The revision of the policy decreased the revenue impact of the policy by $700 million over the forward estimates and $3.3 billion over the medium-term, as costed by the Parliamentary Budget Office.

- Several associations have formed the "Alliance for a Fairer Retirement System" in response to Labor's retiree tax proposal.

KEY QUOTE:

- "The problem with Labor and tax is not just that they keep wanting to put taxes up without any regard for the damage it does, but that they always spend the money before the money comes in. This is what happened with the Mining Tax and they now want to head down the same path with their Retiree Tax." – Scott Morrison, 18 June 2018

ALP POSITION ON LIMITED RECOURSE BORROWING ARRANGEMENTS

- Limited recourse borrowing arrangements (LRBAs) are arrangements that allow superannuation funds to borrow money to acquire certain assets. In practice, they are often used by SMSFs to purchase property.
- In April 2017, as part of their new housing affordability package, Labor announced that they will ban LRBAs should they win the next election. Labor stated that allowing LRBAs to continue would increase risk in the superannuation system and crowd out more first home owners.
- The 2014 FSI recommended abolishing LRBAs to prevent unnecessary build-up of leverage risk in the superannuation system. The Government did not agree to this recommendation, and instead commissioned the Council of Financial Regulators (CFR) and the ATO to monitor leverage risk in the superannuation system and report back to the Government after three years. Treasury is working with the CFR and ATO to submit this report to Government by the end of 2018.

QTB Number:	QB18-000327	QTB Category:	
Contact Officer:	s22	Date and time:	18/12/2018 11:09 PM
Contact Number:	(02) 6263 s22	Next update:	
Office Responsible	TSR	Office Adviser Initial and Date Cleared	

IMPACT OF DENYING REFUNDABILITY OF FRANKING CREDITS ON RETIREMENT SAVINGS

TALKING POINTS

- As the then Treasurer Scott Morrison noted in his press release of 13 March 2018, the Government does not support Labor's policy to deny refundability of franking credits.
  - Labor's policy allows those on higher incomes to use up all of their franking credits, but denies those on lower incomes the ability to do the same. Someone on a salary of $1 million dollars a year will not be impacted, but a low-income earner who makes $25,000 in taxable income will no longer receive a tax refund.
- Denying refunds for franking credits disproportionately affects low and middle income earners and retirees. Retirees with low taxable incomes cannot make full use of their franking credits unless they are able to receive refunds, in particular self-funded retirees.
- Economic modelling by three academics from the Australian National University[1] released in August and reported in the AFR on 25 September 2018 looked at the impact of franking credits for retirees, with specific assumptions about their income and assets, and therefore tax status.
  - It modelled a retired male homeowner of age 65 who earns no further income from labour and is eligible for the Australian means-tested age pension.[2]
  - It found that, in these specific circumstances, providing franking credits can increase consumption throughout retirement on average between 5 to 6 per cent, when compared to no franking credits. This effect is also characterised as equivalent to increasing their superannuation balance at retirement by 8 to 9 per cent.
  - However, these results do rely on these specific assumptions and could not be generalised to all other retirees, and therefore do not represent the impact on all retirees under Labor's policy.
    - The exact impact of denying refundability of franking credits will depend on the member's age, superannuation balance, investment choices and tax status of their fund. Retirees may also make behavioural changes in response to the policy.
  - The authors also found that dividend imputation for Australian shares leads to a significant bias towards individuals investing in Australian equities over global equities.

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[1] A. Butt, G. Khemka and G. Warren, 'What Dividend Imputation Means for Retirement Savers', *SSRN*, published on 26 August 2018.

[2] Ibid, p 4.

KEY STATISTICS

- Under Labor's policy:
    - More than 500,000 Australians on taxable incomes of less than $18,200 would be affected.
    - Just over 45 per cent of individuals who would be impacted are age 65 or older.
    - Approximately 900,000 individual Australians would lose their tax refunds on shares held personally in Australian companies.
    - The vast majority of those affected would be low and middle income earners:
        - 84 per cent of the individuals impacted are on taxable incomes of less than $37,000.
        - 96 per cent of the individuals impacted are on taxable incomes below $87,000.
    - Around 365,000 member accounts across 200,000 SMSFs will lose their refunded franking credits as a result of the policy.

BACKGROUND

Rationale for refunding excess franking credits

- The ability to receive a tax refund for excess franking credits prevents double taxation – that is, the taxation of profits when earned by the company, and again when the shareholder receives their dividend.
- When an Australian company pays a dividend to its shareholders, it has the option of also providing a franking credit that recognises the tax the company has already paid on its income. The franking credits can then be used by the shareholders to offset their tax obligation. Where a shareholder's offset is higher than their tax bill they receive a tax refund from the Australian Tax Office.
- Refundability was originally introduced by the Howard Coalition Government in 2001 as part of the A New Tax System (ANTS) package. The reason for allowing refundability in the ANTS package was that:
    - "[Refunds] are not available to resident tax payers who have insufficient non-dividend income to absorb all the imputation tax credits attaching to their company dividends. This disadvantages low income shareholders, including self-funded retirees. They may face the company tax rate on dividend income rather than their own marginal tax rates."

Labor's policy

- On 13 March 2018 Labor announced a policy to no longer provide refunds for excess franking credits from 1 July 2019. Charities and not-for-profit institutions were exempted from the proposal. The policy would provide savings of $11.4 billion over the forward estimates from 2018-19 and $59 billion over the decade to 2028-29.

- The Opposition noted in the release of the policy that the top one per cent of SMSFs received an average cash refund of more than $80,000 in 2014-15.

- On 27 March 2018 Labor revised its policy, announcing that pensioners and SMSFs with members receiving the pension at the time of announcement would also continue to have access to refundable franking credits.

Sensitivities

- Large superannuation funds with a significant proportion of members still in the accumulation phase can utilise much, or all, of the value of franking credits against the tax payable on other assessable investment earnings and as tax on contributions. Members of SMSFs will be less likely to have sufficient tax payable to make full use of the franking credits.

From: s22
To: Media Liaison
Cc: s22 Ewing, Robert; s22
Subject: RE: Contact for Tsr franking credits op-ed [SEC=UNCLASSIFIED]
Date: Friday, 12 October 2018 5:10:05 PM

Hi s22

Could you please also contact Robert Ewing (s22) from TAD if the op-eds are to be published? Just to cover off on the data angle too.

Thanks,
s22

From: Media Liaison
Sent: Friday, 12 October 2018 5:01 PM
To: s22 Media Liaison
Cc: s22
Subject: RE: Contact for Tsr franking credits op-ed [SEC=UNCLASSIFIED]

Thank you! As mentioned to s22 below is the advice from s22 The op eds are no certainty but we are standing-by just in case.

Regards

s22

From: s22
Sent: Friday, 12 October 2018 3:31 PM
To: Media Liaison
Cc: Tsr DLOs
Subject: TSR op eds [SEC=UNCLASSIFIED]

Hi guys,

Following our chat this morning, I've been told the op eds are now no certainty to be published. That said, the original plan was:

Saturday – retiree tax
Monday – company tax

I've asked s22 to keep me in the loop – will pass on any info if/when I hear it.

Cheers
s22

[redacted]
Departmental Liaison Officer | Office of the Hon Josh Frydenberg MP
Treasurer, Parliament House, Canberra ACT 2600
P +61 2 6277 7340 | **M** +s22 | **E** s22 @Treasury.gov.au

From: s22
Sent: Friday, 12 October 2018 4:49 PM
To: s22
Cc: s22
Subject: Contact for Tsr franking credits op-ed [SEC=UNCLASSIFIED]

Hi s22

Thanks for letting us know about the possibility that the Treasurer may write an op-ed on franking credits that will require fact-checking this weekend. If you could put both s22 and s22 down as contacts that would be great.

s22 – Please let me know if you're unavailable to help this weekend.

Thanks,

s22
Analyst
Retirement Income Policy Division
The Treasury, Langton Crescent, Parkes ACT 2600
☎ +61 2 6263 s22 s22 @treasury.gov.au