Abolishing Franking Credit Refunds: Evidence from an Event Study

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Abstract

Competing asset pricing models offer different predictions on whether dividend taxes affect share prices. This thesis conducts an event study of the announcement of a reform to Australia's dividend imputation system. The reform would have abolished refunds to taxpayers with excess franking credits, which would have had the effect of raising taxes on dividends paid to domestic shareholders. The results provide no evidence that the announcement reduced share prices.

Contents

List of Abbreviations

AIG . . . . . . Australian Investment Guarantee

ASX . . . . . . Australian Securities Exchange

CAPM . . . . Capital Asset Pricing Model

CAR . . . . . . Cumulative Abnormal Return

FAB . . . . . . Franking Account Balance

FABMC . . . . Franking Account Balance as a share of Market Capitalisation

GICS . . . . . Global Industry Classification Standard

OLS . . . . . . Ordinary Least Squares

S&P . . . . . . Standard & Poors'

1
Introduction

The theoretical literature offers competing predictions on whether dividend taxes reduce share prices. In some models share prices are determined by 'the' marginal investor, so dividend taxes affect prices only if they are imposed on this marginal investor. In others, share prices are influenced by all investors, but there is disagreement about the relative importance of domestic and foreign investors in determining share prices.

The announcement of a reform to Australia's dividend imputation system provides an opportunity to test whether dividend taxes reduce share prices. On 13 March 2018 the Australian Labor Party announced that, if elected, it would abolish cash refunds provided to taxpayers with excess imputation credits (which are called 'franking credits' in Australia). The policy would have increased the taxation of dividends paid by domestic companies to domestic shareholders, but would not have changed the taxation of dividends paid to foreign shareholders. Investors perceived the policy as highly likely to be implemented, as opinion polls and betting markets both suggested that Labor was the clear favourite to win the upcoming election.

This thesis conducts an event study of Labor's announcement. It argues that, if the announcement reduced share prices, then the reduction should be larger for those companies expected to distribute more franking credits. It tests whether this is the case using a panel data method. The results provide no evidence that cumulative returns over the days following the announcement were negatively related to expected distributions of franking credits. Hence, it does not detect any effect of the reform on share prices. This is consistent with the predictions of Brennan (1970), among other models.

An understanding of the effect of dividend taxes is important from a policy perspective. There is little consensus among policymakers regarding the appropriate way to tax dividends, as shown by the wide variety of systems in place. This includes classical systems that tax most dividends at full personal rates (such as the US), classical systems that tax dividends at concessional rates (such as the UK), dividend imputation systems (such as Canada), and systems that do not tax dividends at all (such as Singapore).[1] Whether dividend taxes affect share prices is important as it may affect the level of investment and its allocation among firms. Under the 'traditional view' of dividend taxation, the marginal source of financing is new equity, so a reduction in share prices would, all else equal, increase the cost of capital and reduce investment. Under the 'new view', the marginal source of financing is retained earnings, so even if dividend taxes reduced share price, it would not affect the cost of capital or investment. This suggests that if dividend taxes reduce share prices, it may reduce investment among immature firms (who tend to rely on new equity financing), but have little effect on investment among mature firms (who tend rely on retained earnings) (Auerbach 2002). Hence dividend taxes may distort both the aggregate level of investment and its allocation between mature and immature firms.

The next section reviews the literature. Section 3 describes Australia's dividend imputation system and the proposed reform, and section 4 identifies the event window over which the effect of the reform will be evaluated. Section 5 argues that, if the announcement reduced share prices, then cumulative returns over the event window should be negatively related to proxies for the likelihood of a firm distributing franking credits. The data, method and results are described in sections 6, 7 and 8. Section 9 describes some robustness checks, and the final section concludes.

[1] For the US, see Internal Revenue Service (2020). For the UK and Canada, see Organisation for Economic Cooperation and Development (2020). For Singapore, see Deloitte (2019)

2
Literature Review

There are a variety of theoretical models that link the tax treatment of shareholders to asset prices. In some models share prices are determined by 'the' marginal investor, so dividend taxes affect share prices if and only if they are imposed on the marginal investor. However, the identity of this investor differs between models. In M. H. Miller and Scholes (1978) and Swan (2019) the investor is a domestic financial institution, while in Boadway and Bruce (1992) it is a foreign investor.

In other models, share prices are influenced by many or all investors to some extent. In the tax-adjusted capital asset pricing model (CAPM) of Brennan (1970), the effect of dividend taxes on share prices depends on the average of the dividend tax rates faced by all investors, weighted by their wealth. This suggests that:

- Dividend taxes on US shareholders should reduce share prices in the US and abroad, as these shareholders own a large share of the world's wealth.
- Dividend taxes on shareholders on other advanced economies should have little effect on share prices in that country or abroad, as these shareholders own a small share of the world's wealth.

In contrast, Monkhouse (1993) argues that whether dividend taxes affect the share prices of a particular firm may depend on the investor base of that firm.

Australians tend to overweight Australian shares in their portfolios, and place an especially high weight on those shares with the highest dividend yields (Grant et al. 2018), which in Monkhouse's view would suggest that dividend taxes could affect the prices of these shares.

Empirical work shows that dividend taxes on US shareholders decrease share prices in the US and abroad, consistent with the predictions of Brennan (1970) (section 2.1). In contrast, empirical work does not provide a clear answer on whether dividend taxes in other advanced economies reduce share prices (section 2.2). The answer to this question is important, because if dividend taxes decrease share prices, they may distort both the aggregate level of investment and the allocation of investment between firms.

2.1 Evidence on the US

Empirical work supports the claim that dividend taxes on US shareholders decrease the share prices of US companies. The main source of evidence is the response of share prices to the dividend tax cuts in 2003. The tax cuts were scheduled to last until the end of 2008, and it was uncertain if they would be extended further. A firm whose dividend yield is currently high will distribute more during the period when dividend taxes are definitely low. In contrast, a firm whose dividend yield is currently low will distribute more in the future, when the dividend tax cut may have expired. Hence, if dividend taxes affect US share prices, then abnormal returns should be higher for firms with the higher dividend yields. Auerbach and Hassett (2005), Gadarowski et al. (2007) and Amromin et al. (2008) all find that this is the case. The US dividend tax cuts also changed analysts' forecasts for corporate earnings and other variables. Dhaliwal et al. (2007) show that the ex-ante cost of equity capital implied by analysts' forecasts was lower after the tax cut than it had been before, which they view as evidence that dividend taxes reduce share prices.

Empirical work also shows that US dividend taxes reduce the share prices of foreign firms. Kenchington (2019) find that the 2003 dividend tax cuts increased stock prices of foreign firms with high dividend yields, provided that the firm was located in a country with an income tax treaty with the US.

While most empirical work is based on the dividend tax cuts of 2003, some studies present other evidence for the effect of US dividend taxes. An example is Sialm (2009), who presents time series evidence showing that dividend taxes were negatively related to share prices over the period from 1913 to 2006.

2.2 Evidence on other Advanced Economies

Brennan (1970) predicts that dividend taxes in developed countries other than the US, where shareholders own a small share of the world's wealth, dividend taxes should only have a small effect on share prices. The empirical work so far has yet to reach a consensus on whether dividend taxes affect share prices.

2.2.1 Dividend Drop-off Studies

One source of evidence is empirical work on countries with dividend imputation systems. In these systems, domestic shareholders can use imputation credits to reduce their tax payable on dividends, while foreign shareholders cannot. Hence, if imputation credits are capitalised into share prices, this is evidence that dividend taxes affect share prices. The most popular approach is to estimate the market value of imputation credits distributed to shareholders using dividend drop off ratios.

When a company declares a dividend, they will specify that the dividend will be paid to those that hold the share on a particular date. Those who buy the share on or after the 'ex-dividend date' are not entitled to receive the dividend. Usually the share price falls when a share goes ex-dividend, but the share price fall may differ from the amount of the dividend. To quantify this, one can compute a dividend drop off ratio, defined as the ratio of the price of the price fall to the dividend amount.

There is a large literature that attempts to link drop-off ratios to taxation at the shareholder level. A number of papers use drop-off ratios in dividend imputation systems to infer the extent to which imputation credits distributed to shareholders are capitalised into share prices. If the drop-off ratio of a dividends with attached imputation credits is larger than the drop-off ratio of dividends without these credits, this suggests that the market placed a positive value on distributions of imputation credits. Using this method, Cannavan and Gray (2017) found that $1 of distributed imputation credits had a market value of around $0.35 in Australia.

A major challenge is that, in most countries that have had dividend imputation systems, foreign shareholders have been able to benefit from imputation credits by trading around the ex-dividend date. Empirical work has found evidence of such trading in many countries with dividend imputation systems, including Germany (McDonald 2015), Finland (Rantapuska 2008) and Taiwan (Chen et al. 2013, Tseng and Hu 2013).). Australia has unusually strong rules intended to prevent short-term trading aimed at capturing imputation credits, including a rule that states a shareholder can only use the imputation credits attached to a dividend if they held those shares 'at risk' for at least 45 days (Australian Taxation Office 2016). However, these rules merely reduce short-term trading aimed at capturing imputation credits, rather than eliminating it (Ainsworth et al. 2018).

Trading aimed at capturing imputation credits pushes up share prices before the ex-dividend date, and pushes them back down afterwards. As a result, the drop-off ratio will mostly reflect the value placed on credits by those engaged in short-term trading around the ex-dividend date, rather than the value placed on credits by long-term investors who determine share prices at other times (Lajbcygier and Wheatley 2012). This suggests that dividend drop-off studies, whether in Australia or other countries, will not be informative regarding the effect of dividend taxes on share prices at times other than a short window around the ex-dividend date.

Some papers study the change in the drop-off ratio following some tax reform. Bell and Jenkinson 2002 show that the drop-off ratio fell following a reform to the UK's dividend imputation system in 1997. Beggs and Skeels 2006 find that drop-off ratios in Australia increased after cash refunds for excess imputation credits were introduced in 2000. These studies however, do not provide much evidence on the effect of dividend taxes on share prices. Firstly, as discussed above, drop-off ratios are influenced by the value placed on imputation credits by those engaged in short-term trading around the ex-dividend date. Secondly, drop-off ratios tend to be highly volatile, making it hard to attribute changes in the ratio to a particular cause (Chetty et al. 2005). Thirdly, these studies may suffer from more specific issues. In Bell and Jenkinson 2002, for instance, the fall in the mean drop-off ratio was partly due to a greater prevalence of negative drop-off ratios, and it is hard to see how this could have been caused by the reform (Bond et al. 2007).

2.2.2 Estimation of asset pricing models

Motivated by the limitations of dividend drop-off studies, some authors have estimated the market value of imputation credits in other ways. One approach is to estimate an asset pricing model that includes imputation credits as an explanatory variable. The evidence from these models is mixed. Lajbcygier and Wheatley (2012) use a 'two-pass' method to estimate a CAPM-based model and a variety of other models. The results provide no evidence that imputation credits reduce the cost of equity capital.

Using a different 'single-pass' method, Swan (2019) estimates a CAPM-based model. He finds that shares make higher returns in months when they pay dividends with attached imputation credits than in months when they pay dividends without credits. Swan interprets his estimates as showing that imputation credits substantially reduce the cost of equity, and in fact, that imputation credits are close to fully capitalised into share prices.

An advantage of estimating asset pricing models is that the results will not be affected much by short-term trading aimed at capturing imputation credits. Dividend drop-off studies were estimated only on data around the ex-dividend date, so the brief rise and fall in share prices around this data had a large effect on the estimated value of imputation credits. In contrast, these asset pricing models are estimated over multi-year time periods, so only a small proportion of the observations are close to ex-dividend dates. A challenge is that over these long time periods, there will be many different influences on returns, of which dividend imputation is only one.

2.2.3 Event Studies

An event study could be used to study the effect of a change in dividend taxes on share prices. An advantage over DDO studies is that event studies are not as affected by trading around the ex-dividend date, as only a handful of firms will have ex-dividend dates within the event window. An advantage over estimating asset pricing model is that event studies focus on returns over a brief period when the effect of dividend imputation is thought to be especially important, making it easier to detect the effect (if any) of dividend imputation on returns.

Bond et al. (2005) study the consequence of this reform on firm's dividend behaviour. Before the reform, UK pension funds preferred that companies with foreign profits paid ordinary dividends, while after the reform they preferred they pay foreign income dividends. In contrast, foreign investors always preferred that companies pay foreign income dividends. The authors show that some firms switched from paying ordinary dividends to foreign income dividends following the reform, and use event study methods to show that this increased their share prices. This suggests that some firms make dividend decisions that cater to the preferences of UK pension funds, even though these decisions do not maximise their share price. In a related paper, Bond et al. (2007) explain that if UK pension funds where 'the' marginal investor, then the reform should have caused a large fall in UK share prices, but this did not occur.

3
Dividend Imputation and the Proposed Reform

Figure 3.1 provides an overview of Australia's dividend imputation system. One can imagine three steps taking place each year. In step 1, an Australian company pays company tax to the Australian Tax Office, and receives an equal amount of franking credits. This adds to its franking account balance. In step 2, the company pays a dividend to shareholders, and attaches all of its franking credits to that dividend. This reduces the company's franking account balance back to zero. In step 3, the shareholder returns the franking credits to the Tax Office, and receives a tax offset equal to the amount of credits.[1]

Since July 2000, this tax offset has been 'refundable', which means that if the offset reduces the shareholder's personal tax to zero, the excess can be received as cash. The effect of the dividend imputation system is that these profits paid to Australian shareholders are only taxed once, at the shareholder's personal income tax rate.

On 12 March 2018, Labor announced that, if they formed government after the federal election, they would abolish cash refunds provided to shareholders with

[1]In practice the timing of these steps is flexible. For example, a company can receive franking credits in one year, which adds to its franking account balance, and attach those franking credits to a dividend many years later, which reduces its franking account balance.

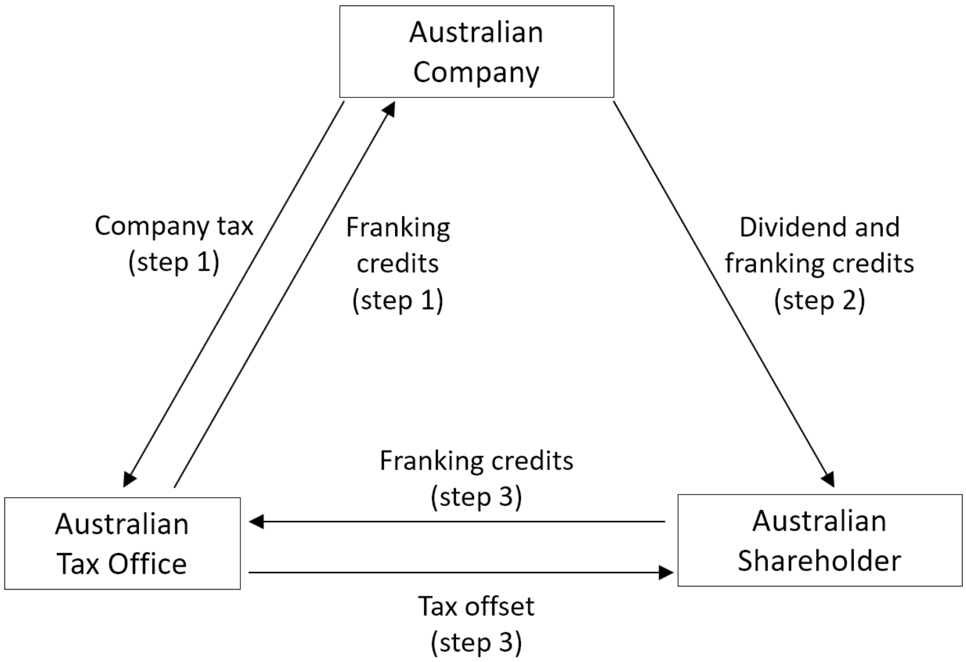


Figure 3.1: A Stylised Depiction of Australia's Dividend Imputation System

excess franking credits. This policy would have increased the tax on dividends paid by Australian companies to a large class of Australian shareholders, but would not have affected the taxation of foreign shareholders.[2]

The magnitude of the increase in dividend taxes is not trivial. If Labor's policy were implemented, and there was no behavioural response, it would have raised revenue equal to the amount of excess franking credits. In the 2014-15 financial year, individuals claimed a total of 2.0 billion AUD of excess franking credits, while superannuation funds (retirement funds used in Australia) claimed a total of 2.9 billion AUD (Parliamentary Budget Office 2018). This implies that the policy would have raised 4.9 billion AUD if it had been in place in 2014-15, assuming no behavioural response. To give a sense of scale, this is equal to 84% of taxes on superannuation funds, and 7.5% of company tax (figure 3.2).

The additional revenue raised by the policy would have been somewhat reduced by tax planning strategies. If investors expected these strategies to be very successful,

[2]Unfranked dividends paid to foreign shareholders are typically subject to Australian withholding tax, while franked dividends are exempt (Australian Taxation Office 2019). Labor's proposal does not affect whether franking credits provide exemption from Australian withholding tax, so it does not affect the taxation of dividends paid to foreign shareholders.

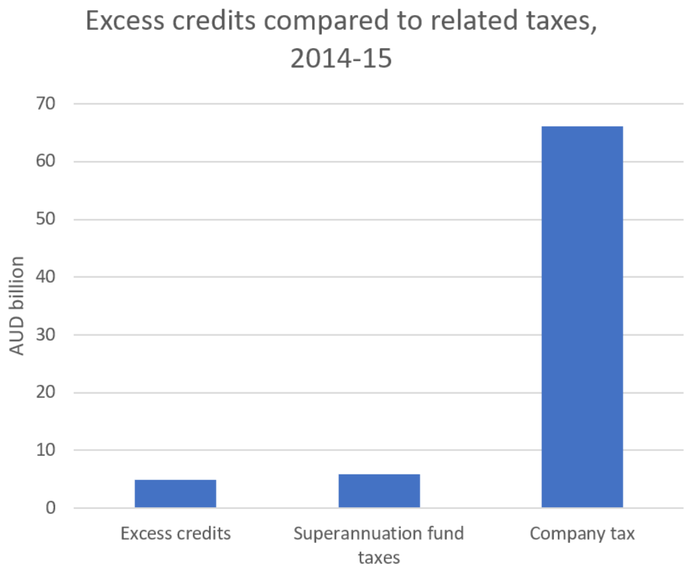


Figure 3.2: A comparison of excess credits to tax revenue

Data Sources: Parliamentary Budget Office (2018) Australian Government (2015)

then it is likely that share prices would react little to Labor's announcement, even if dividend taxes reduce share prices in general. In practice, however, these strategies were only expected to have a modest effect on tax paid. The details of Labor's policy, including the effect of tax planning on revenue, is discussed in Appendix A.

4
Event Windows

4.1 Identifying Possible Windows

In any event study, the choice of event windows is a key methodological choice. I identify three possible event windows, each of which comprises five trading days.

Event Window	Start date	End date
Announcement window	13 March 2018	19 March 2018
Pension window[1]	26 March 2018	3 April 2018
Election window	20 May 2019	24 May 2019

The choice of possible windows was informed by the number of Australian news articles mentioning dividend imputation or franking credits each day (Figure 4.1).

The first spike in news coverage is the announcement of Labor's policy. The policy was first revealed in a number of news articles published after markets had closed on 12 March 2018.[2] The policy was then announced formally in a speech by the leader of the Labor party on 13 March 2018 (Shorten 2018).

A small increase in articles occurs in late March 2018, when Labor announced that recipients of Australian Government pensions and allowances would be exempt

[2]See, for instance, Sydney Morning Herald 2018, Australian Financial Review 2018, Australian Broadcasting Corporation 2018).

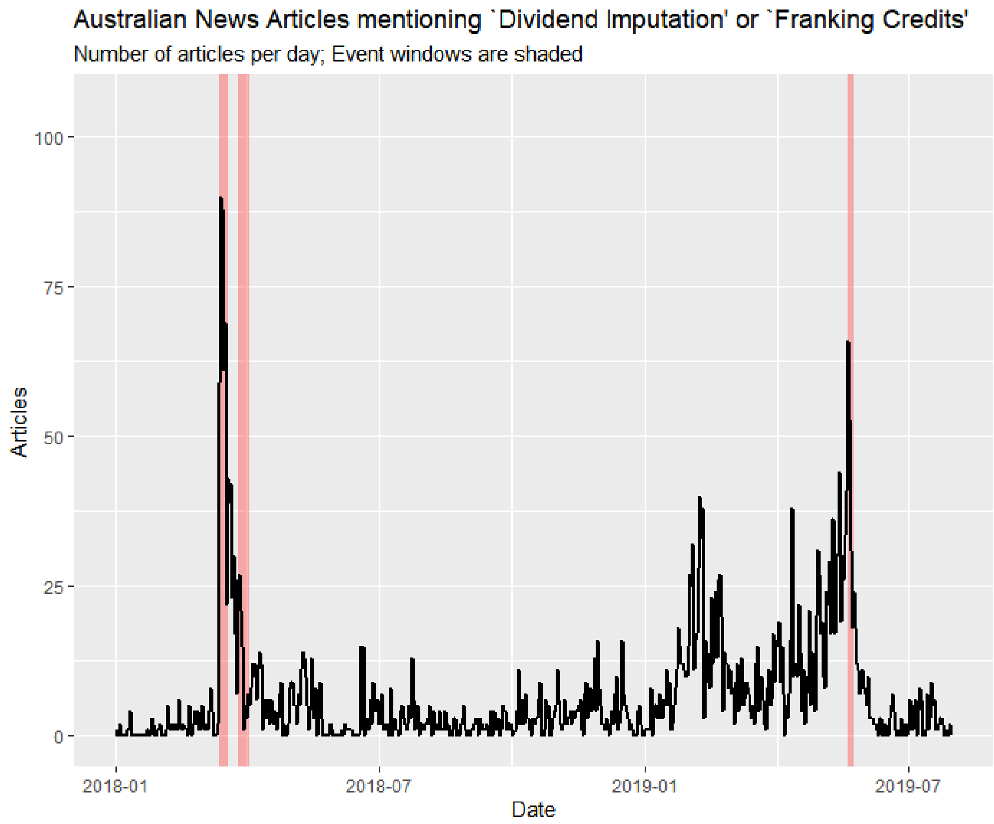


Figure 4.1

Data Source: Nexis

from the policy, as would self-managed superannuation funds that had at least one such recipient as a member. This prompted the inclusion of the 'pension window'.

The surge in articles in February 2019 and around the end of April 2019 both relate to political developments. The first surge occurred when Labor called for the resignation of a Government MP chairing a parliamentary committee on franking credits. The second related to the debates between party leaders, where franking credits featured prominently. Neither set of articles revealed new information about the policy itself. Moreover, these developments do not appear to have affected the perceived probability of the policy being implemented, as Labor retained its lead in the opinion polls and betting markets over those periods.

The final spike occurred at the time of the federal election, on Saturday, 18 May 2018. In a very surprising outcome, the Coalition government was re-elected. This motivated the 'election window'.

The length of each event window is five trading days. Using a shorter window would have the advantage of reducing the extent to which returns are affected by developments unrelated to the dividend imputation policy announcement. However, the window must be sufficiently long to permit the share prices of each firm to adjust to reflect how much investors believe that firm will be affected by the reform. This takes time, as it requires investors to assess the extent to which individuals firms are likely to distribute franking credits in the future. A five-day window was also used by Auerbach and Hassett (2005), who conduct an event study of the US dividend tax cuts of 2003 using a similar panel data method to this thesis.

4.2 Why the Announcement Window is Preferred

The announcement window is an ideal setting in which to test whether dividend taxes affect the cost of equity. In contrast the pension window and election window are less suitable. For this reason, this thesis focusses on the announcement window, though results for the other windows are also presented.

4.2.1 Announcement Window

The announcement window is ideal for two reasons. Firstly, it covers a period when investors' beliefs about the policy changed substantially. If investor's beliefs only change slightly during the window, then any change in share prices caused by the change in these beliefs would likely be small relative to other sources of variation in the data. Secondly, there are few other major developments affecting share prices during the event window, and the effect of those developments that do occur are relatively easy to control for.

Large changes in beliefs

During the announcement window, the perceived probability of the policy being implemented changed dramatically. Before the window, shareholders attached a very low probability to such a policy being implemented. In the year preceding the announcement, there were very few news articles about dividend imputation or franking credits. Moreover, those articles were focussed on issues such as the likelihood that a particular firm will pay a franked dividend, rather than speculation about possible policy changes. Immediately after the announcement, the perceived probability of the policy being implemented jumped dramatically. At the time of Labor's announcement, they were the clear favourite to form government after the upcoming federal election. Labor had been consistently ahead of the incumbent Liberal-National Coalition across a variety of opinion polls for the entire year preceding the announcement (Poll Bludger 2019). Furthermore, betting market odds at the time showed Labor was the clear favourite to form government (Koukoulas 2019). The announcement was also highly salient. It was covered on the front page of most Australian newspapers on 13 March 2018, and was covered on the front page of the Australian Financial Review on every day of the announcement window (see Appendix B).

Other events during the window

During the announcement window, there were a number of developments other than the franking credit policy relevant for Australian share prices. Most importantly, on the same day that the leder of Labor announced the franking credit policy, the deputy leader announced the 'Australian Investment Guarantee' (AIG). The AIG would allow firms to immediately deduct 20% of any qualifying new asset worth $20,000+, with the remainder depreciated as usual. The revenue impact of the policy was expected to be roughly half that of the dividend imputation policy.[3]

To determine if any other developments of note occurred during the announcement window, I listed the headlines of all front page stories of the Australian Financial Review on these days (Appendix B). Some of the developments described in these stories may have been relevant for share prices:

[3] Appendix E, Parliamentary Budget Office 2019 presents estimates of the revenue impact the policies Labor took to the election. According to these estimates, AIG's revenue impact would be 17% as large as the impact of its franking policy in 2021-22, growing to 60% as large in 2022-23. However, this is based on the revenue impact of the version of Labor's policy that exempted pensions. In the announcement window, the relevant policy is the original policy, which had a larger revenue impact.

- There was a story about US monetary policy, underscoring the attention that Australian investors give to developments overseas.

- There were a few stories resulting from the Royal Commission into Misconduct in the Banking, Superannuation and Financial Services Industry. These stories may have caused investors to expect fines or stricter regulation being imposed on the financial industry.

- One story stated that a minor political party in Australia, One Nation, was inching towards supporting the government's proposed company tax cuts. This may have increased the perceived probability of the tax cuts being passed in the Senate.

In terms of Australian macroeconomic news, the announcement window was very quiet. The Australian Bureau of Statistics did not release any market-sensitive economic data.[4] The Reserve Bank of Australia did not make any monetary policy decisions nor publish any press releases on its website. Additionally, neither the federal government, nor any state or territory government, handed down their budget.

4.2.2 Pension window

The pension window starts on the day Labor announced that recipients of Australian Government pensions and allowances would be exempt from its policy. Self-managed superannuation funds that had at least one such recipient as a member would also be exempt. Hence the pension window covers a period during which investors beliefs regarding the nature of the policy changed. However, the change in beliefs was fairly modest. Firstly, the exemption only had a small effect on the estimated revenue impact of the policy (Parliamentary Budget Office 2018). Secondly, the

[4] One of those releases was 'Labour Force, Rebenchmarked Estimates', which seems important at first glance, but merely takes labour force figures that have already been published and scales them to reflect new population data. Another release was 'Housing Finance'. Wallis 2020 finds no evidence that yields respond to this release, suggesting that the response of share prices to this release is likely to be small or zero. Some other releases were published, but they are not perceived as market-sensitive by investors.

policy change was much less salient than the original announcement, as shown by the smaller amount of press coverage received. Hence, even if dividend taxes do reduce share prices, the variation in returns caused by this particular policy announcement may be small, making it hard to detect.

4.2.3 Election window

The election window covers the first five trading days after the Coalition's victory in the 2019 federal election. Before the election, Labor had a consistent lead in the opinion polls (Poll Bludger 2019), so it was expected to win office and then implement its franking credit policy. The Coalition's surprising victory made it extremely unlikely that the franking credit policy would be implemented during the next term of government. Moreover, senior Labor figures blamed the loss partly on the franking credit policy, making it seem unlikely that the franking credit policy would be implemented even if Labor won a subsequent election.

A problem with the election window is that the election outcome also changed investors' beliefs regarding many other economic policies. Labor had promised higher taxes on personal incomes, housing, superannuation and trusts, and had promised increased spending on infrastructure, education and childcare (Australian Broadcasting Corporation 2019). Labor had also promised to increase the wage premium that firms must pay staff who work on Sundays or public holidays, and to introduce a policy that seemed likely to lead to a higher minimum wage (Clayton Utz 2019). This makes it more challenging to estimate the effect of the franking credit policy specifically.

5

A Testable Prediction

In Brennan (1970), the effect of dividend taxes on share prices depends on the weighted average of the dividend tax rates of all investors, with each investor weighted by their total wealth. Since Australian investors only constitute a small share of global wealth, and Labor's franking credit policy only increases the taxation of Australian investors, this model predicts that the policy announcement should not affect share prices.

An alternative hypothesis is that share prices are influenced, at least in part, by Australian investors. If this is the case, then the announcement should reduce share prices, as it increases the tax on dividends paid by Australian companies to Australian shareholders. Moreover, the reduction in share prices should be largest for those companies whose profits will be subject to the largest increase in tax. This implies that the share price reduction should be proportional to the expected present value of the franking credits the firm will distribute after the policy takes effect.

This thesis tests the null hypothesis that the policy has no effect against this alternative hypothesis. Since these hypotheses are statements about causal relationships, it is possible to formalise them using the potential outcomes framework (see Angrist and Pischke 2009 for background). This section argues that the effect of the announcement on returns over the window should be negatively related to a firm's future franking percentage. It then describes two proxies for a firm's future franking percentage.

5.1 A prediction regarding future franking percentages

Let $i = 1, ..., N$ index the set of firms. Let $V_{i,start}$ denote the market capitalisation of firm i before the event window, and let $V_{i,end}$ denote its market capitalisation at the end of the window. Then:

$$\text{Causal Effect of Announcement} = \underbrace{E[V_{i,end}|\text{Announcement occurs}]}_{\text{Firm value that was observed}} - \underbrace{E[V_{i,end}|\text{No announcement}]}_{\text{Firm value in the counterfactual}}$$

The direct effect of Labor's policy would be to increase the tax paid on profits distributed by Australian companies to a large class of Australian shareholders. The increase in the expected present value of taxes paid depends on the expected present value of franking credits distributed, denoted $\mathcal{F}_i$. Hence, the causal effect of the announcement on returns should be negatively related to the expected present value of franking credits distributed. Formally:

$$E[V_{i,end}|\text{Announcement occurs}] - E[V_{i,end}|\text{No announcement}] \propto -\mathcal{F}_i$$

The announcement may also have indirect effects on share prices. For instance, it could have made investors perceive Labor as less 'business friendly', causing them to expect stricter labour market or other regulations. This thesis tests whether the causal effect of the announcement on share prices is related to the franking credit proxies. As such, it should isolate the direct effect of the franking credit policy, which is more relevant to assessing whether dividend taxes affect share prices in general. It does not have any power to detect indirect effects associated with Labor's announcement in particular.

The previous equation is a statement about the change in firm value over the event window. This can be converted into a statement about cumulative returns over the window. Dividing the previous equation through by firm value before the announcement:

$$\frac{E[V_{i,end}|\text{Announcement occurs}]}{V_{i,start}} - \frac{E[V_{i,end}|\text{No announcement}]}{V_{i,start}} \propto -\frac{\mathcal{F}_i}{V_{i,start}}$$

The percentage change in firm value over a period of time is equal to the nominal return in the firm's shares over that period, provided that the firm does not issue or buy back shares. Hence:

$$\begin{aligned}(&E[\text{Return over window}|\text{Announcement occurs}] \\ &- E[\text{Return over window}|\text{No announcement}]) \propto -\frac{\mathcal{F}_i}{V_{i,start}} \end{aligned} \quad (5.1)$$

Hence, if the announcement reduced share prices, then its causal effect on cumulative returns during the announcement window should be negatively related to the ratio of the expected present value of franking credit distributions, $\mathcal{F}_i$, and market capitalisation, $V_{i,start}$.

The ratio can be interpreted as a measure of the expected 'franking percentage' on future dividends, though it is not obvious at first glance. When a firm pays a dividend, for each dollar of cash they can attach $\frac{\tau}{1-\tau}$ of franking credits, where τ is the company tax rate applicable to that company. The 'franking percentage' of a dividend is the amount of franking credits attached as a share of the maximum amount. It is defined by:

$$\text{Franking percentage} = \frac{\text{Franking credits attached}}{\left(\frac{\tau}{1-\tau}\right) \times (\text{Dividend amount})} \times 100\%$$

This definition implies that the present value of franking credits distributed by the firm, $\mathcal{F}_i$, depends on future dividend amounts and future franking percentages. The market capitalisation of the firm, $V_{i,start}$, depends on future dividend amounts. This suggests that the main reason $\frac{\mathcal{F}_i}{V_{i,start}}$ varies between firms mostly because expected future franking percentages vary between firms. In fact, one can show that this ratio is strictly increasing in the franking percentage of any future dividend payment (see Appendix C for a proof).

The predicted relationship, 5.1, can now be given a nice interpretation. This thesis claims that, if Labor's announcement reduced share prices, then cumulative returns during the window should be negatively related to expected future franking percentages, which are summarised by $\frac{\mathcal{F}_i}{V_{i,start}}$.

5.2 Proxies for Future Franking Percentages

Investors' expectations of future franking percentages are not directly observable, but it is possible to find reasonable proxies.

Future franking percentages are determined by the amount of franking credits received by the company relative to its dividends, which will in turn depends on the amount of Australian company tax paid relative to total profits. At the time of the announcement, however, investors did not have access to useful data on Australian company tax paid. [1] However, they had access to data on a variety of other variables that are useful in forecasting future franking percentages. Two of the most useful variables are:

- The firm's franking percentage over the past five years
- The firm's franking account balance as a share of their market capitalisation

This thesis uses each of these variables as a proxy for future franking percentages. Hence, if Labor's announcement reduced share prices, then the causal effect of

[1] The financial statements of listed companies must disclose company tax paid worldwide, but need not disclose the amount paid in Australia specifically. A voluntary tax transparency code was introduced in 2016, which has resulted in many companies disclosing their Australian company tax paid, but at the time of the announcement only one year of data would have been available to investors. A single observation of Australian company tax paid is not very useful for forecasting future franking percentages given the volatility in the series. For example, Qantas paid zero Australian company tax in 2016-17 due to losses carried forward, but its expected future franking percentage is likely quite high, given its track record of choosing positive franking percentages. The Australian Tax Office published data on the Australian company tax paid of the largest corporate tax entities. Many listed companies will fall under the threshold for inclusion in this dataset. Additionally, many companies comprise a set of related corporate tax entities that will be listed in the dataset separately, and it is labour intensive to aggregate the entity-level data into company-level data.

the announcement on cumulative returns over the window should be negatively related to each of these proxies. i.e.

$$\begin{aligned}(&E[\text{Return over window}|\text{Announcement occurs}]\\ &- E[\text{Return over window}|\text{No announcement}]) \propto \left(\text{Proxy for} - \frac{\mathcal{F}_i}{V_{i,start}}\right)\end{aligned}$$

The remainder of this section explains why these proxies are likely to be good measures of future franking percentages.

5.2.1 Past Franking Percentages

The first proxy is a firm's franking percentage over the past five years. This proxy is useful because the franking percentage of individual firms tends to be highly persistent over time. The proxy was calculated by dividing the total franking credits distributed by that firm from FY2007 to FY2017 by the total dividends paid by that firm over the same period. Using data for multiple years has two potential benefits. First, it increases the sample size, as it allows for a company to be included even if it hasn't paid a dividend in the past year, as long as it has paid one in the past decade. Second, using data for multiple years smooths out the year-to-year fluctuations, which may make it a better forecast of future franking credit distributions.

Most firms pay a substantial amount of Australian company tax relative to their profits, so their past franking percentage is 100% (Figure 5.1). Some firms pay little or no company tax, so their past franking percentage is 0%. Around a quarter of firms have a past franking percentage between these extremes.

5.2.2 Franking Account Balances

When a firm pays Australian company tax, it receives franking credits, which adds to its franking account balance (FAB). When it attaches franking credits to a dividend, this subtracts from its FAB. The level of a firm's FAB tracks the amount of franking credits received but not yet distributed. If a firm has a high franking account balance as a share of its market capitalisation (FABMC), then it is likely to be able to choose a high franking percentage on its future dividends.

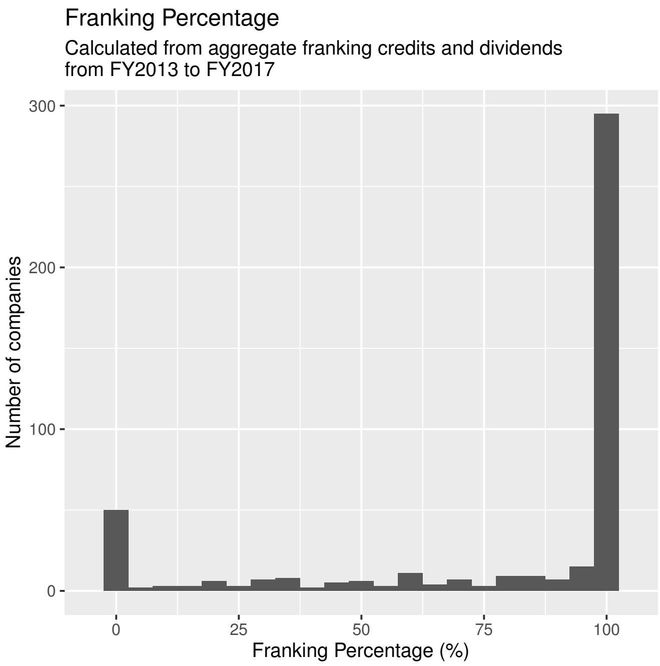


Figure 5.1

While most firms have distributed all the credits they have received, some have accumulated substantial balances (Figure 5.2).

The relationship between the two proxies is striking (Figure 5.3). Firms with a past franking percentage below 100% almost always have a zero or near-zero FABMC, while firms with a franking percentage of 100% vary greatly in their FABMC. This pattern arises because, whenever a company pays a dividend, they typically choose a franking percentage that is as high as possible given the available credits. This ensures that, for a given sequence of dividend payments, the company distributes its FAB as quickly as possible. Distributing franking credits quickly is desirable because the firm does not earn any nominal returns on its FAB.

FABMC is likely to be useful in explaining variation in future franking percentages among firms whose past franking percentage is 100%. To illustrate, consider two firms:

- Firm A pays Australian company tax on half of its worldwide profits, and pays out half of its profits as dividends. This firm will have a franking percentage of 100% and FABMC of 0. If it then decides to pay out its retained earnings

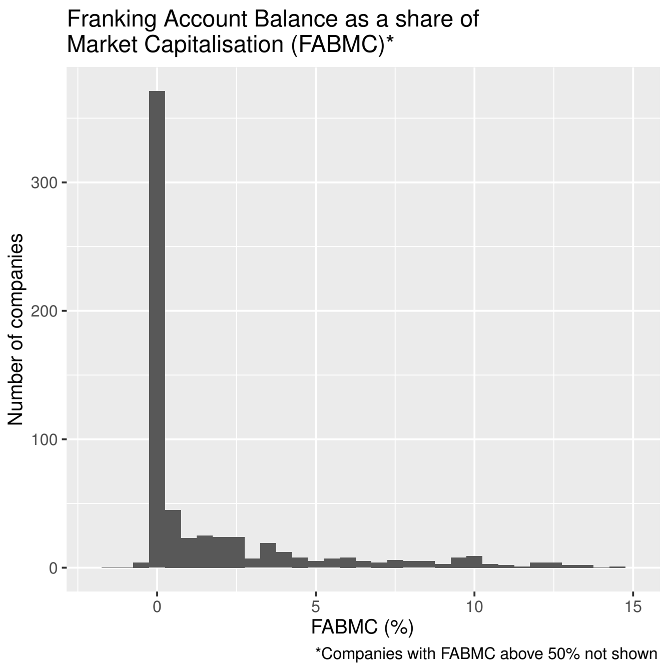


Figure 5.2

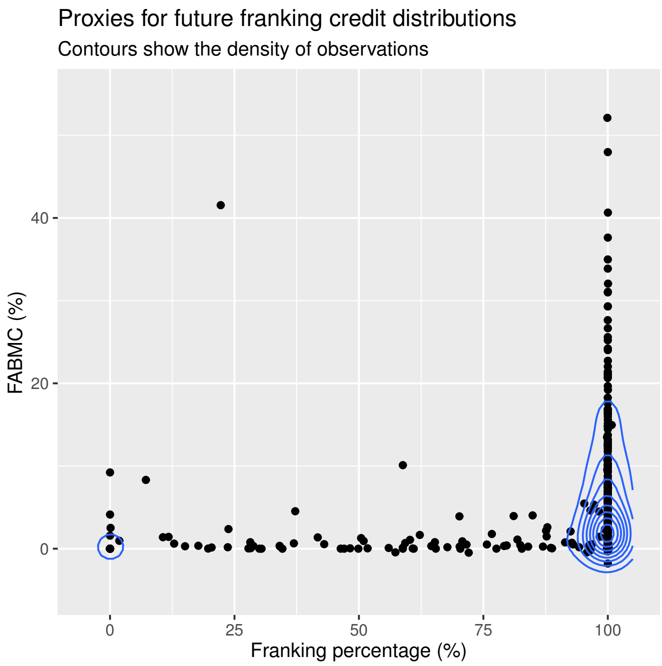


Figure 5.3

as dividends, it will not have any franking credits, so its future franking percentage will be 0%.

- Firm B pays Australian company tax on all of its worldwide profits, and pays out half its profits as dividends. This firm will have a franking percentage of 100% and a substantial FABMC. If it decides to pay out its retained earnings as dividends, it will have substantial franking credits to attach, so its future franking percentage will be high.

On the other hand, FABMC is not useful in explaining variation in future franking percentages among firms whose past franking percentage is below 100%, as these firms almost all have zero FAMBC. For this reason, this thesis produces results using both proxies.

6 Data

6.1 The panel dataset

This thesis uses a panel dataset on listed companies in Australia. The sample period covers all trading days from 1 January 2018 to 30 June 2019, which is an 18 month period. Other event studies of dividend tax changes have used shorter sample periods, such as 12 months in Gadarowski et al. (2007) and Amromin et al. (2008), while others use longer periods, such as 21 months in Auerbach and Hassett (2005). The sample period in this thesis could not be made much shorter, as it must cover all three event windows. When results were produced for a longer sample period of 48 months, the results were little changed.

The sample of firms covers all companies whose shares are listed on the Australian Securities Exchange (ASX), except those removed by data cleaning. The first step of data cleaning removed shares with low trading activity or whose price was too close to zero, which resulted in 603 firms. The second step removed firms that lacked data on the proxy. In the case of franking percentage, this results in 274 tickers. In the case of FABMC, this resulted in 338 tickers, though a further two were removed due to having FABMC above 50%. [1]

[1] Recall firms with high FABMC are able to choose a high franking percentage on future dividends. However, at very high levels of FABMC, the firm is effectively guaranteed to be able to choose a franking percentage of 100% on all dividends, so further FABMC is not informative

The panel dataset contains a number of variables from Bloomberg, including:

- Share market data on each company (closing prices, trading volumes, and market capitalisation), which is available for each trading day.
- Financial statement data on each company (net fixed assets, capital expenditure), which is available semi-annually for most companies. The panel data models use the latest observation that would have been known to investors at the time of Labor's announcement.
- Global Industry Classification System (GICS) codes for each company. GICS classifies firms at four levels of aggregation: sub-industries, industries, industry groups, and sectors. I use the industry codes to compute cluster-robust standard errors, and I include dummies based on the sector codes in some of the specifications.

The dataset also contains data on the two franking proxies. The past franking percentage for each firm was calculated by dividing the total franking credits distributed by that firm from FY2007 to FY2017 by the total dividends paid by that firm over the same period. This calculation was performed using annual data on franking credits distributed and dividends paid from the S&P Capital IQ database.[2]

Obtaining data on each company's FAB was more difficult. This data was not available from Eikon or S&P Capital IQ. Annual FAB data was available in Bloomberg and Morningstar, but there were substantial discrepancies between these two sources for many firms. To investigate these discrepancies, I manually collected annual FAB data from the published financial statements of 42 listed companies, which revealed substantial errors in Bloomberg and smaller errors in Morningstar. Due to these issues, the panel dataset contains the manually collected data for the 42 companies, Morningstar data for most other companies, and Bloomberg data only

regarding future franking percentages. If firms with extreme FABMC were included, it would bias the regressions towards finding no relationship between returns and FABMC. For this reason, the two firms with extreme FABMC are removed from the sample.

[2]This data seems to have minor data quality issues, which are documented in Appendix D. By the time I had noticed these issues the libraries had been closed due to COVID 19, so I could not obtain alternative data from Bloomberg or Eikon

if the other two data sources are unavailable. The panel data models are estimated in the FAB observation from the latest annual report that had been published by the announcement date. The annual report publication dates were obtained from company press releases. The construction of the panel dataset, including the manual collection of FAB data, is described in detail in Appendix D. [3]

Table 6.1 presents descriptive statistics on the firms in the sample. The first few rows present statistics for the set of all firms in the dataset, even though data on the proxies was not available for all firms. The other rows contain statistics for sub-samples of firms formed based on each of the franking proxies. This table shows that companies with high franking percentages tend to have lower market capitalisation than firms with lower franking percentages. Similarly, it shows that companies with positive FAB tend to considerably larger than firms with zero FAB.

It is also useful to compare the GICS sectors of firms in each sub-sample. Firms with a franking percentage of 100% are particularly likely to be in the Financials or Consumer Discretionary sector, while firms with lower franking percentages are unusually likely to be in the Materials or Information Technology sectors (Figure 6.1).

The difference between sub-samples formed on FABMC is much more stark (Figure 6.2). The sample of firms with positive FAB contains a mix of many different sectors. However, the sub-sample of firms with zero FAB is unusual in that almost half are in the Materials sector, of which most are in the mining industry.[4]

[3]The difficulty involved in obtaining FAB data suggests some investors may have found it difficult to incorporate information about FAB into their trading decisions during the announcement window. However, investors do not need to explicitly rely on FAB data for it to be a suitable proxy. All that is required is that FAB be correlated with investor's expectations about future franking credit distributions. This could occur if, for instance, investors form their expectations about franking credit distributions based on the public statements of companies, and those companies take FAB into account when making those statements.

[4]It is not obvious why this is the case. One possible explanation is that many mining companies operate at a loss for many years, in the hope of making a discovery and becoming extremely profitable in the future. These companies will typically have paid little or no company tax, and hence have accumulated zero FAB.

		Mean	25th percentile	Median	75th percentile
All firms (N = 622)	Market Capitalisation ($m)	2442.3	64.9	189.5	723.6
	Net Fixed Assets / Market Capitalisation	27.4	0.6	5.7	30.8
	Capital Expenditure / Market Capitalisation	2.5	0.1	0.7	2.3
	Franking Percentage	83	81.1	100	100
	FABMC	4.3	0	1.1	4.2
Franking percentage 100% (N = 187)	Market Capitalisation ($m)1	3894.2	187.1	465.2	1726
	Net Fixed Assets / Market Capitalisation1	25.3	1.9	9.8	32.3
	Capital Expenditure / Market Capitalisation1	2.3	0.2	1	2.3
	Franking Percentage1	100	100	100	100
	FABMC1	6.6	1.3	3.3	8.7
Franking percentage under 100% (N = 90)	Market Capitalisation ($m)2	7716.8	317.7	1438.8	6519.5
	Net Fixed Assets / Market Capitalisation2	32.7	1.5	14.7	45.2
	Capital Expenditure / Market Capitalisation2	2.2	0.3	1.1	2.5
	Franking Percentage2	47.7	19.9	51.3	78.9
	FABMC2	3.5	0	0.4	1.4
FAB Positive (N = 245)	Market Capitalisation ($m)3	5133.6	197.1	592.8	2432.9
	Net Fixed Assets / Market Capitalisation3	25	1.3	9.8	32.3
	Capital Expenditure / Market Capitalisation3	2.2	0.2	1	2.3
	Franking Percentage3	88.7	95.3	100	100
	FABMC3	5.9	0.7	2.3	7
FAB Zero (N = 92)	Market Capitalisation ($m)4	708.5	53.2	137.6	294.3
	Net Fixed Assets / Market Capitalisation4	28.1	0.9	8.6	32.2
	Capital Expenditure / Market Capitalisation4	2.8	0.1	0.7	2.7
	Franking Percentage4	58.1	7.5	65.4	100
	FABMC4	0	0	0	0

Table 6.1: Descriptive Statistics on All Firms and on Sub-samples

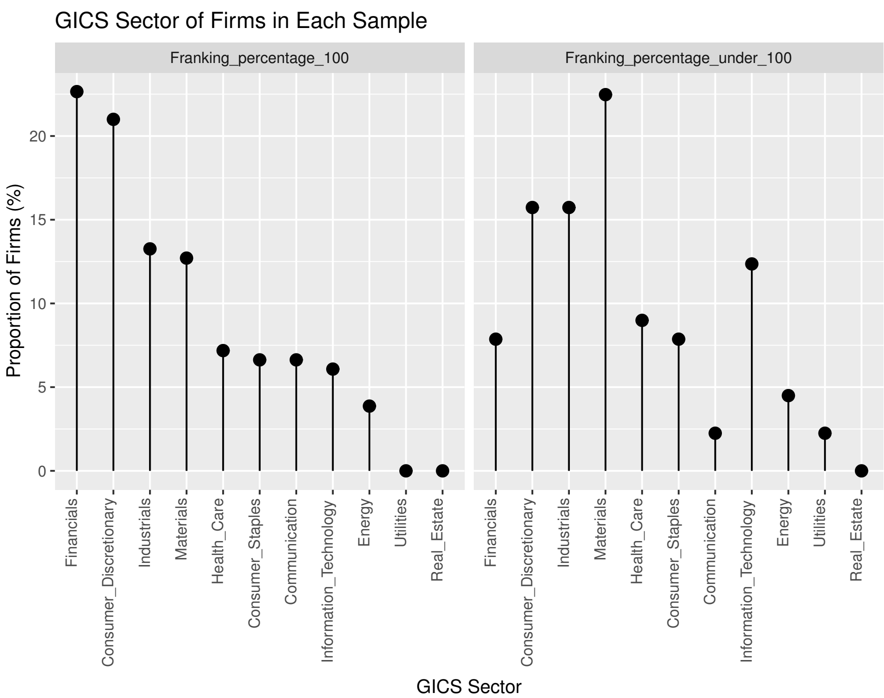


Figure 6.1

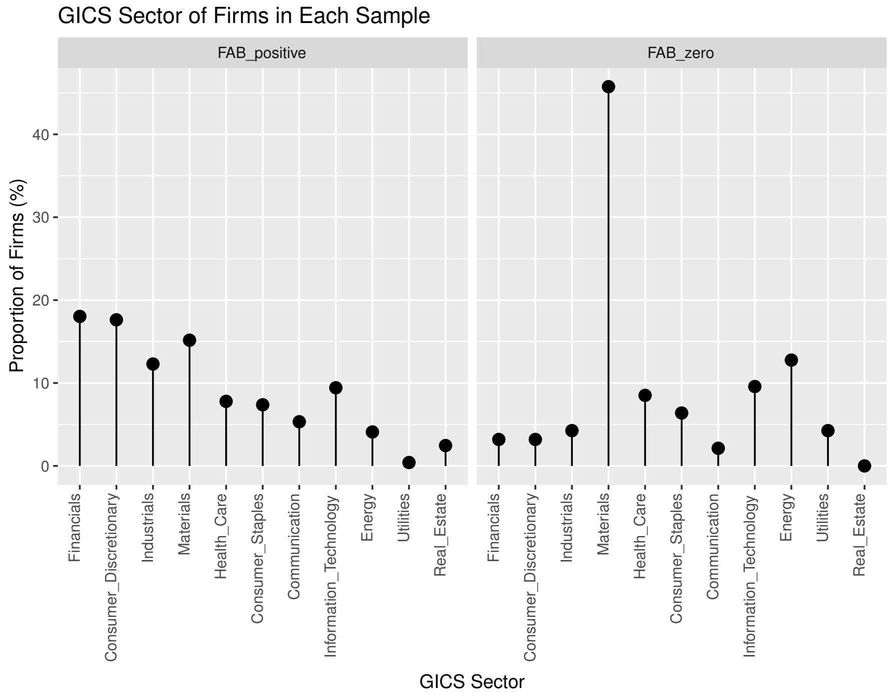


Figure 6.2

6.2 The Returns on Other Asset Classes

Daily nominal returns on a variety of asset classes were obtained from Bloomberg. These series can be used to control for variation in the returns of individual shares due to factors other than the franking credits announcement. The asset classes included are listed in the table below.

In the panel dataset, the return on the shares of individual firms is calculated as the percentage change from market close to market close. To maximise the extent to which the returns on other asset classes are useful in explaining variation in Australian shares, I calculate the returns in other assets over a similar time interval. Due to differences in time zones, this requires calculating returns in some assets from close to close, and calculating the returns in other assets from open to open.

Asset Class	Variable Used	Currency	Time when Prices are Measured
Australian shares	ASX All Ordinaries Index	Australian dollars	Close
US shares	S&P 500 Index	US dollars	Open
Europe shares	S&P Europe 350 Index	Euros	Open
China shares	S&P China Broad Market Index	US dollars	Close
Japan shares	Nikkei 225 Index	Japanese Yen	Close
Crude oil	Brent futures contract	US dollars	Open
Metallurgical coal	SGX TSI Australia Premium Coking Coal Futures	US dollars	Close
Thermal coal	Thermal coal grade 5500 kcal/kg	Chinese Renminbi	Close
Iron ore	Iron Ore Australian Fines	US dollars	Close

7 Method

7.1 Motivation for the Panel Data Method

Section 5 argued that if Labor's announcement reduced share prices, then the causal effect of the announcement on cumulative returns during the event window should be negatively related to each of the proxies for future franking percentages. This thesis tests whether this is the case using a panel data method. To understand why the panel data method is required, it is useful to understand the limitations of simpler methods.

The simplest method would be to regress cumulative returns over the announcement window against one of the proxies, and then test whether the coefficient on the proxy differs from zero. This was done for the first proxy (past franking percentage) and then separately for the second proxy (FABMC). The results provided no evidence of a negative relationship between cumulative returns and either proxy, as illustrated by figures 7.1 and 7.2.

This simple approach suffers from two major limitations. First, the error and regressor may not be orthogonal, in which case ordinary least squares (OLS) would not be consistent. The error contains all influences on returns other than the proxy. This implies it will include the 'normal returns', $E[\text{Returns over window}|\text{No announcement}]$, which capture factors that influence returns even if the announcement had not

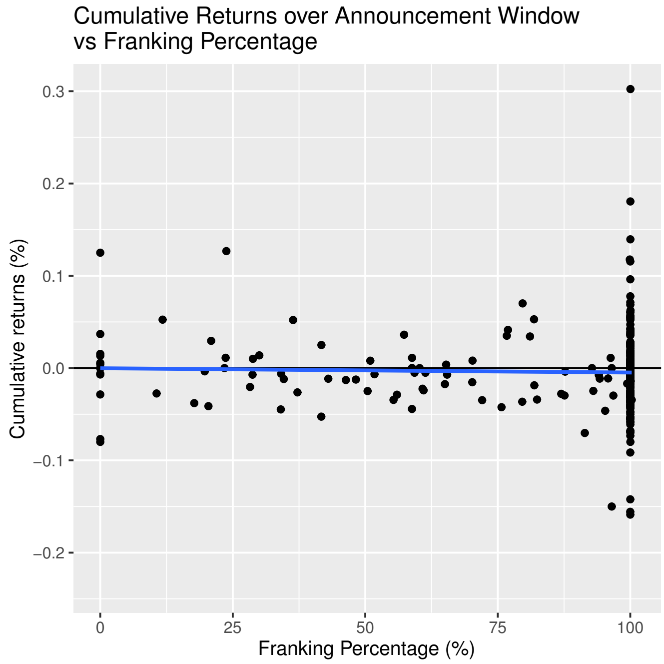


Figure 7.1

occurred. Orthogonality will fail if the normal returns are correlated with proxy, which could occur for a variety of reasons. For example, suppose that Australian financial companies tend to have high systematic risk, and make higher normal returns as a result. Since financial companies tend to have a high past franking percentage (see figure 6.1), there will be a positive correlation between normal returns and franking percentage. The second limitation is that the error is likely to be correlated across firms due to factors that affect many firms simultaneously. For example, an increase in iron ore would increase the returns of many different mining firms. These limitations motivate the panel data method used in this thesis.

7.2 Overview of the Panel Data Method

This thesis uses a panel data method similar to that used in other event studies. Specifically, it estimates a single panel data regression of the returns on individual shares against the market return, event dummies, and interactions of the event dummies and firm characteristics. The coefficients on the interaction terms provide an estimate of the relationship between abnormal returns and firm characteristics.

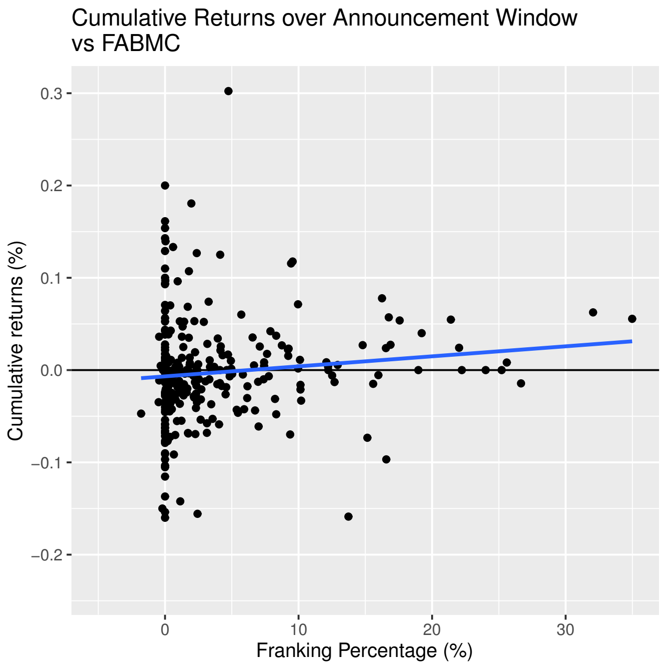


Figure 7.2

Auerbach and Hassett (2005) used this kind of method to show that abnormal returns of US shares following news of a dividend tax cut were positively related to dividend yield. Using this method, I test whether the abnormal returns of Australian shares after Labor's announcement are negatively related to each of the two proxies for future franking credit distributions.

To understand the panel data method, suppose there is only one event window, and it comprises a single day t^*. Consider the following 'CAPM-inspired' specification:[1]

$$r_{i,t} = \alpha_i + m_t\beta_i + D_t\gamma_i + v_{i,t}$$

where:

- $r_{i,t}$ is the return on share i on day t
- α_i is a firm fixed effect
- m_t is the return on the share market as a whole

[1]This model does not include the risk-free rate. It is therefore closer to the Black CAPM, which does not have any special role for the risk-free rate, rather than the Sharpe-Litner CAPM, where the risk-free rate appears on both sides of the equation (Fama and French 2004).

- β_i is the coefficient on the market return
- D_t is a dummy that equals 1 on the event date and 0 otherwise
- γ_i is the coefficient on the dummy
- $v_{i,t}$ is an error term

First, suppose this model was used to study an event that had a negligible effect on the market return, such as a reform that only affects firms in a specific industry. In this case, the estimate of the first two terms, $(\hat{\alpha}_i + m_t\hat{\beta}_i)$ can be be viewed as an estimate of the 'normal' return, since it is the return that the share would be expected to have absent the event. The estimate of the term, $D_t\hat{\gamma}_i$, will equal the difference between actual returns and normal returns on the event date, t^*. Hence it can be viewed as an estimate of the 'abnormal' return.

$$D_t\hat{\gamma}_i = r_{i,t^*} - (\hat{\alpha}_i + m_t\hat{\beta}_i)$$

Now suppose the model was used to study an event that may have affected the market return m_t. This is true of the US dividend tax cut studied by Auerbach and Hassett 2005, and may also be true of the franking credits announcement studied by this thesis. If the market return m_t is affected by the event, then the estimated normal return $(\hat{\alpha}_i + m_t\hat{\beta}_i)$ will also be affected by the event. As a result, the estimated abnormal return $D_t\hat{\gamma}_i$ will not be a good estimate of the causal effect of the event. However, these estimated abnormal returns will still be informative regarding whether the event caused the share's returns to be higher or lower than what would be expected given the share's correlation with market returns. As such, these abnormal returns will still be useful for studying the relationship between the causal effect of the event and firm characteristics.

The CAPM-inspired specification had a separate abnormal return γ_i for each firm. To study the relationship between abnormal returns and firm characteristics, it is useful to assume the abnormal return is a linear function of a set of firm characteristics. Assume:

$$r_{i,t} = \alpha_i + m_t\beta_i + D_t\gamma + D_t w_i\lambda + v_{i,t}$$

where w_i is some time-invariant firm characteristic. The coefficient γ, is the abnormal return of a firm for whom the firm characteristic is zero. The coefficient λ measures how much higher (or lower) the abnormal return is when the firm characteristic is one unit higher. In this thesis, the firm characteristic of interest is a proxy for future franking credit distributions.

7.3 Specifications

The baseline specification, 7.1, used in this thesis is similar to the equation above. The firm characteristic of interest, w_i is either the first proxy, past franking percentage, or the second proxy, FABMC. The announcement window lasts for 5 days, so there is one dummy for each day, $D_t^1, \ldots, D_t^5$.

The firm characteristics specification, 7.2, builds on the baseline specification by adding interaction terms of a vector of firm characteristics, z_i, and the announcement dummies.

Finally, the full specification, 7.3, extends the firm characteristics specification by adding a vector of returns on other asset classes, q_t.

$$r_{i,t} = \alpha_i + m_t\beta_i + \sum_{j=1}^{5} D_t^j \gamma^j + \sum_{j=1}^{5} D_t^j w_i \lambda^j + v_{i,t} \tag{7.1}$$

$$r_{i,t} = \alpha_i + m_t\beta_i + \sum_{j=1}^{5} D_t^j \gamma^j + \sum_{j=1}^{5} D_t^j w_i \lambda^j + \sum_{j=1}^{5} D_t^j z_i \delta + v_{i,t} \tag{7.2}$$

$$r_{i,t} = \alpha_i + m_t\beta_i + \sum_{j=1}^{5} D_t^j \gamma^j + \sum_{j=1}^{5} D_t^j w_i \lambda^j + \sum_{j=1}^{5} D_t^j z_i \delta + q_t' \phi_g + v_{i,t} \tag{7.3}$$

The purpose of the vector of firm characteristics z_i is to reduce the risk of omitted variable bias. Specifically, the firm characteristics included are those thought to be correlated with the influence of the AIG announcement on returns (see section 4.2.1 for background on AIG). The characteristics include:

- **Dummies for each of the 11 GICS sectors**. These dummies could proxy for differences in the extent to which different industries are expected to invest in assets that qualify for AIG.

- **Capital expenditure (capex) as a share of market capitalisation**. Current capex is likely to be correlated with expected future capex, and hence the benefit of AIG.

- **Net fixed assets as a share of market capitalisation**. Net fixed assets reflects the effects of past capex, so it may be correlated with future capex and hence the benefit of AIG.

The inclusion of these firm characteristics may also help mitigate omitted variable bias arising from other sources. For example, a number of news stories about misconduct in the banking industry were published during the announcement window (see Appendix B). The industry dummies should control for the returns of banks being lower due to these news stories, which stops these lower returns being erroneously attributed to the tendency of Australian banks to have large FAB.

The purpose of including the returns in other asset classes q_t is to control for common sources of variation in the returns of many different shares (see section 6.2) for a list of assets). If this is not done, the errors of firms in different industries may be correlated, in which case the standard errors may not be appropriate, leading to incorrect inferences. The vector of coefficients on these other assets, ϕ_g, is allowed to differ by industry. This allows for the possibility that, for instance, an increase in crude oil prices raises the returns of firms in the materials sector firms but reduces the returns of firms in the consumer discretionary sector.

7.4 Estimation and Inference

7.4.1 Estimation of the Coefficients

The assumptions made about the panel data models inform the chosen methods for estimating the coefficients and computing the standard errors. Assume:

- Strict exogeneity. i.e. The conditional expectation of the error given the regressors is zero.

- Errors are clustered at the industry level. This allows for heteroscedasticity, serial correlation of the error for a given firm, and correlation between the errors of different firms in the same industry.

- Fixed effects[2]

All three specifications were estimated by the within groups estimator. That is, each specification was transformed by expressing variables as deviations from their firm-specific means, and then the transformed specification was estimated by OLS.

The model contains individual-invariant regressors m_t, D_t, but does not contain time fixed effects. A model with both individual-invariant regressors and time effects would have had perfect multi-collinearity problems (see Chapter 5, Biorn 2016). Intuitively, it would be impossible to determine whether variation in the dependent variables was due to variation in the individual-invariant regressors or due to the time fixed effects. Time fixed effects are not included in the model, because obtaining estimates of the coefficients on the individual-invariant regressors is important in this setting.

7.4.2 Computation of the Standard Errors

Cluster-robust standard errors are computed, with clusters defined at the level of the 53 GICS industries. The GICS classifies firms at varying level of aggregation, ranging from sub-industries up to sectors, meaning that larger or smaller cluster sizes are possible. Choosing larger clusters has both benefits and costs:

- The benefit of allowing for larger clusters is that it represents a weaker assumption about the error covariance matrix. In economic terms, it allows for the possibility that firms that are more distinct from each other have correlated errors. For example, errors clustered at the GICS sub-industry level allow for errors to be correlated across firms in 'Oil & Gas Drilling'

[2] As there are many time periods in the sample, T, the loss of degrees of freedom due to having to estimate N fixed effects is small relative to the total sample size NT. This loss of degrees of freedom is a price worth paying to avoid making the restrictive assumption that the individual-specific effects $\alpha_1, \ldots, \alpha_N$ are uncorrelated with the regressors.

sub-industry, while errors clustered at the GICS industry level allow for errors to be correlated across the 'Energy Equipment & Services' industry, which is broader.

- The cost of larger clusters is that it reduces the number of clusters. My chosen method of computing the standard errors is consistent as the number of clusters approaches infinity. If the number of clusters is too small, the standard errors may be very imprecise.

It is not easy to trade off these considerations. Cameron and D. L. Miller (2015) say that one reasonable approach is to compute the standard errors on progressively more aggregated levels, and then stop when the standard errors stop changing substantially. When I performed this exercise, the standard errors changed noticeably as I moved from clustering at the firm level to the GICS sub-industry level, and again as I moved to clustering at the GICS industry level. However, the standard errors were little affected by clustering at higher levels of aggregation. Hence, I have decided to compute standard errors clustered at the level of the GICS industries. The sample used in this thesis contains data on firms in 53 GICS industries.

Analysis on 'few' clusters can be a source of econometric difficulties. The first issue is the computation of the standard errors. The 'uncorrected' formula for cluster-robust standard errors tends to be downwardly biased when there are few clusters. To remedy this, I used the formula with the finite-sample correction in equation (12) of Cameron and D. L. Miller (2015). The second issue relates to hypothesis testing. Whenever I test the hypothesis that an individual coefficient is zero, I assume the Wald statistic has a student t distribution with $(G-1) = (53-1)$ degrees of freedom. If I had instead used a student t distribution with degrees of freedom based on the number of observations, the distribution would have had thinner tails, leading to understated p-values. Although the methods in this thesis were implemented in R, both of these choices mimic the defaults in Stata.

7.4.3 Cumulative Abnormal Returns

To assess the total effect of the announcement on share prices over the announcement window, one should calculate cumulative abnormal return (CARs). The CAR from day 1 to j is the sum of the abnormal returns from those days. Define:

- $\Gamma^j = \gamma^1 + ... + \gamma^5$ for each j. This is the CAR of a firm for which the proxy is zero.
- $\Lambda^j = \lambda^1 + ... + \lambda^5$ for each j. This is the increase in CAR associated with a 1 percentage point increase in the proxy.

The results that follow focus on the estimates of $\Lambda^1, ..., \Lambda^5$, since these are estimates of the relationship between CARs and the proxy, and hence are most relevant to testing whether the reform affected share prices.[3]

[3]The point estimates of Λ^j can be given by adding the point estimates of λ^j. To compute the standard errors one must account not only for the variances of each λ^j, but also the correlations between them. Salinger (1992) suggests rearranging the regression equation before estimation, so that when the rearranged equation is estimated, it provides estimates of Λ (along with appropriate standard errors) rather than λ. The results in this thesis were produced by rearranging the specifications in this way.

8 Results

If the announcement reduced share prices, then CARs should be negatively related to the proxies for future franking percentage. To test this, the three specifications were estimated for the first proxy, past franking percentage, and then separately for the second proxy, FABMC. All of these specification contain hundreds of coefficients, so I only report the coefficients on the interaction of CARs and the proxy $\Lambda^1, ..., \Lambda^5$. The focus is on Λ^5, which is the increase in the CAR over the 5-day event window associated with a 1 percentage point increase in the proxy. The results do not provide any evidence that these coefficients are negative, and hence do not provide evidence that Labor's announcement reduced share prices.

8.1 Results using Past Franking Percentage as a Proxy

Across all three specifications, the point estimates of each of the coefficients of $\Lambda^1, ..., \Lambda^5$ were close to zero (Table 8.1). Moreover, none of the coefficients were different from zero at a 5% level of significance. These results do not provide any evidence that a firm's CARs were negatively related to a firm's past franking percentage over the announcement window. Hence they also do not any provide evidence for the alternative hypothesis that dividend taxes reduce share prices.

The confidence intervals are somewhat wide, especially by the fifth day of the window, as highlighted by figure 8.1. For example, the 95% confidence interval for Λ^5 in the baseline specification is $[-0.026, 0.003]$. The lower bound estimate of $\Lambda^5 = -0.026$ suggests that, if a firm's franking percentage were somehow increased by 10 percentage points, that would result in a 0.26 percentage point reduction in returns over the announcement window, whichis not trivial.

Due to this issue, the method cannot discriminate between models where the reform has zero effect on prices (such as Boadway and Bruce (1992), where foreigners are 'the' marginal investor) or where it has a trivial effect on prices (such as Brennan (1970), where Australians' influence share prices, but only in proportion to their reflects their small share of world wealth). It also does not refute a model in which Australians have a non-trivial but modest effect. However, if Australians had a large influence on Australian share prices, as in models where they are 'the' marginal investor, then this method would be likely to correctly reject the null hypothesis of no effect.

Dependent variable: Share returns, r_(i, t)

	Baseline Specification	Firm Characteristics Specification	Full Specification
Franking_percentage : CAR_day_1	0.0036	0.0031	0.0032
	(0.0045)	(0.0061)	(0.0062)
	0.4268	0.6128	0.6028
Franking_percentage : CAR_day_2	0.0019	0.0065	0.0067
	(0.0036)	(0.0057)	(0.0059)
	0.6068	0.2644	0.2608
Franking_percentage : CAR_day_3	0.0029	0.0105	0.0108
	(0.0049)	(0.0086)	(0.0088)
	0.5516	0.2298	0.2247
Franking_percentage : CAR_day_4	0.0011	0.0053	0.0058
	(0.0044)	(0.0083)	(0.0085)
	0.8126	0.5260	0.4935
Franking_percentage : CAR_day_5	-0.0116	-0.0133	-0.0125
	(0.0074)	(0.0119)	(0.012)
	0.1207	0.2691	0.3013
Firm-specific fixed effects, α_i	Yes	Yes	Yes
Firm-specific betas, β_i	Yes	Yes	Yes
Controls for firm characteristics	No	Yes	Yes
Controls for returns on other assets	No	No	Yes
N	99162	91390	77057
R2	0.047	0.053	0.069

Cluster-robust standard errors are in brackets.
* significant at 10%, ** significant at 5%, *** significant at 1%

Table 8.1

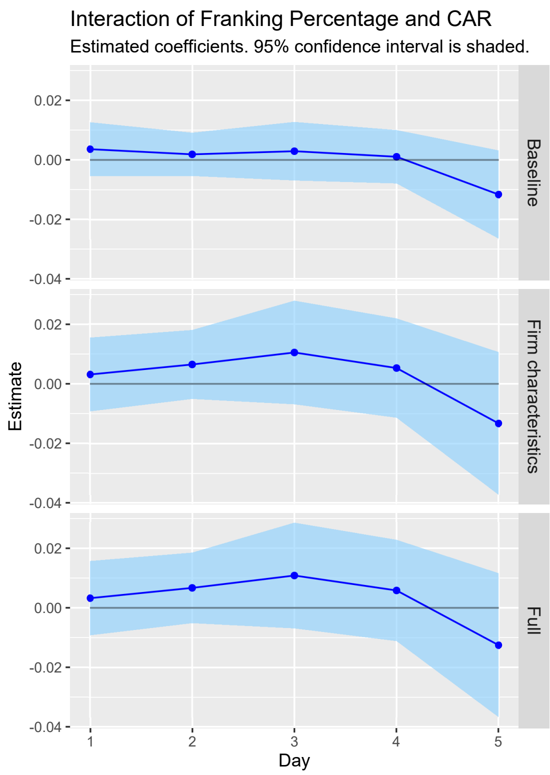


Figure 8.1

8.2 Results using FABMC as a Proxy

The previous section did not find any evidence that CARs were negatively related to the first proxy, past franking percentages. This section shows that there is no evidence that CARs are related to FABMC either. Across all three specifications, the point estimates of each of the coefficients of $\Lambda^1, ..., \Lambda^5$ were close to zero and generally slightly positive (Table 8.2). None were different from zero at a 5% level of significance. Hence these results do not provide any evidence that cumulative returns were negatively related to FABMC, and hence no evidence for the alternative hypothesis that dividend taxes reduce share prices.

Once again, the confidence intervals are fairly wide, especially at the end of the horizon, as highlighted by figure 14. In the full specification, the confidence interval for Λ^5 is $[-0.044, 0.185]$. The lower bound estimate of -0.044 implies that if a firm's FABMC were 10 percentage points higher, then cumulative returns over the window would be 0.44 percentage points lower, which is not trivial.

Dependent variable: Share returns, r_(i, t)

	Baseline Specification	Firm Characteristics Specification	Full Specification
FABMC : CAR_day_1	0.0359 *	0.0363	0.0346
	(0.0187)	(0.0229)	(0.0225)
	0.0602	0.1185	0.1306
FABMC : CAR_day_2	0.0273	0.0077	0.0041
	(0.0216)	(0.0239)	(0.0241)
	0.2116	0.7493	0.8651
FABMC : CAR_day_3	0.0457	0.0316	0.0268
	(0.0315)	(0.0418)	(0.0434)
	0.1531	0.4536	0.5389
FABMC : CAR_day_4	0.0384	-0.0061	-0.0111
	(0.0498)	(0.0391)	(0.0376)
	0.4440	0.8762	0.7694
FABMC : CAR_day_5	0.0707	0.0356	0.0300
	(0.0584)	(0.0548)	(0.0518)
	0.2312	0.5187	0.5644
Firm-specific fixed effects, α_i	Yes	Yes	Yes
Firm-specific betas, β_i	Yes	Yes	Yes
Controls for firm characteristics	No	Yes	Yes
Controls for returns on other assets	No	No	Yes
N	117732	113387	95583
R2	0.028	0.030	0.044

Cluster-robust standard errors are in brackets.
* significant at 10%, ** significant at 5%, *** significant at 1%

Table 8.2

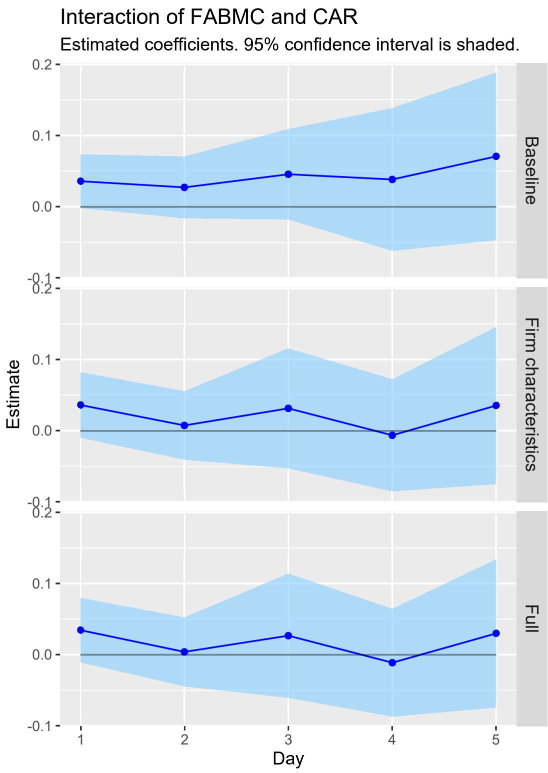


Figure 8.2

9
Robustness Checks

9.1 Discrete Proxies

The first proxy was past franking percentage. Most of the variation in this proxy was concentrated at the extremes, with the majority of firms having a franking percentage 100% (Figure 5.1). It is possible that investors view these firms as qualitatively different to other firms. For this reason, all three specifications were estimated with a dummy variable that equals 1 if a firm's franking percentage is 100% and 0 otherwise. There was no evidence that CARs were negatively related to this discrete proxy (Figure 9.1)

A similar issue arises in the context of the second proxy. The majority of firms had a FABMC of 0% (Figure 5.2). The influence of FABMC on investor's expectations of future franking percentage may not be smooth. Recall that a firm with a FABMC of 0% may have a franking percentage of anywhere between 0% and 100%, while a firm with any positive amount of FABMC almost always has a franking percentage of 100%. Motivated by this, all three specifications were estimated with a dummy variable that equals 1 if a firm's FABMC is positive and 0 otherwise. These results do not provide any evidence that CARs are related to the second discrete proxy (Figure 9.2).

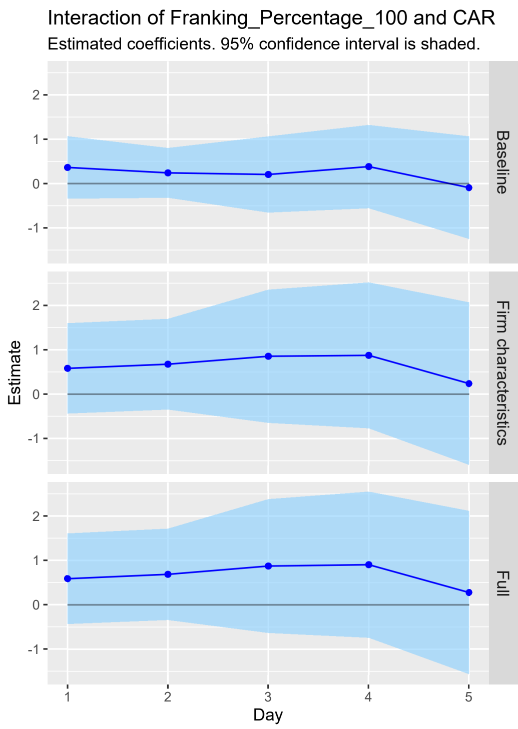


Figure 9.1

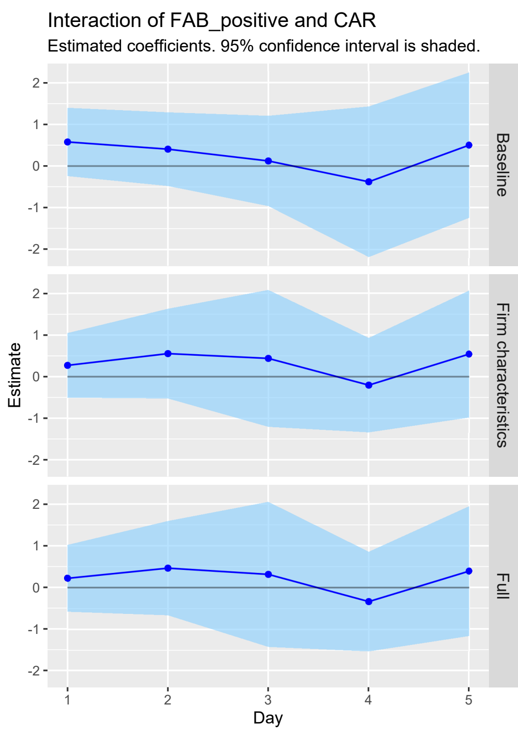


Figure 9.2

9.2 Results for Other Event Windows

The previous sections presented results for the announcement window, as this window is the ideal setting in which to test whether the franking credit policy affected share prices (see section 4). However, it is possible to extend the methods used earlier to simultaneously estimate the CARs for all three windows. This is done by simply adding dummies to the previous specifications. For example, the baseline specification can be written:

$$r_{i,t} = \alpha_i + m_t\beta_i + \sum_{j=1}^{5} D_t^{annt,j}\gamma^{annt,j} + \sum_{j=1}^{5} D_t^{pension,j}\gamma^{pension,j} + \sum_{j=1}^{5} D_t^{elect,j}\gamma^{elect,j}$$
$$+ \sum_{j=1}^{5} D_t^{annt,j} w_i \lambda^{annt,j} + \sum_{j=1}^{5} D_t^{pension,j} w_i \lambda^{pension,j} + \sum_{j=1}^{5} D_t^{elect,j} w_i \lambda^{elect,j} + v_{i,t}$$

where:

- $D_t^{annt,1}, ..., D_t^{annt,5}$ are dummies for each day in the announcement window
- $D_t^{pension,1}, ..., D_t^{pension,5}$ are dummies for each day in the pension window
- $D_t^{elect,1}, ..., D_t^{elect,5}$ are dummies for each day in the election

A usual, if dividend taxes reduce share prices, then CARs over the announcement window should be negatively related to the proxy, $\Lambda^{annt,5} < 0$. However, the pension window covers a period in which Labor announced an exemption for pensioners. If dividend taxes reduce share prices, then CARs over the pension window should be *positively* related to the proxy. Similarly, the election window covers a time in which the probability of the franking credit policy fell dramatically. Hence if dividend taxes reduce share prices, then CARs over the election window should also be positively related to the proxy.

9.2.1 Results for Past Franking Percentage

There is no evidence of a negative relationship between CARs during the announcement window and past franking percentage, consistent with the results of earlier sections. Moreover, there is no evidence that CARS were positively related to past franking percentage during the pension window. This is not surprising, as the pension window covers a period during which investor's beliefs about the policy changed in a fairly small way, so any effect of the change on share prices is likely to be hard to detect.

In the baseline specification, there is strong evidence of a positive relationship between CARs and past franking percentage. However, this evidence is not present in the firm characteristics specification (7.2) or the full specification (7.3). This suggests that the positive coefficient on the interaction of CARs and past franking percentage is the result of omitted variable bias. The election changed investor's beliefs about franking credit policy, but it also changed their beliefs regarding a wide variety of other policies. The influence of these other policies on returns over the election window is correlated with firm characteristics, such as their GICS sector, market capitalisation and capital expenditure. Since the baseline specification omits these characteristics, and they are correlated with past franking percentage, it mistakenly suggests that the franking credit policy raised returns.

9.2.2 Results for FABMC

The results for FABMC are broadly similar. There is no evidence that CARs are negatively related to FABMC during the announcement window, or that they are positively related to FABMC during the pension window. Once again, in the baseline specification CARs are positively related to FABMC during the election window. However, in the firm characteristics and full specification the estimated relationship between CARs and FABMC at the end of the horizon is almost significant at a 5% level. One could interpret this as tentative evidence that the franking credit policy reduced returns. However, given the large number of other policy changes occurring during the election window, it is likely that the estimates are still affected by omitted variable bias. For example, the Coalition's victory reduced investor's expectations about future taxes on incomes, housing, superannuation funds and trusts. This is likely to increase returns for many shares, but the increase is likely to be smaller for firms that make most of their profits outside Australia. Firms that make most of their profits overseas will pay less Australian company tax, so they

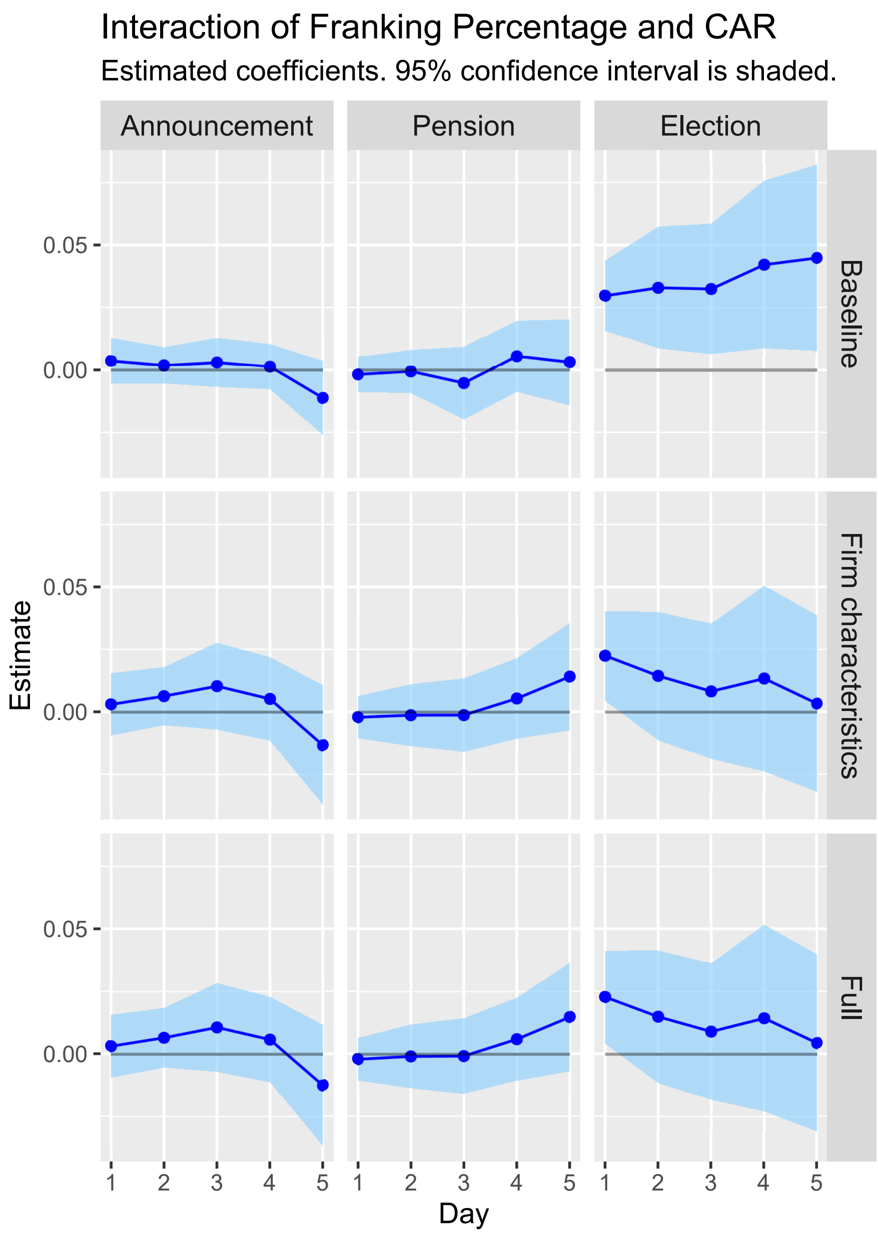
Dependent variable: Share returns, r_(i, t)

	Baseline Specification	Firm Characteristics Specification	Full Specification
Announcement window			
Franking_percentage:CAR_day_1	0.0036	0.0031	0.0032
	(0.0045)	(0.0062)	(0.0062)
Franking_percentage:CAR_day_2	0.0019	0.0064	0.0066
	(0.0036)	(0.0058)	(0.0059)
Franking_percentage:CAR_day_3	0.0030	0.0103	0.0107
	(0.0048)	(0.0086)	(0.0088)
Franking_percentage:CAR_day_4	0.0013	0.0053	0.0058
	(0.0045)	(0.0083)	(0.0085)
Franking_percentage:CAR_day_5	-0.0112	-0.0132	-0.0125
	(0.0074)	(0.0119)	(0.0121)
Pension window			
Franking_percentage:CAR_day_1	-0.0018	-0.0020	-0.0020
	(0.0035)	(0.0042)	(0.0042)
Franking_percentage:CAR_day_2	-0.0006	-0.0012	-0.0008
	(0.0043)	(0.0061)	(0.0063)
Franking_percentage:CAR_day_3	-0.0052	-0.0012	-0.0007
	(0.0072)	(0.0073)	(0.0075)
Franking_percentage:CAR_day_4	0.0055	0.0054	0.0060
	(0.0071)	(0.008)	(0.0082)
Franking_percentage:CAR_day_5	0.0031	0.0141	0.0148
	(0.0085)	(0.0107)	(0.0108)
Election window			
Franking_percentage:CAR_day_1	0.0298 ***	0.0224 **	0.0228 **
	(0.007)	(0.0089)	(0.0093)
Franking_percentage:CAR_day_2	0.0330 ***	0.0144	0.0150
	(0.0121)	(0.0128)	(0.0132)
Franking_percentage:CAR_day_3	0.0325 **	0.0083	0.0090
	(0.013)	(0.0134)	(0.0136)
Franking_percentage:CAR_day_4	0.0422 **	0.0134	0.0144
	(0.0167)	(0.0185)	(0.0186)
Franking_percentage:CAR_day_5	0.0449 **	0.0034	0.0044
	(0.0185)	(0.0176)	(0.0176)
Firm-specific fixed effect, α_i	Yes	Yes	Yes
Firm-specific betas, β_i	Yes	Yes	Yes
Controls for firm characteristics	No	Yes	Yes
Controls for returns on other assets	No	No	Yes
N	99162	91390	77057
R2	0.048	0.060	0.077

Cluster-robust standard errors are in brackets.

Table 9.1

will tend to have lower FABMC. This would cause a positive correlation between returns and FABMC, even if dividend taxes do not affect share prices.



Interaction of Franking Percentage and CAR
Estimated coefficients. 95% confidence interval is shaded.
Announcement
Pension
Election
Baseline
Firm characteristics
Full
Estimate
0.05
0.00
Day
1
2
3
4
5

Figure 9.3

Dependent variable: Share returns, r_(i, t)

	Baseline Specification	Firm Characteristics Specification	Full Specification
Announcement window			
FABMC : CAR_day_1	0.0367 *	0.0368	0.0351
	(0.0187)	(0.0228)	(0.0225)
FABMC : CAR_day_2	0.0287	0.0084	0.0049
	(0.0217)	(0.0238)	(0.0241)
FABMC : CAR_day_3	0.0479	0.0329	0.0283
	(0.0317)	(0.0423)	(0.044)
FABMC : CAR_day_4	0.0420	-0.0035	-0.0080
	(0.0498)	(0.0394)	(0.0381)
FABMC : CAR_day_5	0.0756	0.0392	0.0343
	(0.0583)	(0.0546)	(0.0516)
Pension window			
FABMC : CAR_day_1	0.0062	-0.0283	-0.0296
	(0.0358)	(0.0397)	(0.0404)
FABMC : CAR_day_2	0.0062	-0.0223	-0.0228
	(0.0493)	(0.0643)	(0.0651)
FABMC : CAR_day_3	0.0136	-0.0417	-0.0443
	(0.0593)	(0.0823)	(0.0843)
FABMC : CAR_day_4	0.0700	0.0146	0.0100
	(0.0699)	(0.0935)	(0.0958)
FABMC : CAR_day_5	0.1048	0.0435	0.0379
	(0.0723)	(0.0977)	(0.1009)
Election window			
FABMC : CAR_day_1	0.1152 ***	0.1205 ***	0.1235 ***
	(0.0423)	(0.0343)	(0.0338)
FABMC : CAR_day_2	0.1363 ***	0.0972 **	0.1000 **
	(0.0442)	(0.0403)	(0.0408)
FABMC : CAR_day_3	0.1748 ***	0.1615 **	0.1645 **
	(0.0606)	(0.0683)	(0.0689)
FABMC : CAR_day_4	0.2701 **	0.2712 *	0.2732 *
	(0.1041)	(0.1448)	(0.1453)
FABMC : CAR_day_5	0.2837 ***	0.2787 **	0.2791 **
	(0.0967)	(0.138)	(0.1386)
Firm-specific fixed effect, α_i	Yes	Yes	Yes
Firm-specific betas, β_i	Yes	Yes	Yes
Controls for firm characteristics	No	Yes	Yes
Controls for returns on other assets	No	No	Yes
N	117732	113387	95583
R2	0.029	0.035	0.050

Cluster-robust standard errors are in brackets.
* significant at 10%, ** significant at 5%, *** significant at 1%

Table 9.2

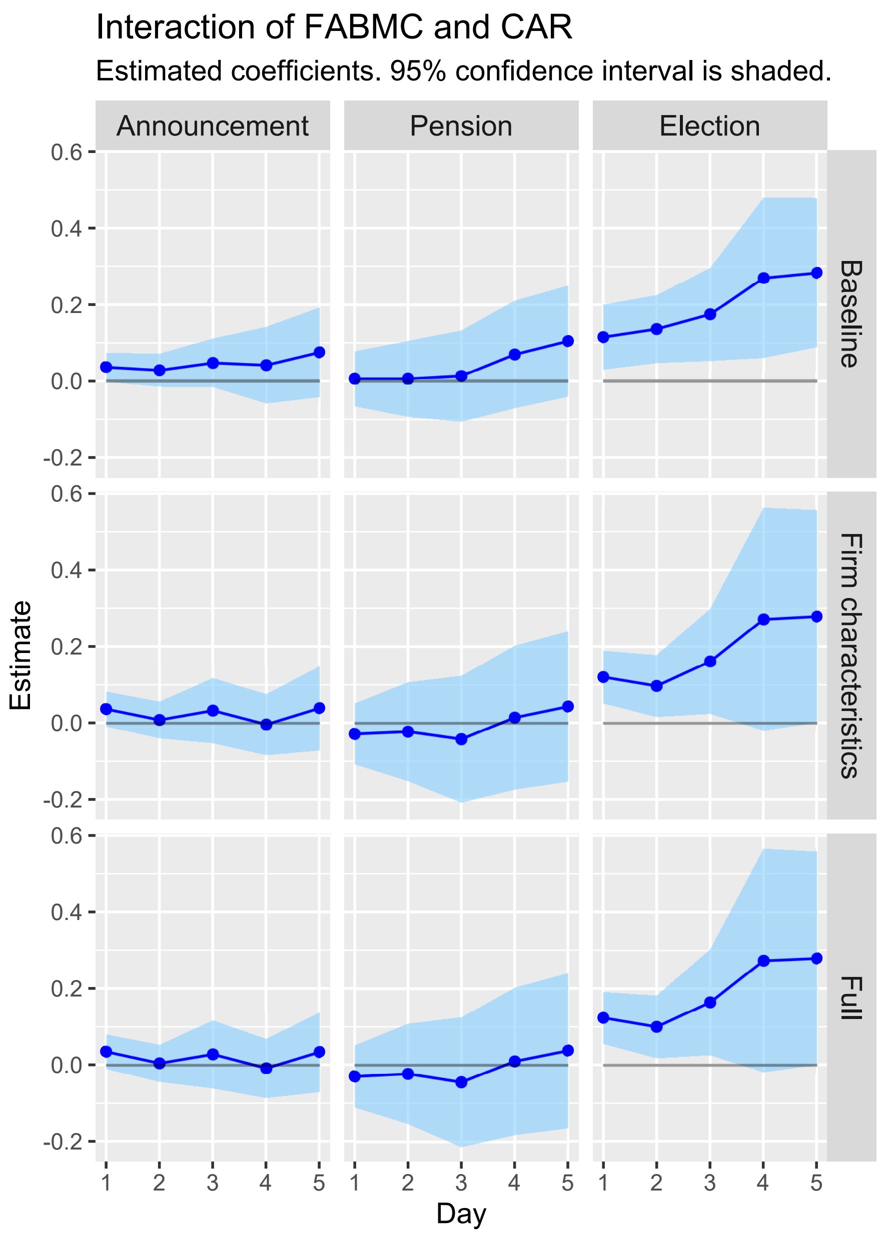

Interaction of FABMC and CAR
Estimated coefficients. 95% confidence interval is shaded.
Announcement
Pension
Election
Baseline
Firm characteristics
Full
Estimate
0.6
0.4
0.2
0.0
-0.2
1
2
3
4
5
Day

Figure 9.4

10
Conclusion

This thesis studies whether dividend taxes reduce share prices. To do this, it conducts an event study of the announcement of a major reform to Australia's dividend imputation system. The reform would have increased the taxation of dividends paid by Australian companies to Australian shareholders, but would not have affected the taxation of dividends paid to foreign shareholders. If the reform had reduced share prices, then firms' CARs during the announcement window should be negatively related to their expected future franking percentage. The results provide no evidence that CARs are negatively related to two reasonable proxies for the future franking percentage. Hence the thesis does not find any evidence that the reform reduced share prices.

The results are consistent with models in which dividend taxes imposed on domestic shareholders have a negligible effect on prices, such as models where the marginal investor is a foreign shareholder, or the tax-adjusted CAPM model of Brennan (1970). However, the results are also compatible with models in which the dividend taxes have a modest effect on share prices, as the methods in this thesis have low power to detect small violations of the null. One way to improve the method is to collect past franking percentages from the Bloomberg and Eikon databases, which typically cover a larger sample of firms than the S&P Capital

IQ database. A larger sample size may result in narrower confidence intervals, enhancing the ability of the method to distinguish between competing models.

Further work could consider the effect of the announcement on firm's dividend behaviour. The franking credit policy would have weakened the preference of domestic investors for receiving dividends over capital gains. Domestic investors may be able to influence firms to behave in ways that do not maximise their share prices (Bond et al. 2005). This suggests that if the franking credit policy were implemented, then the changing tax preference of domestic investors could cause firms to reduce their dividend yields. If investors believed this would result in a change in dividend yields, then it may have affected returns during the announcement window.

Appendices

A

Detail on Labor's proposed policy

This thesis claims that Labor's proposal would have increased the taxes on domestic shareholders, while leaving taxes on foreign shareholders unchanged. This appendix provides a detailed explanation of why. This appendix begins by describing Australia's dividend imputation system. It then explains how the policy would have affected individual taxpayers and superannuation funds. Finally, it discusses the quantitative importance of the policy, taking into account tax planning strategies.

A.1 Illustration of Australia's Dividend Imputation System

Distribution of Franking Credits by a Company

To illustrate, suppose the company makes Australian profits of $\pi > 0$, and pays a statutory rate of $\tau \in [0,1]$. Then:

$$(\text{Franking credits added}) = (\text{Company tax paid}) = \tau\pi$$

Suppose the company distributes all the remaining profits as a cash-dividend. Then:

$$(\text{Dividend amount}) = (\text{Profits after company tax}) = (1-\tau)\pi$$

The company would like to 'fully frank' the dividend, which means it is attaching as many franking credits to the dividend as is allowed under the rules. The maximum amount allowed is:

$$\text{(Maximum amount of credits)} = \text{(Dividend amount)} \times \frac{\tau}{1-\tau} = (1-\tau)\pi \times \frac{\tau}{1-\tau} = \tau\pi$$

That is, if the company fully franks the dividend, it attaches franking credits equal to the amount of company tax paid on the profits that funded that dividend.

Companies can attach franking credits to some other types of payments, such as off-market share buy-backs. The principle behind attaching franking credits to these other payments is similar, but the details are not relevant for this thesis.

Use of the credits by the Australian shareholder

Now suppose the company has one shareholder, who is an Australian resident. Suppose that, in addition to receiving the franked dividend, the individual receives income of ≥ 0 from other sources. The individual must include both the cash amount of the dividend and the amount of any franking credits in their taxable income. Hence, their taxable income is:

$$\text{(Taxable income)} = \underbrace{(1-\tau)\pi}_{\text{Dividend amount}} + \underbrace{\tau\pi}_{\text{Franking credits}} + \underbrace{y}_{\text{Other income}} = \pi + y$$

The individual's personal income tax payable is given by:

$$\text{(Income tax payable)} = f\text{(Taxable income)} - \text{(Franking credit offset)} = f(\pi+y) - \tau\pi \tag{A.1}$$

where $f : \mathbb{R} \to \mathbb{R}$ is a function that calculates the tax payable on a given amount of taxable income.

Total tax on profits

The effect of the system is that these profits are subject to personal tax, but not subject to company tax at all. To see this, note that the total tax collected on these profits is:

$$\begin{aligned}\text{(Total tax on profits)} &= \text{(Company tax)} + \text{(Income tax with dividends)} \\ &\quad - \text{(Income tax without dividends)} \\ &= \tau\pi + f(\pi+y) - \tau\pi - f(y) = f(\pi+y) - f(y)\end{aligned}$$

A.2 The Effect of Labor's Policy on Individuals

Effect on Income Tax Payable

In the status quo the income tax payable by the Australian shareholder is given by equation A.1. For most individual taxpayers, the franking credit offset reduces income tax payable, but to zero. These shareholders do not have excess credits to redeem for cash. However, for some shareholders the offset reduces income tax payable to zero, leaving excess credits, which can then be redeemed for cash.

Labor's proposal was to make the offset 'non-refundable'. i.e. Shareholders would be entitled to use franking credits to reduce income tax payable, but could no longer redeem excess credits for cash. Under this policy, income tax payable would be:

$$\begin{aligned}\text{(Income tax payable)} &= max\left\{f(\text{Taxable income}) - (\text{Franking credit offset}), 0\right\}\\ &= max\left\{f(\pi + y) - \tau\pi, 0\right\}\end{aligned}$$

Most individuals do not have excess credits, so they would not be directly affected. However, individuals with excess credits will see their income tax payable increase. With refundability, their income tax payable is negative, $(f(\pi + y) - \tau\pi) < 0$, but without refundability income tax payable is zero.

Effect on total tax on profits

Labor's policy increases total tax payable on profits distributed to shareholders with low taxable incomes. This is because it leaves the company tax on these profits unchanged, while increasing income tax payable from a negative number to zero. Figure A.1 shows the total tax on profits in the case where the shareholder has no income other than franked dividends, y=0. Whenever the total profits are less than $200,000, the Australian shareholder has excess franking credits. Consequently, whenever profits are below this level, the total tax on profits is higher when these credits are not refundable.

Many shareholders will have substantial other income, $y > 0$. For example, a shareholder of working-age will likely have labour income. These shareholders will

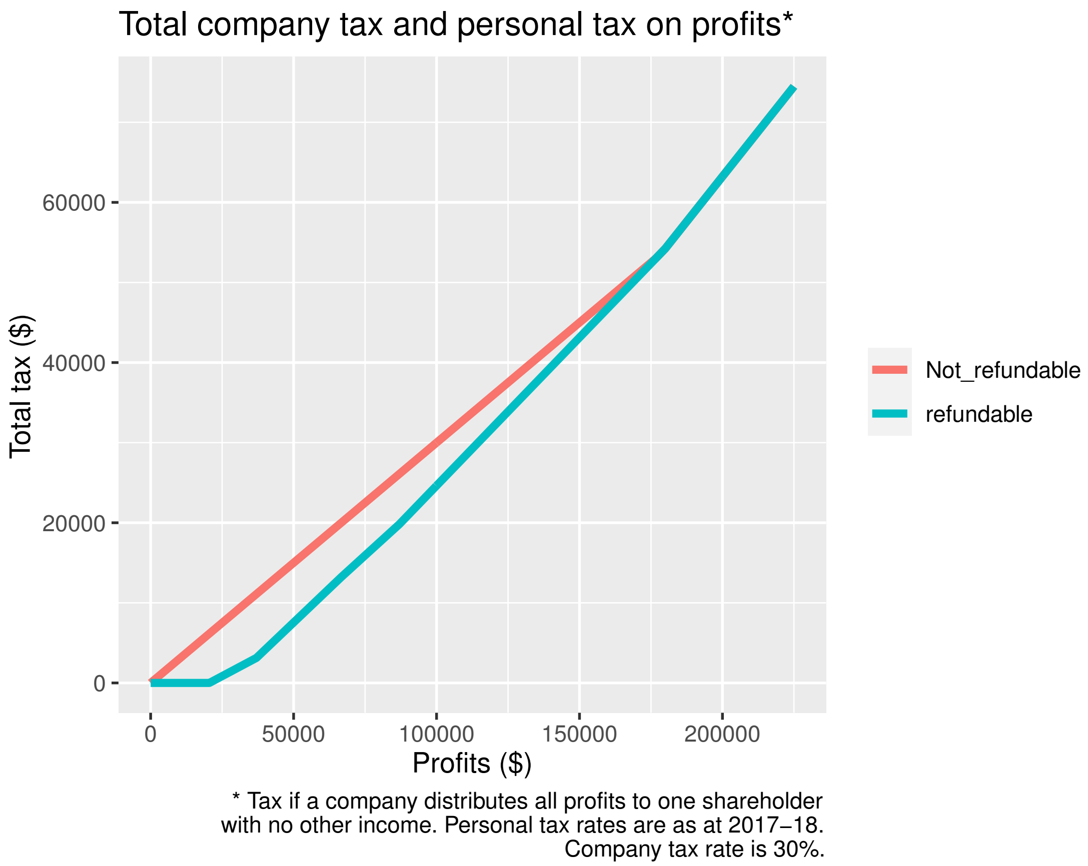


Figure A.1

have fewer excess credits. Consequently, the tax on profits distributed to these shareholders will not increase as much as suggested by Figure A.1.

A.3 The Effect of Labor's Policy on Superannuation Funds

The explanation so far has focussed on individual shareholders. However, Labor's policy would also increase the tax paid on profits distributed to superannuation funds, which are a type of retirement saving account popular in Australia. The amount of assets held is very large, making it the world's fourth largest pension market in 2018 (Willis Towers Watson 2019).

The vast majority of superannuation assets are held by defined contribution funds. In these funds, the member and their employer makes contributions to the fund over the member's life. The fund invests the member's contributions according to the member's chosen asset allocation. Upon retirement, the member's account is used to provide a lump-sum, an income stream, or some combination of the two.[1]

The tax treatment of Australia's superannuation system is complex, as it can be taxed at three stages. The system can be roughly described as a taxed-taxed-exempt ('TTE') system, since:

- **Contributions are taxed (T)**[2]

- **Investment earnings are usually taxed (T)**. Tax of 15% is payable on earnings of members who are not yet retired ('accumulation members'). However, no tax is payable on earnings of members who retired and receiving an income stream from their account ('pension members')

- **Benefits are usually exempt (E)**

A superannuation fund will have tax liabilities arising from many of its members, and will also receive franking credits on behalf of many members. The fund can apply franking credits of one member to reduce tax liabilities of another member, provided it compensates the first member.

Funds that have a high proportion of pension members tend to have small tax liabilities relative to the franking credits received, as the earnings of pension members are not taxed. These funds often have substantial excess credits. Usually these are 'self-managed superannuation funds', which are funds with at most four members. Occasionally they are Australian Prudential Regulation Authority regulated superannuation funds, which can have an unlimited number of members.

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[1] A minority of Australians have defined benefit funds, where the member makes contributions, and the fund commits to pay benefits according to some formula (say, based on years of service and salary in last year of work). The fund invests the contributions in various assets, and uses those assets to pay the benefits. I do not discuss defined benefit funds in this thesis.

[2] The contributions are either paid out of the member's before-personal-tax income (in which case they are subject to a 15% tax as they enter the fund), or they are paid out of the member's after-tax income.

A.4 Quantitative Importance of the Policy

If Labor's policy were implemented, and there were no behavioural response, it would raise revenue equal to the amount of excess franking credits. In the 2014-15 financial year, individuals claimed a total of 2.0 billion AUD of excess franking credits, while superannuation funds claimed 2.9 billion (Parliamentary Budget Office 2018). Hence, absent a behavioural response the total amount that would have been raised in that year was 4.9 billion, which is equal to 84% of taxes on superannuation funds, and 7.5% of company tax in that year (figure 3.2).

The actual amount of revenue raised is likely smaller due to two types of behavioural responses:

- Tax planning responses reduce the tax on a given amount of profit distributed by Australian companies to Australian shareholders
- Real behavioural responses reduce the amount of such profit, for example by companies increasing their reliance on debt financing rather than equity financing

I want to understand the extent to which Labor's policy increases the tax paid on a given amount of profit distributed by Australian companies to Australian shareholders. For this purpose, I want to take into account tax planning responses, but not real behavioural responses.

The amount of excess credits provides an estimate of the revenue increase absent any behavioural response. This suggests a revenue increase in 2014-15 of 4.9 billion. The Parliamentary Budget Office produced estimates of the revenue increase in future years in the presence of both tax planning responses and real behavioural responses. They said that their estimates would have been about 15% higher if they had not allowed for these responses. Applying this 15% figure to the amount of excess credits in 2014-15 suggests a revenue increase in 2014-15 of 4.3 billion. Hence, the revenue increase in 2014-15 if one took into account tax planning responses, but not real behavioural responses, is somewhere in the range of 4.3 to 4.9 billion. These estimates suggest that Labor's policy would increase the taxation of domestic shareholders by a substantial amount, even when tax planning responses are taken into account.

B
Newspaper Headlines

I manually recorded the headlines on the front page of each issue of the Australian Financial Review during the announcement window. I classified the headlines into stories related to dividend imputation (indicated in bold) and other stories.

Date	**Headline stories (stories related to franking credits shown in bold)**
Tue, 13 Mar 2018	**‘Labor to cut dividends cash refund’**
	‘ASEAN in struggle to be relevant’
	‘What partner gender gap, asks PwC’
	‘Red hot Emeco talks sale with shareholder’
	‘Cattle rustling: Terra Firma to offload old Packer empire for $1 billion’
Wed, 14 Mar 2018	**‘Labor sets up income tax fight’**
	‘NAB bankers took cash bribes to falsify loans and earn bonuses’
Thu, 15 Mar 2018	**‘Dividend row risk to Labor seat’**
	‘Super fund boost in share shake-up’
	‘Mike Tilley gets behind local cryptoexchange’
	‘China hardliner to replace Rex Tillerson’
	‘Some cricket games could go pay TV way’
	‘Master of the universe: Stephen Hawking’
Fri, 16 Mar 2018	**‘Shorten plan to calm share grab backlash’**
	‘Widodo seeks deeper closer ties with Australia’
	‘On the campaign trail with Jokowi’
	‘PM to boost ASEAN as foil against China’
	‘Singapore doubts US commitment to Asia’
	‘Brokers obsessed by loan commissions’
Sat, 17 Mar 2018	**‘Retirement Collision’**
	‘Wesfarmers throws Coles off the table’
	‘One Nation softens on company tax cuts’
	‘NAB’s big blue’
	‘Russian dossier: The true story of an investigation too hot to handle’
Sun, 18 Mar 2018	No issue published on Sundays
Mon, 19 Mar 2018	**‘Batman win emboldens Labor on shares grab’**
	‘ASEAN’s rival China plan’
	‘ASX tightens listing rules after scandals’
	‘New visa scheme aims to lure global talent’
	‘US Fed’s Powell to lift above RBA’s 1.5pc’
	‘Deadly sins of the banks’

C

Interpretation of $\left(\frac{\mathcal{F}_i}{V_{i,start}}\right)$

Section 5 claimed that the ratio $(\frac{F_i}{V_{i,start}})$ could be interpreted as a measure of future franking percentages. This justify this interpretation, this appendix shows that this ratio is a strictly increasing function of the franking percentage of a dividend payment on any future date.

Model setup

Suppose that on day $t = 1$, Labor both announces its policy and implements it immediately. Let d_t denote the dividend payment (if any) made on date t, and let f_t denote the amount of franking credits attached to dividend payments on that date. Let τ denote the statutory tax rate applicable to the company. Then the franking percentage on a given day, denoted ρ_t, is defined:

$$\rho_t \equiv \frac{f_t}{(\frac{\tau}{1-\tau})\times d_t}$$

With this definition, the expected present value of franking credits distributed by the firm, F_i, is:

$$F_i = E\left[\sum_{t=1}^{\infty} \frac{1}{(1+r)^t}\left(\frac{\tau}{1-\tau}\right) d_t \rho_t\right]$$

where r is a constant nominal discount rate.

The denominator is the market capitalisation of the firm. Investors value future dividends. Suppose that the representative investor also places a value of $\theta \in [0,1]$ on each dollar of franking credits received.[1] Then market capitalisation will approximately equal the expected present value of dividends and franking credits received.

$$V_{i,start} = E\left[\sum_{t=1}^{\infty} \frac{1}{(1+r)^t}\left(d_t + \theta\left(\frac{\tau}{1-\tau}\right) d_t\rho_t\right)\right]$$

The ratio $\left(\frac{F_i}{V_{i,start}}\right)$ is:

$$\frac{F_i}{V_{i,start}} = \frac{E\left[\sum_{t=1}^{\infty} \frac{1}{(1+r)^t}\left(\frac{\tau}{1-\tau}\right) d_t\rho_t\right]}{E\left[\sum_{t=1}^{\infty} \frac{1}{(1+r)^t}\left(d_t + \theta\left(\frac{\tau}{1-\tau}\right) d_t\rho_t\right)\right]}$$

Claim: This ratio is strictly increasing in the franking percentage ρ_k of any given future period $t = k$.

Proof: Differentiating with respect to k gives:

$$\frac{\partial\left(\frac{F_i}{V_{i,start}}\right)}{\partial\rho_k} = \frac{V_{i,start}\cdot\frac{\partial F_i}{\partial\rho_k} - F_i\cdot\frac{\partial V_{i,start}}{\partial\rho_k}}{V_{i,start}^2} \tag{C.1}$$

To compute this, I first compute:

$$\begin{aligned}\frac{\partial F_i}{\partial\rho_k} &= \frac{\partial}{\partial\rho_k}E\left[\sum_{t=1}^{\infty} \frac{1}{(1+r)^t}\left(\frac{\tau}{1-\tau}\right) d_t\rho_t\right]\\ &= E\left[\frac{\partial}{\partial\rho_k}\sum_{t=1}^{\infty} \frac{1}{(1+r)^t}\left(\frac{\tau}{1-\tau}\right) d_t\rho_t\right]\\ &= E\left[\frac{1}{(1+r)^t}\left(\frac{\tau}{1-\tau}\right) d_k\right]\end{aligned} \tag{C.2}$$

and:

$$\begin{aligned}\frac{\partial V_{i,start}}{\partial\rho_k} &= \frac{\partial}{\partial\rho_k}E\left[\sum_{t=1}^{\infty} \frac{1}{(1+r)^t}\left(d_t + \theta\left(\frac{\tau}{1-\tau}\right) d_t\rho_t\right)\right]\\ &= E\left[\frac{\partial}{\partial\rho_k}\sum_{t=1}^{\infty} \frac{1}{(1+r)^t}\left(d_t + \theta\left(\frac{\tau}{1-\tau}\right) d_t\rho_t\right)\right]\\ &= E\left[\frac{1}{(1+r)^t}\theta\left(\frac{\tau}{1-\tau}\right) d_k\right]\end{aligned} \tag{C.3}$$

[1] Brennan (1970) implies that θ is close to 0, as share prices are determined almost entirely by foreign investors. Monkhouse (1993) argued that θ is not too close to either 0 or 1.

Calculating both of these derivatives required interchanging differentiation and the expectation operator, which is possible due to Leibniz's rule.

Comparing equation C.2 and C.3 shows that:

$$\frac{\partial F_i}{\partial \rho_k} = E\left[\frac{1}{(1+r)^t}\left(\frac{\tau}{1-\tau}\right)d_k\right] \geq E\left[\frac{1}{(1+r)^t}\theta\left(\frac{\tau}{1-\tau}\right)d_k\right] = \frac{\partial V_{i,start}}{\partial \rho_k} \quad \text{for all} \quad \theta \in [0,1]$$

Similarly:

$$V_{i,start} > F_i \quad \text{for all} \quad \theta \in [0,1]$$

Together these statements imply that:

$$V_{i,start}.\frac{\partial F_i}{\partial \rho_k} > F_i.\frac{\partial V_{i,start}}{\partial \rho_k}$$

Hence, an increase in the franking percentage of year $t = k$ results in an increase in the ratio, regardless of the value of $\theta \in [0,1]$.

$$\frac{\partial\left(\frac{F_i}{V_{i,start}}\right)}{\partial \rho_k} = \underbrace{\frac{1}{V_{i,start}^2}}_{\geq 0} \times \underbrace{V_{i,start}.\frac{\partial F_i}{\partial \rho_k} - F_i.\frac{\partial V_{i,start}}{\partial \rho_k}}_{>0} > 0$$

D

Detail on Panel Dataset

D.1 The Sample of Companies

I used the Equity Screening function in Bloomberg to generate a list of tickers that refer to all securities listed on the Australian Securities Exchange (ASX) on 13 March 2018. This resulted in a set of 2515 tickers. I extracted those tickers whose security type was 'common stock'. This is done for two reasons.

Firstly, The theory in this thesis predicts that if Labor's announcement reduced share prices, then returns during the announcement window should be negatively related to the proxies for franking credit distributions. This prediction does not necessarily apply to the returns of other securities, such as bonds or units in trusts. As such, data on these other securities is not informative regarding whether Labor's policy affected share prices. Secondly, some of these securities represent part ownership of a fund that will itself own shares in Australian companies. Examples include closed end funds and ETFs. If these securities are included in the sample it may introduce correlation between the errors of these securities and those of securities in other industries. This would violate the assumption of clustered errors, making inference based on cluster-robust standard errors invalid.

After extracting the 1995 tickers whose security type was common stock, I performed a number of data cleaning steps. These steps make use of data on prices and trading activity that are described later in this data appendix.

1. I removed companies who did not have a daily return on the announcement date, 13 March 2018. This occurs whenever the closing price is unavailable on 12 or 13 March 2018.

2. I removed companies with fewer than 50 observations of daily returns.

3. I removed companies that were traded fewer than 10 times per trading day on average.[1]

4. I removed companies whose share price was below 0.10 on average.[2] This leaves 618 companies.

5. I removed companies that lacked data on the franking proxy needed. In the case of franking percentage, this results in 274 tickers. In the case of FABMC, this resulted in 338 tickers, of which a further two were removed due to having FABMC above 50%.

D.2 Data on Individual Australian Shares

For each ticker in the sample, I extracted a variety of variables from Bloomberg. First I extracted the Global Industry Classification Standard (GICS) codes. I collected the codes at all four levels of aggregation: sub-industry; industry; industry group; and sector. Second, I extracted daily time series data on each of these tickers. I extracted a variety of different measures of the concepts of interest so that I can compare them. Whenever I extracted data, I ensured it was denominated in Australian dollars. I collected:

[1] The reason for excluding companies with low trading activity is that their daily returns are unlikely to reflect changes in market participant's beliefs in an accurate and timely way. Instead, their returns will often reflect reasons other than fundamentals. For example, if someone bought or sold a substantial amount of illiquid shares, this could push the price of those share quite far from that suggested by its fundamentals.

[2] Bloomberg reports share prices rounded to the nearest whole cent. For companies with very low share prices, if the share price change doesn't cross a rounding barrier, I will calculate a 0% return. However, if it does cross a rounding barrier, I will calculate a very large or very negative return. E.g. If the price changes from 0.0245 to 0.0255, Bloomberg will report a change from 0.02 to 0.03, and I will calculate a 50% return. I want to avoid this source of noise, so I exclude these companies.

- Closing prices. The variable used was BLOOMBERG CLOSE PRICE. I could have used PX CLOSE 1D, but this variable was identical except lagged by one day. I inspected a variety of other measures of closing prices, but they are not available for Australian companies.
- Number of trades. I used NUM TRADE
- Market capitalisation. I used CUR MKT CAP
- Net fixed assets. I used BS NET FIXED ASSET. This is defined as 'Gross fixed Assets less amounts of Accumulated Depreciation.'
- Capital expenditure. I used CAPITAL EXPEND. This is defined as expenditure on tangible fixed assets, though it includes intangible assets for some companies.

The measures of net fixed assets and capital expenditure chosen were those that seemed closest in scope to the capital goods subject to the AIG. This ensures these variables are as effective as possible in controlling for potential omitted variable bias due to the influence of AIG on returns during the announcement window.

D.3 Past Franking Percentages

Franking percentages were calculated from data in S&P Capital IQ. The database contained the four variables listed in this table, which contain data on ordinary dividends only.[3] The databases contains a corresponding set of four variables that contain data on special dividends.

The past franking percentage of a firm is calculated using their franking credits distributed and dividend payments for the last 5 financial years.

$$\frac{\sum_{t=1}^{5}(\text{IQ DPS IMPUTED CRD AMT} + \text{IQ DPS SPEC IMPUTED CRD AMT})}{\sum_{t=1}^{5}(\text{IQ DPS GROSS} + \text{IQ DPS SPEC GROSS}) \times \frac{\tau}{1-\tau}}$$

[3]The descriptions of the ordinary dividend variables do not explicitly state that they refer to ordinary dividends only. However, I determined that they only cover ordinary dividends by comparing these variables with the published financial statements of a number of listed companies.

Code	Title
IQ DPS IMPUTED PCT	Imputation percentage
IQ DPS IMPUTED CRD AMT	Imputation credit amount
IQ DPS GROSS	Gross dividends per share
IQ DPS NET	Net dividends per share

I identified some specific issues with the CIQ data. I was careful to avoid these issues affecting my results, but it makes it appear likely that there are other errors in the CIQ data that are more difficult to detect.

Firstly, I identified one extreme observation, which I removed. Blue Sky Alternative Investments Limited is recorded as having distributed $74,235 franking credits per share in FY2010, which is impossible given that it distributed less than 5 cents in dividends per share that year.

Secondly, I compared CIQ's 'imputation credit percentage' figure with the franking percentage figures I calculated using CIQ's imputation credit amounts and dividend amounts. This revealed that CIQ reports an imputation credit percentage of '0' when a firm did not pay any dividends in that period. It would be better if CIQs described the imputation credit percentage as missing or N/A in this case, as a firm not paying a dividend is a very different situation to a firm paying a dividend and attaching zero credits.

D.4 Franking Account Balances

Measures of Franking Account Balances disclosed by Companies

Each ASX-listed company must publish a Corporations Act annual report, which must include FAB data. ASX-listed companies must also make other disclosures, such as the Appendix 4E half-year report. However, companies are not required to include FAB in these other disclosures, and in practice, few companies choose to do so.

When companies disclose FAB they typically include three measures:

- The franking credit balance on the last date of their financial year (the 'unadjusted' balance)

	CONSOLIDATED	
	June 2018 $000	June 2017 $000
Franking Account Balance:		
The amount of franking credits available for the subsequent financial years are:		
- franking account balance as at the end of the financial year at 30%	**590,529**	564,369
- franking credits that will arise from the payment of income tax payable as at the end of the financial year	**4,900**	36,008
- franking credits that will be utilised in the payment of proposed final dividend	**(85,952)**	(57,243)
The amount of franking credits available for future reporting years	**509,477**	543,134

Table D.1

- Additions to or subtractions from franking credit balance that had not occurred by the end of their financial year, but occurred afterwards or are anticipated to occur afterwards

- The franking credit balance available for future years (the 'adjusted' balance). This equals the unadjusted balance plus the adjustments.

In this thesis, FAB is used as a proxy for a company's expected franking credit distributions. For this purpose, the adjusted balance is most appropriate

Data Sources

I collected FAB data from Bloomberg (which covers 670 companies), from Morningstar (which covers 400 companies), and manual collection from the annual reports of listed companies (for 42 companies). Comparing these data sources revealed some large errors in the Bloomberg data, and some smaller errors in the Morningstar data.

There were a few tickers for which Bloomberg reported FAB that was 1000 times higher than Morningstar or manual collection. An example is Harvey Norman, whose FY2018 annual report contains the following table.

The first row contains unadjusted balances, the second and third rows contain adjustments, and the last row contains adjusted balances. The adjusted balance for June 2017 is 543 million AUD, which differs from Bloomberg which says 543134 million AUD. This is an error by a factor of 1000, which likely arises because Bloomberg thought the figures in the table were in millions rather than in thousands. However, the adjusted balance for June 2018 in Bloomberg is correct.

Another source of errors is the fact that some companies disclose their FAB in a non-standard way. Consider this disclosure in Rio Tinto's FY 2018 report:

"The approximate amount of the Rio Tinto Limited consolidated tax group's retained profits and reserves that could be distributed as dividends and franked out of available credits that arose from net payments of income tax in respect of periods up to 31 December 2018 (after deducting franking credits expected to be utilised on the 2018 final dividend declared) is US$6,178 million."

The manually collected data performs two adjustments to calculate Rio Tinto's FAB. Rio Tinto discloses that its FAB is just sufficient to attach the maximum amount of credits to a US$6,178 million distribution. To calculate its FAB, this amount must be multiplied by $\frac{\tau}{1-\tau} = \frac{0.3}{1-0.3}$, which implies its FAB must be US$2,647 million. This amount must then be converted into AUD using the exchange rate prevailing at the end of the FY2018 financial year, which implies it is A$3,751 million. Due to these kinds of difficulties, Morningstar does not report a FAB for Rio. Bloomberg does report a FAB, but the figure is incorrect as they have not applied the $\frac{0.3}{1-0.3}$ factor.

In this thesis I use manually collected data for the 42 companies. If this is unavailable, I use Morningstar data. If Morningstar is also unavailable, I use Bloomberg. This ensures I use data that is as accurate as possible. A further advantage is that, by manually collecting the data, I can ensure I use adjusted balances rather than unadjusted balances.

D.5 Metadata on Annual Reports

As discussed above, the FAB data in Bloomberg, Morningstar is largely derived from annual reports, and the manually collected data is also derived from annual reports. To make use of this data, I had to collect metadata variables on annual report.

Annual report publication dates

If investors took FAB into account then making trading decisions during the event windows, they will have based their decisions on the latest available FAB data known at the time. Determining what FAB data was known at the time is not trivial, as each company can choose its own financial year, and each can choose when to publish its annual report. To determine the latest annual report that had been published by each company before the announcement date, I collected data on annual report publication dates.

Strictly speaking, I needed data on the publication dates of Corporations Act annual reports, not other periodic disclosures such as Appendix 4D preliminary final reports, because companies typically only disclose their FAB in the Corporations Act annual report. Unfortunately, after investigating the variables in the Bloomberg and Eikon databases, it became that neither database contained a variable that reported the publication date of the Corporations Act annual report specifically. For this reason, I collected these dates from company press releases announcing the publication of this report. These press releases are available on an Australian website for retail investors called Hot Copper.

Presentation currency

A challenge when manually collecting FAB data is that some companies present their financial statements in currencies other than Australian dollars. To facilitate manual collection, I needed data on the 'presentation currency' of each company's annual reports. I collected data on the presentation currency of individual companies from Bloomberg, Reuters, and manual collection from company reports. I found the three measures were usually the same. Differences arose when a company changed their presentation currency from one report to the next. To my knowledge, Bloomberg and Eikon do not allow users to specify a particular year and extract the presentation currency for that year. For this reason, I manually collected the presentation currencies for the specific companies and years needed.

Financial year end dates

When a company reports its FAB as at the end of financial year in foreign currency, it will have converted the FAB amount in AUD to the FAB amount in that currency using the exchange rate prevailing on the end of financial year. To reverse this calculation, I need to know the financial year end date of each company. I collected financial year end dates from Bloomberg, Eikon and manual collection. The three data sources agreed in almost all cases. The differences seem to arise when a company changes its financial year from one year to the next. For this reason, I use manually collected financial year end dates where possible, since this allows me to ensure I use the financial year end date for the specific annual report of interest.

References

Ainsworth, Andrew B. et al. (2018). “Taxes, Order Imbalance and Abnormal Returns around the ex-Dividend day”. In: *International Review of Finance* 18.3, pp. 379–409. URL: https://onlinelibrary.wiley.com/doi/abs/10.1111/irfi.12155.

Amromin, Gene, Paul Harrison, and Steven Sharpe (2008). “How Did the 2003 Dividend Tax Cut Affect Stock Prices?” In: *Financial Management* 37.4, pp. 625–646. URL: https://onlinelibrary.wiley.com/doi/abs/10.1111/j.1755-053X.2008.00028.x.

Angrist, Joshua D. and Jörn-Steffen Pischke (2009). *Mostly Harmless Econometrics: An Empiricist's Companion*. Economics Books 8769. Princeton University Press. URL: https://ideas.repec.org/b/pup/pbooks/8769.html.

Auerbach, Alan J. (2002). “Taxation and corporate financial policy”. In: *Handbook of Public Economics*. Ed. by A. J. Auerbach and M. Feldstein. Vol. 3. Handbook of Public Economics. Elsevier. Chap. 19, pp. 1251–1292. URL: https://ideas.repec.org/h/eee/pubchp/3-19.html.

Auerbach, Alan J. and Kevin A. Hassett (July 2005). *The 2003 Dividend Tax Cuts and the Value of the Firm: An Event Study*. NBER Working Papers 11449. National Bureau of Economic Research, Inc. URL: https://ideas.repec.org/p/nbr/nberwo/11449.html.

Australian Broadcasting Corporation (Mar. 2018). “Labor wants to scrap a policy which means some who pay no tax get 2.5 million refund”. In: URL: https://www.abc.net.au/news/2018-03-13/labor-plan-scrap-5-billion-year-shareholder-refund-policy/9541016.

— (2019). “Labor's policy revolution finally detailed, but will voters buy it?” In: URL: https://www.abc.net.au/news/2019-05-10/federal-election-2019-labor-reveals-costings/11100352?nw=0.

Australian Financial Review (Mar. 2018). “Labor to end share dividend cash perk in 59b grab”. In: URL: https://www.afr.com/politics/labor-to-end-share-dividend-cash-perk-in-59b-grab-20180312-h0xcxp.

Australian Government (2015). *Final Budget Outcome 2014-15*. URL: https://archive.budget.gov.au/2014-15/fbo/FBO-2014-15-Consolidated.pdf.

Australian Taxation Office (Dec. 2016). *Franking credit trading*. URL: https://www.ato.gov.au/Business/Imputation/Integrity-rules/Franking-credit-trading/.

— (May 2019). *Dividends paid or credited to non-resident shareholders*. URL: https://www.ato.gov.au/Forms/You-and-your-shares-2019/?page=13.

Beggs, David J. and Christopher L. Skeels (2006). “Market Arbitrage of Cash Dividends and Franking Credits*”. In: *Economic Record* 82.258, pp. 239–252. URL: https://onlinelibrary.wiley.com/doi/abs/10.1111/j.1475-4932.2006.00337.x.

Bell, Leonie and Tim Jenkinson (2002). “New Evidence of the Impact of Dividend Taxation and on the Identity of the Marginal Investor”. In: *The Journal of Finance*

57.3, pp. 1321–1346. URL: https://onlinelibrary.wiley.com/doi/abs/10.1111/1540-6261.00462.

Biorn, Erik (2016). *Econometrics of Panel Data: Methods and Applications*. OUP Catalogue 9780198753445. Oxford University Press. URL: https://ideas.repec.org/b/oxp/obooks/9780198753445.html.

Boadway, Robin and Neil Bruce (1992). "Problems with integrating corporate and personal income taxes in an open economy". In: *Journal of Public Economics* 48.1, pp. 39–66. URL: http://www.sciencedirect.com/science/article/pii/004727279290041D.

Bond, Stephen, Michael Devereux, and Alexander Klemm (Aug. 2005). *Dissecting dividend decisions: some clues about the effects of dividend taxation from recent UK reforms*. IFS Working Papers W05/17. Institute for Fiscal Studies. URL: https://ideas.repec.org/p/ifs/ifsewp/05-17.html.

— (Aug. 2007). *The Effects of Dividend Taxes on Equity Prices; A Re-examination of the 1997 U.K. Tax Reform*. IMF Working Papers 07/204. International Monetary Fund. URL: https://ideas.repec.org/p/imf/imfwpa/07-204.html.

Brennan, Michael J. (1970). "Taxes, Market Valuation and Corporate Financial Policy". In: *National Tax Journal* 23.4, pp. 417–427. URL: http://www.jstor.org/stable/41792223.

Cameron, Colin and Douglas L. Miller (2015). "A Practitioner's Guide to Cluster-Robust Inference". In: *Journal of Human Resources* 50.2, pp. 317–372. URL: https://ideas.repec.org/a/uwp/jhriss/v50y2015i2p317-372.html.

Cannavan, Damien and Stephen Gray (2017). "Dividend drop-off estimates of the value of dividend imputation tax credits". In: *Pacific-Basin Finance Journal* 46, pp. 213–226. URL: http://www.sciencedirect.com/science/article/pii/S0927538X17301580.

Chen, Hung-Ling, Edward H. Chow, and Cheng-Yi Shiu (2013). "Ex-dividend prices and investor trades: Evidence from Taiwan". In: *Pacific-Basin Finance Journal* 24, pp. 39–65. URL: http://www.sciencedirect.com/science/article/pii/S0927538X13000188.

Chetty, Raj, Joseph Rosenberg, and Emmanuel Saez (July 2005). *The Effects of Taxes on Market Responses to Dividend Announcements and Payments: What Can we Learn from the 2003 Dividend Tax Cut?* Working Paper 11452. National Bureau of Economic Research. URL: http://www.nber.org/papers/w11452.

Clayton Utz (2019). "Federal Election 2019 – key workplace issues 101: Minimum wages and penalty rates". In: URL: https://www.claytonutz.com/knowledge/2019/march/federal-election-2019-key-workplace-issues-01-minimum-wages-and-penalty-rates.

Deloitte (2019). *International Tax: Singapore Highlights*. URL: https://www2.deloitte.com/content/dam/Deloitte/global/Documents/Tax/dttl-tax-singaporehighlights-2019.pdf.

Dhaliwal, Dan, Linda Krull, and Oliver Zhen Li (2007). "Did the 2003 Tax Act reduce the cost of equity capital?" In: *Journal of Accounting and Economics* 43.1, pp. 121–150. URL: http://www.sciencedirect.com/science/article/pii/S0165410106000711.

Fama, Eugene F. and Kenneth R. French (Sept. 2004). "The Capital Asset Pricing Model: Theory and Evidence". In: *Journal of Economic Perspectives* 18.3, pp. 25–46. URL: https://www.aeaweb.org/articles?id=10.1257/0895330042162430.

Gadarowski, Christopher et al. (2007). “Dividend Tax Cut and Security Prices: Examining the Effect of the Jobs and Growth Tax Relief Reconciliation Act of 2003”. In: *Financial Management* 36.4, pp. 89–106. URL: http://www.jstor.org/stable/30129813.

Grant, Andrew R., P. Joakim Westerholm, and Winston Wu (2018). “Imputation Credits and Trading Around Ex-Dividend Day: New Evidence in Australia”. Mimeo, Available at SSRN: https://ssrn.com/abstract=3221900 or http://dx.doi.org/10.2139/ssrn.3221900.

Internal Revenue Service (2020). *Publication 550 Investment Income and Expenses*, p. 19.

Kenchington, David G. (2019). “Does a change in dividend tax rates in the U.S. affect equity prices of non-U.S. stocks?” In: *Review of Accounting Studies* 24.2, pp. 593–628. URL: https://ideas.repec.org/a/spr/reaccs/v24y2019i2d10.1007_s11142-019-9489-z.html.

Koukoulas, Stephen (Mar. 2019). *Tweet.* URL: https://twitter.com/TheKouk/status/973374002319142914?s=20.

Lajbcygier, Paul and Simon M. Wheatley (2012). “Imputation Credits and Equity Returns*”. In: *Economic Record* 88.283, pp. 476–494. URL: https://onlinelibrary.wiley.com/doi/abs/10.1111/j.1475-4932.2012.00833.x.

McDonald, Robert L. (June 2015). “Cross-Border Investing with Tax Arbitrage: The Case of German Dividend Tax Credits”. In: *The Review of Financial Studies* 14.3, pp. 617–657. eprint: https://academic.oup.com/rfs/article-pdf/14/3/617/24432194/140617.pdf. URL: https://doi.org/10.1093/rfs/14.3.617.

Miller, Merton H. and Myron S. Scholes (1978). “Dividends and taxes”. In: *Journal of Financial Economics* 6.4, pp. 333–364. URL: http://www.sciencedirect.com/science/article/pii/0304405X78900090.

Monkhouse, Peter H.L. (1993). “The Cost of Equity under the Australian Dividend Imputation Tax System”. In: *Accounting & Finance* 33.2, pp. 1–18. URL: https://onlinelibrary.wiley.com/doi/abs/10.1111/j.1467-629X.1993.tb00321.x.

Organisation for Economic Cooperation and Development (2020). *OECD Tax Database Explanatory Annex, Part II, Taxation of corporate and capital income.*

Parliamentary Budget Office (2018). *Policy costing: Dividends paid or credited to non-resident shareholders.* URL: https://www.aph.gov.au/-/media/05_About_Parliament/54_Parliamentary_Depts/548_Parliamentary_Budget_Office/Publicly_released_costings/Dividend_imputation_credit_refunds_-_PDF.pdf?la=en&hash=977EF1543E08E4B0F35FAB79ACB9AE542E9A2692.

— (2019). *2019 Post-election report.* URL: https://www.aph.gov.au/About_Parliament/Parliamentary_Departments/Parliamentary_Budget_Office/General_elections/2019_general_election/2019_Post-election_report.

Poll Bludger (2019). *BludgerTrack 2019.* URL: https://www.pollbludger.net/bludgertrack2019/.

Rantapuska, Elias (2008). “Ex-dividend day trading: Who, how, and why?: Evidence from the Finnish market”. In: *Journal of Financial Economics* 88.2, pp. 355–374. URL: http://www.sciencedirect.com/science/article/pii/S0304405X08000299.

Salinger, Michael (1992). “Standard Errors in Event Studies”. In: *Journal of Financial and Quantitative Analysis* 27.1, pp. 39–53.

Shorten, Bill (Mar. 2018). *A fairer tax system: Dividend imputation reform.* URL: https://www.billshorten.com.au/news/bill-s-media-releases/a-fairer-tax-system-dividend-imputation-reform-tuesday-13-march-2018/.

Sialm, Clemens (2009). "Tax Changes and Asset Pricing". In: *American Economic Review* 99.4, pp. 1356–83. URL: https://www.aeaweb.org/articles?id=10.1257/aer.99.4.1356.

Swan, Peter L. (2019). "Investment, the Corporate Tax Rate, and the Pricing of Franking Credits". In: *Economic Record* 95.311, pp. 480–496. eprint: https://onlinelibrary.wiley.com/doi/pdf/10.1111/1475-4932.12493. URL: https://onlinelibrary.wiley.com/doi/abs/10.1111/1475-4932.12493.

Sydney Morning Herald (Mar. 2018). "Shorten hits shareholderes with plan for 59 billion revenue grab". In: URL: https://www.smh.com.au/politics/federal/shorten-hits-shareholders-with-plan-for-59-billion-revenue-grab-20180312-p4z40d.html.

Tseng, Yun-lan and Shing-yang Hu (2013). "Tax reform and the identity of marginal traders around ex-dividend days". In: *Pacific-Basin Finance Journal* 25, pp. 181–199. URL: http://www.sciencedirect.com/science/article/pii/S0927538X13000528.

Willis Towers Watson (2019). "Global Pension Assets Study 2019". In: URL: https://www.willistowerswatson.com/en-US/news/2019/02/global-dc-pension-assets-exceed-db-assets-for-the-first-time.