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## Investor-Level Taxes and Corporate Dividend Policy: Evidence from a Quasi-natural Experiment

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# Investor-Level Taxes and Corporate Dividend Policy: Evidence from a Quasi-natural Experiment*

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**Abstract**

We utilise a change to the treatment of franking credits in the hand of domestic shareholders, namely the introduction of fully refundable franking credits, to provide robust evidence on the causal effect of investor-level taxes on corporate dividend policy. Consistent with investors having a greater preference for the distribution of dividends, we find that the introduction of fully refundable franking credit increases both the likelihood that firms pay dividends and the level of the dividend payments they make. Subsequent analysis reveals that effective tax rate and firm size explain cross-sectional variation in dividend policy responses to the tax reform, with large firms and firms with high effective tax rates more likely to pay dividends and to pay larger dividends than their peers.

*Keywords:* Corporate dividend policy; Dividend imputation system; Franking credit refundability; Australian tax law reform

*JEL codes:* G35; H24; H25

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## 1. Introduction

Since Modigliani and Miller (1961), it has been understood that taxes play an important role in shaping corporate dividend policy. Despite this, reliably estimating the causal relationship between the two variables has proven empirically challenging. More specifically, although a number of studies investigate corporate responses to statutory tax rate and tax policy changes, these changes are generally motivated by economic and political considerations and/or form part of broader policy initiatives, making it difficult to identify any causal effect on dividend policy. Our paper uses a change in 2000 to the Australian tax law on the treatment of franking credits in the hand of domestic shareholders to overcome these confounding factors and, in doing so, provide robust evidence on how taxes shape corporate dividend payment decisions.

In 1987, Australia introduced a dividend imputation tax system to address the double taxation of corporate earnings occurring under the previous, classical tax regime. Australia's imputation system means that dividend payments to shareholders are accompanied by franking credits for taxes paid at the corporate level, with the total value of franking dividends available for distribution increasing with the company tax paid, or the firm's effective tax rate, *ceteris paribus*. As these franking credits can be used to offset tax liabilities, they reduce the tax payable by shareholders and, in doing so, increase the post-tax value of their dividends. Prior to 2000, franking credits were non-refundable, with credits that could not be used to reduce tax due at the shareholder level effectively forfeited. This often meant that credits distributed to shareholders with low marginal tax rates, including superannuation funds and retirees, went unused. However, changes to Australia's tax laws saw franking credits received after 1 July 2000 become fully refundable, with franking credits in excess of shareholders' existing tax liabilities paid to them as a cash refund

through the annual tax return process.[1] By allowing all eligible shareholders to fully utilize their franking credits irrespective of their tax liabilities, the regulatory change increased the appeal of, and demand for, dividends. However, in doing so, the reform had no direct impact on corporate investment decisions and, as such, represents an exogenous shock to investor dividend demand. Given the literature predicts that a higher demand for dividends will motivate firms to pay more dividends to shareholders (e.g. Baker and Wurgler, 2004; Becker, Ivkovic and Weisbenner, 2010), we hypothesize that the introduction of laws allowing for franking credit refundability increased investor dividend demand and, in turn, corporate dividend payments.

To understand whether our prediction is supported empirically, we start by comparing the dividends paid by Australian firms before and after 2000. In doing so, we recognize that a simple comparison of dividend payments made during these two periods gives rise to many potential confounding factors given that any differences we identify could also reflect macroeconomic changes over time.[2] To control for these confounding factors, we develop a difference-in-differences (DID) approach where the treatment is a switch from a non-refundable to refundable franking credit tax regime, the treated are Australian firms, and the controls are firms in Hong Kong,[3] Malaysia, New Zealand, and Singapore. All five countries are current or former members of the Commonwealth, meaning not only that their financial systems are greatly influenced by the U.K. system, but that they also share many other similarities. Moreover, none of the four countries forming the control group experienced significant changes to their dividend taxation laws during our sample period.[4]

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[1] https://www.aph.gov.au/Parliamentary_Business/Bills_Legislation/bd/bd0102/02bd036

[2] For example, Kuo *et al.* (2013) report that the proportion of dividend paying Australian firms declines from 37% to 30% over our sample period, a significant proportion of which they attribute to changes in market risk.

[3] In 1997, Hong Kong was transferred from the U.K. to China, where it became a special administrative region. For simplicity, hereafter, we use "country" to refer to a "country" a "region", or both.

[4]We note that in 2003, Singapore commenced a 5-year transition from an imputation system to a one-tier tax system where dividends were not taxed (modified classical tax system). Similar to the imputation system, Singapore's one-

Our analysis reveals that the introduction of franking credit refundability in Australia increased the likelihood that Australian firms pay dividends by 4.6%, and the level of dividend payments by 0.4%. Both results are consistent with franking credit refundability increasing the post-tax value of dividends in the hands of investors and, in doing so, increasing the demand for dividends. Importantly, these are only average effects, and do not take into account firm-specific factors that might prompt differential responses to the tax change.

One factor that may result in cross-sectional variation in firms' dividend policy response to franking credit refundability is their effective tax rates. In allowing the refund of franking credits, Australian legislators increased the value of these credits to shareholder taxed at lower rates and, in doing so, ensured their universal appeal to investors. This, in turn, increased firms' incentive to distribute franking credits, with the magnitude of this tax incentive, and hence, the increase in dividend payout, a function of the quantum of franking credits available for distribution. More specifically, the higher the firm's effective tax rate, the larger the pool of franking credits available for distribution, and the greater the proportion of income able to be distributed as franked dividends. As such, we expect that firms with higher effective Australian corporate tax rates are not only more likely to pay a dividend in the wake of the tax reform, but to also increase the level of the dividend paid. Our analysis reveals that, consistent with our prediction, firms with higher effective corporates tax rate are more likely to pay a dividend, and pay higher dividends, after the introduction of refundable franking credits than their peers with lower effective tax rates.

tier system also eliminates double taxation by exempting dividend taxes for shareholders and allowing firms to continue to distribute accumulated franking credits for up to five years (Teck 2006). Therefore, we contend that this taxation change has only a limited effect on investor dividend demand. Indeed, any effect is most likely positive, biasing against our identification of a positive effect of refundable franking credits on dividend payments in Australia.

The corporate dividend policy response to franking credit refundability will also vary with the fraction of shareholders who stand to benefit from the change. From previous discussion, beneficiaries will be investors with low marginal tax rates. The largest class of such investors is complying domestic superannuation funds, who were only required to pay $0.15 tax on every dollar of income in an environment where franking credits ranged from $0.56 to $0.42 for each dollar of fully franked dividend. We argue that these superannuation funds will have a higher post-reform demand for fully franked dividends, consistent with Jun, Gallagher and Partington (2011), who report that, since the introduction of fully refundable franking credits, domestic superannuation funds have been overweight in stocks paying fully-franked dividends, and Hanlon and Pinder (2019) who find that resident individuals, companies, and superannuation funds all have a preference for investing in fully franked dividend paying firms. Moreover, we conjecture that the greater supply, and higher liquidity, of larger firms means they are more likely to be held primarily by domestic superannuation funds. Taken together, we predict that larger firms are more likely to both pay dividends and increase the level of the dividend following the introduction of franking credit refundability. Our testing confirms that, as predicted, larger firms are more likely to both pay a dividend and increase the level of the dividends paid.

Our paper contributes to a substantial literature that explores the effect of personal taxes on dividend policy around changes in the tax system.[5] For example, Khoury and Smith (1977) and Poterba and Summers (1984) report an increase in aggregate dividend payments following the introduction of dividend imputation tax regimes in Canada and the U.K., respectively. Similarly, Pattenden and Twite (2008) find that both dividend initiations and dividend payouts increased with the introduction of dividend imputation in Australia, with the increase most pronounced in firms

[5] See Allen and Michaely (2003) and Farre-Mensa et al. (2014) for a review of both the theoretical and empirical literature.

with higher franking account balances. In the U.S. context, Chetty and Saez (2005) find that firms increased dividend payments in response to the US Jobs and Growth Tax Relief Reconciliation Act of 2003, which cut dividend tax rates. Finally, Hanlon and Hoopes (2014) examine dividend policy choices in anticipation of two U.S. dividend tax shocks in 2011 and 2013, reporting that firms altered the timing of their dividend payments in response, particularly those with high levels of insider holdings.

The closest paper to ours is Bell and Jenkinson's (2002) investigation into the ex-dividend share price effects of the U.K.'s 1997 abolition of dividend tax credit reclamation by tax exempt investors.[6] We complement Bell and Jenkinson's (2002) work by examining the introduction, rather than the removal, of fully refundable franking credits, which are the equivalent of reclaimable dividend tax credits. Moreover, we consider how reform affects corporate decision making, including the drivers of any cross-sectional variation in observed responses, rather than the market response to these decisions.

The paper is organized as follows. Section 2 describes the taxation systems in place in Australia, Hong Kong, Malaysia, New Zealand, and Singapore during the period of this study. Section 3 describes how we compute the variables we use in our empirical analysis and the sample construction process. Section 4 outlines the difference-in-differences methodology we use in our empirical analysis. Section 5 presents our results and Section 6 draws some conclusions.

## 2. Taxation Systems

[6] Related studies link observed changes in ex-dividend day share price behaviour to the introduction of personal taxes in the U.S. in 1913 (Barclay, 1987) and the reduction in the preferential treatment of capital gains resulting from the 1986 US Tax Reform Act (Michaely, 1991). These papers, along with the work of Bell and Jenkinson (2002), are subject to concerns about endogenous tax rates as well as alternative explanations for observed share price drop-off, including short-term arbitrage trading and market-microstructure considerations.

A classical tax system effectively taxes any income distributed to shareholders twice, initially as earnings at the corporate level, and then again as dividends in the hands of the shareholder. There are three variants of classical tax system, namely: a full classical tax system, where dividends are taxed at the investor's full income tax rate; a modified classical tax system, where dividends are taxed at a lower rate than the investor's income tax rate; and a partial inclusion tax system, where a specified percentage of dividends are exempt from taxation. Relative to a full classical system, a modified classical or partial inclusion system reduces the taxation of dividends at the shareholder level, however, some degree of double taxation remains in both.

An imputation system addresses the double taxation issue permeating classical tax systems by granting all domestic shareholders a credit for any tax paid at the corporate level so as to offset any dividend taxes payable by shareholders. More specifically, a full imputation system provides shareholders with a franking credit equal to 100% of taxes paid at the corporate level, while a partial imputation system provides credit for a percentage of the corporate tax paid. Whatever the type of imputation system, domestic shareholders are only liable for the difference between the tax payable in their hands and that already paid at the corporate level, with shareholders who are unable to use all of their franking credits in this manner provided with a cash rebate equal to the value of unutilized credits in most imputation systems. Refundability aside, the existence of franking credits means that an imputation system either reduces, or eliminates, the double taxation of dividends. Thus, holding all else constant, an imputation tax system lowers the cost of equity, confers a tax advantage on equity financing and increases investor preference for dividends relative to a classical tax system.[7]

[7] See Cormick and McLaren (2018) and Ainsworth (2016) for a review of both the issues with, and empirical literature around, the various dividend imputation systems operating during our sample period.

## 2.1. Australia

Australia operates a full imputation system whereby dividends paid by resident firms are accompanied by franking credits for tax paid on domestic earnings by the firm. These franking credits are used by resident shareholders to reduce their taxable income. Prior to 2000, franking credits in excess of domestic shareholders' existing tax liabilities were non-refundable, that is, they could not be carried forward or give rise to cash refund and, therefore, were effectively forfeited. However, tax reforms meant that franking credits received after 1 July 2000 were fully refundable, with excess franking credits paid as a cash refund to shareholders.[8] Australia's imputation system renders all inter-firm dividends exempt from corporate tax in the hands of the receiving firm and, as such, ensures that franking credits can be passed through to the receiving firm's shareholders.

There were two changes to the Australian corporate tax rate during our window of interest. Specifically, the tax rate fell from 36% to 34% in 2000, and from 34% to 30% in 2001. Importantly, in both cases, earnings accumulated prior to the change retained the franking credit level applicable at the time of income generation. As a result, both changes in corporate tax rate provided no incentive for firms to alter their dividend policy.

While Australian companies are subject to the same statutory tax rate, the tax system's treatment of specific types of income and expenses mean firms can have different effective tax rates and levels of franking credits. In particular, depreciation expenses and investment allowances are allowable tax deductions and, as such, lower firms' taxable income, the corporate tax paid and, therefore, the franking credits available for distribution to resident shareholders. Similarly, taxes paid offshore on foreign income cannot be passed on to resident shareholders, lowering the

[8] As stated by Cormick and McLaren (2018) "In 2000, the Australian Government allowed all unused imputation credits to be paid to the taxpayer as a tax refund. With retirement funds in Australia paying income tax at 15% and registered charities paying no income tax, the refund of surplus imputation credits provides a substantial increase on investment returns."

franking credits available for distribution. Taken together, these tax treatments mean that it is the tax paid by firms, or their effective tax rate, that determines the level of franking of dividends, with inter-firm differences in effective tax rates corresponding variations in the levels of franking credits available for distribution with dividends. Dividends paid from earnings taxed at the full Australian corporate tax rate are termed fully franked dividends, while dividends paid from earnings on which no (some) Australian corporate tax has been paid are termed unfranked (partially franked) dividends. All else constant, the size of the franking credit attached to a fully franked dividend will be greater than that accompanying a partially franked dividend, with no credit received for an unfranked dividend.

### 2.2. Malaysia

Malaysia also operates a full dividend imputation system, with resident companies taxed on earnings at the prevailing statutory corporate tax rate before being able to make distributions to shareholders. Moreover, companies wishing to pay dividends requiring franking credits in excess of their accumulated franking balance must pay the franking difference as an additional tax. Shareholders are then taxed on the grossed up value of the franked dividends they receive, but are entitled to claim a franking credit to offset their tax liability, and receive a cash refund for any excess franking credits.

While Malaysian corporations face the same statutory tax rate, like Australian firms, they often have different effective tax rates and levels of franking credits. This is because resident company shareholders receiving franked dividends from another resident company are taxed at the same corporate income tax rate, but claim the franking credit attached to the dividend to offset their own tax liability. Franked dividends paid by Malaysian companies to Singaporean residents

or resident companies also give rise to a franking credit that can be offset against Singaporean tax liabilities.

While the Malaysian corporate tax rate fell from 30% to 28% in 1998, earnings accumulated prior to 1998 retained the franking credit level applicable at the time of income generation, with additional tax to support the required level of franking credits being determined at the statutory corporate tax rate prevailing at the time of dividend distribution. The change in corporate tax rates therefore provided no incentive for resident firms to change their dividend policy.

### 2.3. New Zealand

New Zealand operates a full dividend imputation system which applies to dividends paid by New Zealand resident firms to resident shareholders. New Zealand corporate tax paid is allocated to shareholders by way of franking credits. These credits are included in the taxable income of resident shareholders, who are then entitled to a tax rebate equal to the franking credit included in their dividend. While any excess franking credits are not refundable, they can be carried forward to reduce any taxable income in the following year. All inter-firm dividends are exempt from corporate tax in the hands of the receiving firm, meaning the imputation tax credits are preserved and can be paid to receiving firms' shareholders.

As with Australian and Malaysian firms, New Zealand firms face the same statutory tax rate, but can have different effective tax rates and levels of franking credits. Hence, it is the level of New Zealand corporate tax paid that determines the level of franking of dividends, with differences in effective tax rates across firms imply varying levels of franking credits available for distribution with dividends.

### 2.4. Singapore

Until 2003, Singapore had a full dividend imputation system, with resident companies required to deduct tax at the prevailing statutory corporate tax rate before making dividend payments to shareholders. Moreover, companies wishing to pay dividends with franking credits greater than their accumulated franking balance had to pay the difference as an additional tax. Once distributed, shareholders were taxed on the grossed up value of dividends received, entitled to claim the corresponding franking credits, and able to receive excess franking credits as cash refunds. This meant that, while a Singaporean resident company receiving taxable dividends from another resident company was taxed at the appropriate corporate income tax rate, it could claim the franking credit attached to the dividend to offset the resulting tax liability. Similarly, franked dividends paid by Singaporean companies to Malaysian residents or resident companies gave rise to a franking credit that could be offset against Malaysian tax liabilities.

In 2003, Singapore began a 5-year transition from an imputation system to a modified classical tax system where dividends are not taxable. During this transition period, resident companies holding accumulated franking credits as at 31 December 2002 were allowed to pay franked dividends until they exhausted they franking credits.

In addition to transitioning from an imputation to a modified classical system, Singapore's corporate tax rate fell from 26% to 25.5% in 2001, falling to 24.5% in 2002 and to 22% in 2003. Given accumulated franking credits retained the franking level that applied to the effective corporate tax rate prior to the change corporate tax change, these changes provided no incentive for Singaporean firms to change their dividend policy.

### 2.5. Hong Kong

Hong Kong operated a modified classical tax system over our period of interest, where dividend income, whether derived from Hong Kong or overseas, was not taxable. Similarly, withholding tax was not payable on dividends paid to resident or non-resident shareholders, with the lack of distinction between onshore versus offshore investors rendering shareholder tax residence irrelevant. Finally, changes in the corporate tax rate from 16.5% to 16% in 1999, and from 16% to 17.5% in 2003, provided no incentive for firms to change their dividend policy.

## 3. Data and Sample

Our sample period commences in January 1996 and concludes in December 2004. We obtain annual, firm-level accounting and stock return data from Compustat Global, removing firms whose total assets are recorded in a currency different from that of their headquarter country and converting all remaining control country firms' accounting data to Australian dollars using Federal Reserve Bank Reports exchange rates. Our final sample comprises 26,181 firm-year observations for 4,442 unique firms from Australia, Hong Kong, Malaysia, New Zealand, and Singapore.

Table 1 provides a breakdown of our sample by country, showing that Australian firms represent 38.02% (36.15%) of the unique firms (firm-year observations) included in our final sample. The Australian firms are followed by firms from Malaysia and Hong Kong, which represent 23.17% and 21.54% (25.19 and 22.23%) of the sample's unique firms (firm-year observations), respectively. Finally, despite only 4 of the 9 years in our sample occurring after 2000, 55.4% of our total firm-year observations are post-2000. This is consistent with Compustat Global's coverage of Asia-Pacific firms increasing significantly from 2000 onward (Coulton and Ruddock 2011; Dempsey, Gunasekarage and Truong 2019).

[Table 1 about here]

We calculate two dividend payment measures, namely: $Dividend\ Dummy_{i,t}$, an indicator variable taking a value of one if a firm pays a dividend in a given year and zero otherwise; and $Dividend\ Yield_{i,t}$, or total dividends scaled by the book value of total assets. We then construct $RFC_{i,t}$, an indicator variable taking a value of one following the switch to a refundable franking credit tax regime for Australian firms after 2000, and zero otherwise. Finally, we construct control variables to account for other firm-specific factors shown to affect dividend policy. We follow previous studies (for example, DeAngelo, DeAngelo and Stulz 2006; Denis and Osobov 2008; Becker, Ivkovic and Weisbenner 2011; Huang, Wu, Yu and Zhang 2015; Glendening, Khurana and Wang 2016) and include: *Log(Assets)*, the natural logarithm of total assets; *Growth*, the natural logarithm of the growth rate of assets over the prior year; *Leverage*, total liabilities scaled by the book value of total assets; *Net Income*, net income scaled by the book value of total assets; *Cash*, cash scaled by the book value of total assets; *MB*, the sum of the market value of equity and the book value of liabilities, scaled by the book value of total assets; *Stock Return* and *Volatility*, the mean and standard deviation, respectively, of daily stock return percentages in the preceding twelve months, requiring a minimum of 100 daily stock return observations to estimate; and *ETR*, the effective tax rate, or tax paid scaled by pre-tax income.

Table 2 presents descriptive statistics for these variables, with continuous measures winsorized at the 1st and 99th percentiles. *RFC* has a mean value of 0.203, indicating that approximately 20.3% of our firm-year observations correspond to Australian firms benefiting from refundable franking credits. The average of *Dividend Dummy* is 0.448, meaning that dividends

were paid in 44.8% of our firm-year observations. This statistic is comparable to the value of 39.0% reported by Coulton and Ruddock (2011) in their study of Australian firms over a similar period. However, it is significantly higher than the 20% of U.S. firms reported by both Fama and French (2001) and Kalay and Lemmon (2008) to have paid dividends over the same timeframe. This cross-country difference may be an artefact of a sample selection bias: while U.S. studies include all publicly listed firms in their samples, the aforementioned database coverage issues mean that more established firms dominate our sample. Life-cycle theory (e.g., Fama and French 2001; Grullon, Michaely and Swaminatha 2002; DeAngelo, DeAngelo and Stulz 2006; Coulton and Ruddock 2011) suggests that such firms are more likely to pay dividends than their less established counterparts.

[Table 2 about here]

## 4. Difference-in-Differences Methodology

Papers by Baker and Wurgler (2004) and Becker et al. (2011), among others, predict that firms facing a higher investor dividend demand will respond to this demand by increasing their level of dividends payments to shareholders. On the basis of this prediction, we hypothesize that the introduction of laws allowing for refundable franking credits will increase dividend payments. We test our hypothesis by comparing the dividends paid by Australian firms before and after the 2000 tax law reform. To do this, we develop a difference-in-differences (DID) regression model where the treatment is a switch from non-refundable to refundable franking credits, the treated are Australian firms, and the controls are firms in Hong Kong, Malaysia, New Zealand, and Singapore. Our model is defined as follows:

$$Dividend_{i,t} = \beta_0 + \beta_1 * RFC_{i,t} + \sum_{j=1}^{J} \gamma_j * Control_{j,i,t} + \varepsilon_{i,t} \quad (1)$$

Where $Dividend_{i,t}$ is either $Dividend\ Dummy_{i,t}$ or $Dividend\ Yield_{i,t}$, $Control_{j,i,t}$ is a vector of controls that account for other firm-specific factors shown by previous studies to affect dividend policy, and all variables are calculated in the manner defined in Section 3. When estimating Equation (1), we include year fixed effects to control for time-varying, global factors, country-fixed effects to control for time-invariant country-specific factors, and industry fixed effects to take account of time-invariant industry-specific factors. We also adjust standard errors for heteroscedasticity and cluster them at the firm level. Irrespective of whether our dependent variable is $Dividend\ Dummy_{i,t}$ or $Dividend\ Yield_{i,t}$, our coefficient of interest is $\beta_1$, with a significantly positive value providing support for our hypothesis that franking credit refundability increases the likelihood or level of corporate dividend payments, respectively.

## 5. Average Dividend Policy Effects

Table 3 presents the results of estimating Equation (1) using each of our two measures of dividend policy. The results presented in Columns (1) through (4) characterise the effect of franking credit refundability on the likelihood that firms pay a dividend, with *Dividend Dummy* included as the dependent variable and both ordinary least squares (Columns (1) and (2)) and Probit models (Columns (3) and (4)) estimates included. Examination of all four columns reveals that, irrespective of the estimation method employed or whether we include control variables, the coefficient of *RFC* is positive and statistically significant. This finding is consistent with our

hypothesis that franking credit refundability leads to increased investor demand for fully franked dividends and, hence, increases the likelihood that the firm will pay a dividend. Economically, using the most conservative *RFC* coefficient of 0.133 (Column (3)), franking credit refundability increases the likelihood of dividend payments by 4.6%.[9]

[Table 3 about here]

The impact of franking credit refundability on the level of dividend payments is reported in Columns (5) and (6), where we replace *Dividend Dummy* with *Dividend Yield* as our dependent variable and, given that dividends were not paid in more than half of our firm-year observations, we estimate Tobit models. Examination of both columns reveals that the coefficient of *RFC* remains positive when substituting a continuous dividend policy measure for a dichotomous one. Notwithstanding this, the significance of the *RFC* coefficient in Columns (5) and (6) is lower than that for the estimates presented in Columns (1) through (4), suggesting that, consistent with prior literature (e.g., Baker and Wurgler 2004; Becker et al. 2011), franking credit refundability has a stronger effect on the likelihood that firms will pay dividends than on the level of dividends that they actually pay. Economically, the introduction of franking credit refundability increased dividends by 0.4%.

In all Columns of Table 3, the signs of the control variable coefficients are consistent with both our own expectations and the results presented in previous studies. The positive coefficient of *Log(Assets)* is in line with the predictions of life-cycle theory (e.g., Fama and French 2001;

[9] This result is also consistent with Brav et al.'s (2005) survey evidence.

Grullon et al. 2002; DeAngelo et al. 2006; Coulton and Ruddock 2011), which suggest that established firms are more likely to pay dividends. The coefficients of *Leverage* and *Volatility* are negative, suggesting that business risk reduces dividend payments (e.g., Grullon et al. 2002; Shao et al. 2010; Becker et al. 2011; Huang et al. 2015). On the other hand, the coefficients of *Net Income* and *Stock Return* are positive, consistent with the notion that better performing firms tend to pay more dividends to their shareholders (e.g., Becker et al. 2011; Zhou et al. 2013; Huang et al. 2015).

Importantly, the sample coverage issues described in Section 3 introduce the possibility that the results reported in Table 3 are driven by sample selection bias. Specifically, if the improved coverage of firms in the Asia-Pacific region from 2000 onward means that the proportion of small and young firms in control group countries exceeds the proportion in Australia, then it is possible that the positive *RFC* coefficient reflects the positive relation between firm size and dividend payments. We address this potential selection bias by repeating our regression analyses using the subsample of firms that have observations in both the pre- and post-2000 periods, with the associated regression results reported in Table 4 in the same order as in Table 3. In Columns (1) through (4), the coefficient of *RFC* is positive and statistically significant, confirming the positive effect of franking credit refundability on the likelihood that a firm will pay dividends. Likewise, in Columns (5) and (6) the coefficient of *RFC* is positive and statistically significant, confirming the positive effect of franking credit refundability on the level of dividend payments. Moreover, the coefficients of *RFC* in Table 4 are even more significant than in Table 3, both in terms of their magnitude and their significance. This suggests that Compustat's Asia-Pacific coverage issues bias against, rather than towards, us finding a result. Consistent with this, Table 1 reports that the percentage of firm-year observations in Australia in the post-2000 period is 56.2%, which is

greater than the 55.4% in the full sample. Taken together, these statistics point toward the proportion of small and young firms Australian firms covered by Compustat Global increasing by more than in the control group.

[Table 4 about here]

A final concern with the results presented in Table 3 relates to the construction of our control group. More specifically, it is possible that either the dividend demands of investors or the preferences of firms to pay dividends in a single control country decreased significantly during the sample period, leading to the positive relation between franking credit refundability and dividend payments documented in Table 3.[10] To alleviate this concern, we focus on the model yielding our most significant results, namely that including *Dividend Dummy* as the dependent variable, and re-estimate this model four times, excluding a different country from the control group each time. The results of this analysis are presented in Table 5. In all four columns, the coefficient of *RFC* is positive and statistically significant at the 1% level, suggesting that the results in our baseline regressions are not driven by the demands of investors, nor the preferences of firms from any particular country in our control group.

[Table 5 about here]

## 6. Cross-sectional Effects

[10] Fatemi and Bildik (2012) report that the proportion of dividend paying firms observed across a sample of 33 countries including Australia, Hong Kong, Malaysia, New Zealand and Singapore declined between 1986 and 2006.

In this section, we explore cross-sectional variation in firms' responses to the introduction of fully refundable franking credits by taking into account firm-specific factors that might prompt differential responses to the tax change. For the reasons outlined in Section 1, we hypothesize that, all else constant, the likelihood of firms paying a dividend after franking credits become fully refundable, and the level of dividend payments they make, will be positively correlated with the firms' effective corporate tax rate and size. We test our hypotheses by estimating the following models:

$$Dividend_{i,t} = \beta_0 + \beta_1 * RFC_{i,t} + \beta_2 * RFC_{i,t} \times highETR_{it} + \sum_{j=1}^{J} \gamma_j * Control_{j,i,t} + \varepsilon_{i,t} \qquad (2a)$$

$$Dividend_{i,t} = \beta_0 + \beta_1 * RFC_{i,t} + \beta_3 * RFC_{i,t} \times highAssets_{it} + \sum_{j=1}^{J} \gamma_j * Control_{j,i,t} + \varepsilon_{i,t} \qquad (2b)$$

Where $highETR_{it}$ is an indicator variable taking a value of one if the firm's effective tax rate is above the sample median value and zero otherwise, $highAssets_{it}$ is an indicator variable taking a value of one if the firm's total assets are above the sample median value and zero otherwise, and all other variables are as previously defined. When estimating Equations (2a) and (2b), we include year, country and industry fixed effects, adjust standard errors for heteroscedasticity and cluster errors at the firm level. Our coefficients of interest are $\beta_2$ and $\beta_3$, with positive and statistically significant values providing support for our hypotheses regarding firms' effective tax rates and size, respectively.

Table 6 presents the results of estimating Equations (2a) with coefficients obtained using *Dividend Dummy* and *Dividend Yield* presented in Columns (1) and (2) and Columns (5) and (6), respectively. Examination of all four columns reveals that, irrespective of our measure of dividend payout or whether we include our vector of control variables, the coefficient of *RFC x highETR* is

always positive and statistically significant. This suggests that, consistent with our hypothesis, Australian firms with high effective corporate tax rates are not only more likely to pay a dividend following the introduction of fully refundable franking credits than are firms with low effective corporate tax rates, they also pay larger dividends.

[Table 6 about here]

The results of estimating Equation (2b) are also presented in table 6, with coefficients obtained using *Dividend Dummy* and *Dividend Yield* reported in Columns (3) and (4) and Columns (7) and (8), respectively. All four columns report that the coefficient of *RFC x highAssets* is positive and statistically significant, consistent with larger Australian resident firms being more likely to pay dividends, and pay larger dividends, than smaller domestic firms following the introduction of fully refundable franking credits. Again, this is consistent with our prediction.

## 6. Conclusion

We take advantage of the arguably exogenous shock to investor dividend demand caused by a reform to Australian tax law in 2000 to understand how taxes affect corporate dividend policy. We hypothesize that, by allowing the refund of unused franking credits to shareholders, the tax law reform made dividends universally more appealing, with shareholder demand for, and corporate payment of, dividends growing as a result. Overall, our empirical results suggest that firms respond to changes in personal taxes in a way that is consistent this conjecture. Moreover, our analysis reveals that both the likelihood that Australian firms paid dividends, and the level of dividend payments they made, increased significantly following the introduction of franking credit

refundability. We also find that the level of available franking credit influences the response to the tax change. In particular, larger firms or firms with a higher effective corporate tax rate are more likely to pay a dividend as well as to pay a larger dividend.

A natural extension of our study would be to investigate whether the domestic ownership of Australian firms explains any differential dividend policy responses to the introduction of franking credit refundability. While Balachandran *et al* (2019) report that managerial equity ownership is positively related to the likelihood of a dividend being paid, and that this relationship did not change with the introduction of dividend imputation, it remains to be seen whether managerial responsiveness to franking credit refundability is a function of corporate ownership structures, including domestic superannuation fund shareholdings. Detailed ownership data would help to refine our analysis.

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**Table 1: Sample summary**

This table presents a breakdown of the sample by country. The sample comprises a total of 26,181 firm-year observations for between 1996 and 2004 for 4,442 unique firms from Australia, Hong Kong, Malaysia, New Zealand and Singapore. A total of 55.4% of firm-year observations are from the post-2000 period.

| Country | Unique Firm | Firm-Year | 2001-2004 | |
|---|---|---|---|---|
| | | | Firm Year | Percent |
| Australia | 1,689 | 9,463 | 5,314 | 56.2 |
| Hong Kong | 957 | 5,819 | 3,314 | 57.0 |
| Malaysia | 1,029 | 6,596 | 3,509 | 53.2 |
| New Zealand | 175 | 983 | 548 | 55.7 |
| Singapore | 592 | 3,320 | 1,828 | 55.1 |
| Full Sample | 4,442 | 26,181 | 14,513 | 55.4 |

**Table 2: Descriptive statistics**

This table presents descriptive statistics for the variables used in the study, number of observations, mean, median, standard deviation 25th percentile, and 75th percentile for each variable. Variables as defined in in Section 3. Continuous variables are winsorized at the 1st and 99th percentiles.

| Variable | N | Mean | Median | Std dev | p25 | p75 |
|---|---|---|---|---|---|---|
| *RFC* | 26,181 | 0.203 | 0.000 | 0.402 | 0.000 | 0.000 |
| *Dividend Dummy* | 26,181 | 0.448 | 0.000 | 0.497 | 0.000 | 1.000 |
| *Dividend Yield* | 26,181 | 0.014 | 0.000 | 0.028 | 0.000 | 0.016 |
| *ETR* | 21,361 | 0.128 | 0.079 | 0.262 | 0.000 | 0.278 |
| *Log(Assets)* | 26,181 | 4.474 | 4.443 | 2.109 | 3.173 | 5.795 |
| *Growth* | 22,446 | 0.071 | 0.038 | 0.458 | -0.078 | 0.181 |
| *Leverage* | 26,176 | 0.467 | 0.418 | 0.396 | 0.225 | 0.603 |
| *Net Income* | 24,419 | -0.091 | 0.019 | 0.420 | -0.071 | 0.064 |
| *Cash* | 25,875 | 0.108 | 0.038 | 0.173 | 0.012 | 0.117 |
| *MB* | 19,916 | 1.452 | 1.043 | 1.392 | 0.806 | 1.501 |
| *Stock Return* | 17,462 | 0.087 | 0.068 | 0.330 | -0.078 | 0.228 |
| *Volatility* | 17,462 | 4.201 | 3.540 | 2.665 | 2.258 | 5.379 |

**Table 3: Dividend policy changes and refundable franking credits – Difference-in-Differences estimates**

This table presents the results of estimating OLS and Probit models including *Dividend Dummy* as the dependent variable (Columns (1) to (4)) and a tobit model with *Dividend Yield* as the dependent variable (Columns (5) and (6)). Continuous variables are winsorized at the 1st and 99th percentiles. Robust standard errors are clustered at the firm level, and associated p-values are reported in parentheses.

| Dependent variable: | *Dividend Dummy* | | | | *Dividend Yield* | |
|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Variable | OLS | | Probit | | Tobit | |
| *RFC* | 0.067*** | 0.078*** | 0.133*** | 0.178** | 0.001 | 0.004* |
| | (0.000) | (0.000) | (0.001) | (0.024) | (0.657) | (0.058) |
| *Log(Assets)* | | 0.056*** | | 0.189*** | | 0.002*** |
| | | (0.000) | | (0.000) | | (0.000) |
| *Growth* | | -0.005 | | -0.000 | | -0.012*** |
| | | (0.647) | | (0.996) | | (0.000) |
| *Leverage* | | -0.098*** | | -0.629*** | | -0.018*** |
| | | (0.000) | | (0.000) | | (0.000) |
| *Net Income* | | 0.077*** | | 2.549*** | | 0.130*** |
| | | (0.000) | | (0.000) | | (0.000) |
| *Cash* | | -0.009 | | -0.221 | | -0.001 |
| | | (0.797) ** | | (0.182) | | (0.832) |
| *MB* | | 0.011 | | -0.029 | | 0.007*** |
| | | (0.011) | | (0.179) | | (0.000) |
| *Stock Return* | | 0.197 | | 0.609*** | | 0.011*** |
| | | (0.000) | | (0.000) | | (0.000) |
| *Volatility* | | -0.070* | | -0.274*** | | -0.008*** |
| | | (0.000) | | (0.000) | | (0.000) |
| Constant | 0.834*** | 0.667*** | 0.982*** | 0.711*** | 0.027*** | 0.023*** |
| | (0.000) | (0.000) | (0.000) | (0.005) | (0.000) | (0.000) |
| Year FE | Yes | Yes | Yes | Yes | Yes | Yes |
| Industry FE | Yes | Yes | Yes | Yes | Yes | Yes |
| Country FE | Yes | Yes | Yes | Yes | Yes | Yes |
| N | 26,181 | 15,269 | 26,161 | 15,257 | 26,181 | 15,269 |
| Adj. R-squared | 0.148 | 0.354 | | | | |
| Pseudo R-squared | | | 0.121 | 0.370 | -0.155 | -0.542 |

**Table 4: Dividend policy changes and refundable franking credits – subsample analyses**

This table presents the results of estimating OLS and Probit models including *Dividend Dummy* as the dependent variable (Columns (1) to (4)) and a tobit model with *Dividend Yield* as the dependent variable (Columns (5) and (6)). The sample is limited to firms that have observations in both the pre- and post-2000 periods. Continuous variables are winsorized at the 1st and 99th percentiles. Robust standard errors are clustered at the firm level, and associated p-values are reported in parentheses. *, ** and *** denote statistical significance of coefficients at the 10%, 5% and 1% levels, respectively.

| Dependent variable: | *Dividend Dummy* | | | | *Dividend Yield* | |
|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Variable | OLS | | Probit | | Tobit | |
| *RFC* | 0.102*** | 0.107*** | 0.254*** | 0.281*** | 0.005*** | 0.005** |
| | (0.000) | (0.000) | (0.000) | (0.001) | (0.004) | (0.024) |
| Controls | No | Yes | No | Yes | No | Yes |
| Year FE | Yes | Yes | Yes | Yes | Yes | Yes |
| Industry FE | Yes | Yes | Yes | Yes | Yes | Yes |
| Country FE | Yes | Yes | Yes | Yes | Yes | Yes |
| N | 20,884 | 13,311 | 20,884 | 13,311 | 20,884 | 13,311 |
| Adj. R-squared | 0.140 | 0.351 | | | | |
| Pseudo R-squared | | | 0.114 | 0.369 | -0.124 | -0.520 |

**Table 5: Dividend policy changes and refundable franking credits – alternative control firms**

This table presents the results of estimating OLS models including *Dividend Dummy* as the dependent variable. In Columns (1) to (4), we exclude firm-year observations from Hong Kong (KHG), Malaysia (MYS), New Zealand (NZL), and Singapore (SGP), respectively. Continuous variables are winsorized at the 1st and 99th percentiles. Robust standard errors are clustered at the firm level, and associated p-values are reported in parentheses. *, ** and *** denote statistical significance of coefficients at the 10%, 5% and 1% levels, respectively.

| Dependent variable: | *Dividend Dummy* | | | |
|---|---|---|---|---|
| | (1) | (2) | (3) | (4) |
| | Country Excluded | | | |
| Variable | HKG | MYS | NZL | SGP |
| *RFC* | 0.078*** | 0.067*** | 0.075*** | 0.054*** |
| | (0.000) | (0.000) | (0.000) | (0.003) |
| Controls | Yes | Yes | Yes | Yes |
| Year FE | Yes | Yes | Yes | Yes |
| Industry FE | Yes | Yes | Yes | Yes |
| Country FE | Yes | Yes | Yes | Yes |
| N | 15,269 | 10,368 | 15,054 | 13,038 |
| Adj. R-squared | 0.354 | 0.418 | 0.356 | 0.367 |

**Table 6: Dividend policy changes and refundable franking credits – cross-sectional analysis**
This table presents the results of estimating models including *Dividend Dummy* as the dependent variable (Columns (1) to (4)) and *Dividend Yield* as the dependent variable (Columns (5) to (8)). Continuous variables are winsorized at the 1st and 99th percentiles. Robust standard errors are clustered at the firm level, and associated p-values are reported in parentheses. *, ** and *** denote statistical significance of coefficients at the 10%, 5% and 1% levels, respectively.

| Dependent variable: | *Dividend Dummy* | | | | *Dividend Yield* | | | |
|---|---|---|---|---|---|---|---|---|
| Variables: | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
| *RFC* | -0.725*** | -0.302*** | -0.795*** | -0.099 | -0.045*** | -0.018*** | -0.040*** | -0.012* |
| | (0.000) | (0.005) | (0.000) | (0.503) | (0.000) | (0.000) | (0.000) | (0.050) |
| *RFC*highETR* | 1.519*** | 0.696*** | | | 0.075*** | 0.027*** | | |
| | (0.000) | (0.000) | | | (0.000) | (0.000) | | |
| *RFC*highAssets* | | | 1.424*** | 0.315** | | | 0.060*** | 0.017*** |
| | | | (0.000) | (0.023) | | | (0.000) | (0.005) |
| *Log(Assets)* | | 0.174*** | | 0.185*** | | 0.002*** | | 0.002*** |
| | | (0.000) | | (0.000) | | (0.002) | | (0.001) |
| *Growth* | | -0.008 | | 0.003 | | -0.012*** | | -0.012*** |
| | | (0.885) | | (0.943) | | (0.000) | | (0.000) |
| *Leverage* | | -0.634*** | | -0.643*** | | -0.017*** | | -0.019*** |
| | | (0.000) | | (0.000) | | (0.000) | | (0.000) |
| *Net Income* | | 2.656*** | | 2.521*** | | 0.143*** | | 0.129*** |
| | | (0.000) | | (0.000) | | (0.000) | | (0.000) |
| *Cash* | | -0.145 | | -0.169 | | 0.001 | | 0.002 |
| | | (0.444) | | (0.325) | | (0.935) | | (0.736) |
| *MB* | | -0.041* | | -0.028 | | 0.007*** | | 0.007*** |
| | | (0.082) | | (0.207) | | (0.000) | | (0.000) |
| *Stock Return* | | 0.567*** | | 0.608*** | | 0.010*** | | 0.011*** |
| | | (0.000) | | (0.000) | | (0.000) | | (0.000) |
| *Volatility* | | -0.255*** | | -0.272*** | | -0.008*** | | -0.008*** |
| | | (0.000) | | (0.000) | | (0.000) | | (0.000) |
| Constant | 0.866*** | 0.713*** | 0.899*** | 0.722*** | 0.022*** | 0.022*** | 0.024*** | 0.024*** |
| | (0.000) | (0.005) | (0.000) | (0.004) | (0.000) | (0.000) | (0.000) | (0.000) |
| Year FE | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Industry FE | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Country FE | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| N | 21,333 | 12,205 | 26,161 | 15,257 | 21,361 | 12,222 | 26,181 | 15,269 |
| Pseudo R-squared | 0.156 | 0.365 | 0.148 | 0.370 | -0.311 | -0.674 | -0.209 | -0.544 |

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