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Dividend imputation in Australia: The value of franking balances

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Abstract

While tax clienteles are noted in the literature there is little empirical evidence to support their impact on share valuation or corporate finance more generally. This paper provides evidence of tax clienteles arising from the specific exclusion of non-resident shareholder access to imputation credit benefits. In 1987, the Australian Government set out to address the problem of double taxation of dividends by allocating a tax credit equal to the Australian corporate tax paid on earnings to resident shareholders. This credit, called a dividend imputation credit or a franking credit, is attached to dividends distributed to Australian resident shareholders. Franking credits that are not distributed accrue over time as franking balances. This paper focuses on the value of these franking balances with the finding that franking credits are valuable to the marginal investor in the smaller companies in the sample but not for companies falling within the largest 100 listed companies. Further, there is evidence that smaller companies are less likely to accumulate franking balances consistent with franking credits being of more value in the hands of the marginal investor in these companies. The results are consistent with the existence of two tax clienteles, resident shareholder and non-resident shareholders, where resident shareholders are the marginal investors in small firms and non-resident shareholders as the marginal investors in large firms.

1. Introduction

This paper provides evidence of tax clienteles in an Australian corporate setting. The current dividend tax legislation effectively splits Australian corporations into two clienteles, companies with resident marginal investors where franking credits are valuable and companies with non-resident marginal investors where franking credits are of less value. There is little empirical evidence of the existence of tax driven corporate behaviour in the finance literature (Myers 1984, 2001) and this paper provides evidence of the impact of tax clienteles on Australian share valuation.

The introduction of the dividend imputation tax system in Australia in 1987 marked a fundamental change in the way that Australian dividends were taxed as it removed double taxation of earnings subject to Australian corporate tax for Australian resident shareholders. Prior to this change earnings were taxed once at the corporate level at the corporate tax rate and then at the individual investor level at the individual tax rate when dividends were paid out. This change to the Australian tax system creates an integrated tax system for Australian resident shareholders with dividend income being taxed at the investor marginal income tax rate. Under the dividend imputation system, Australian resident investors are credited with the Australian corporate tax paid by Australian companies through the distribution of dividend imputation credits, or franking credits. These credits are attached to dividends distributed by Australian companies either as fully or partially franked dividends. More recently, while Australian companies are penalised for distributing more franking credits than they have accumulated, franking balances can build up over time where earnings subject to Australian corporate tax are not fully distributed. Further, corporations maintain a record of franking credits that are available for distribution to investors but companies are not required to disclose this information under the accounting standards that applied during the study period and so there is considerable variation in disclosure of franking balance across companies. A critical feature of the Australian dividend imputation tax system for this analysis is that non-resident investors are specifically excluded under the legislation.

The question of whether franking credits are valuable has proven to be an important question for regulators and consultants in the determination of appropriate rates of return for regulated industries (Gray & Hall 2008). Yet, there has been no analysis of the value of franking balances that Australian companies accumulate over time. The results reported in this paper suggest the existence of two tax clienteles with respect to these franking balances. The first tax clientele consists of the marginal investors in large Australian companies who attach little value to franking balances. These investors are most likely non-resident shareholders who find it too costly to set up schemes to benefit from franking balances. The second tax clientele consists of marginal investors in small Australian companies who value franking balances.

The theoretical link between tax and the value of a company is well understood (Modigliani & Miller 1958, 1963; Miller 1977) though empirical support for the impact of taxes on the value of the company has been less forthcoming (Myers 1984, 2001).[1] The introduction of dividend imputation provides an opportunity to further explore the impact of the taxes on the value of a company. Empirical research into the Australian imputation system supports the existence of tax effects in corporate financing and share valuation (Walker & Partington 1999; Faff *et al.* 2001; Twite 2001; Cannavan *et al.* 2004; Hathaway & Officer 2004; Beggs & Skeels 2006; Pattenden 2006) though much of this research is based on data drawn from the period prior to 1 July 1997 when tax regulations were introduced to limit franking credit trading schemes. Research using data that extends beyond 1 July 1997 is limited (Cannavan *et al.* 2004; Hathaway & Officer 2004; Beggs & Skeels 2006) though it is evident that the regulatory changes introduced on 1 July 1997 restricted the ability of non-resident investors to benefit from franking credits (Gray & Hall 2008; Lally 2008; Truong & Partington 2008). The introduction of a tax rebate for unused franking credits from the 1 July 2000 is another important change to imputation system (Beggs & Skeels 2006) as this removes a constraint on the use of franking credits by resident investors.[2]

[1] There have been some exceptions (MacKie-Mason 1990; Graham 2003).
[2] This rebate allowed individuals and superannuation funds who held franking credits in excess of their taxable income to claim a tax refund. Prior to 1 July 2000 individual shareholders could only claim tax credits against the tax that they owed and this created inequities, particularly for small shareholders with little taxable income and superannuation funds

The specific exclusion of non-resident taxpayers is particularly important given non-resident investors control more than 40% of the equity listed on the Australian Stock exchange.[3] Indeed, there are examples of non-resident investors using various schemes to benefit from franking credits (Cannavan *et al.* 2004). A further exclusion, perhaps more by omission than design, affects all investors and this relates to undistributed franking credits (or franking balances). Companies can choose not to distribute all of their Australian taxed income as dividends and so Australian resident shareholders in this case may not gain the full benefit of the franking credits accumulated by the company. Since 1987, the level of franking balances accumulated by Australian companies has grown, resulting in a substantial notional tax benefit withheld at the corporate level for Australian resident shareholders. A recent estimate puts the total franking balances held by all Australian companies, both listed and unlisted, at more than $100 billion dollars (Kerin 29 January 2010).

This paper uses a large sample of corporations listed on the Australian Securities Exchange that report their franking balances over the period 2001 to 2006 and this sample is used to explore the question of whether undistributed franking credits held at the corporate level are of value to shareholders. Fixed effects panel analysis suggests that franking balances are correlated with the market value of shares in the company, consistent with franking credits being of value to shareholders, though this effect is not uniform across the sample. Importantly, there is little evidence that franking credits are of value to the marginal investor in very large companies, those drawn from the largest 100 listed companies by book value of assets. The literature is reviewed in the next section, with data description provided in Section 3. The results of the analysis are reported and discussed in Section 4 and summary and conclusions follow in Section 5.

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that were taxed at 15%. With the introduction of franking credit refunds after 1 July 2000 resident investors can now obtain the full benefit of the franking credits regardless of their taxable income. It has been suggested that this led to greater emphasis on dividend payment as resident investors were no longer limited by their taxable income in their use of franking credits (Beggs & Skeels 2006).

[3] Non-resident ownership of Australian listed equity amounted to 42% as of the end of the December quarter 2008 (ASX 2009).

2. Literature review

The impact of dividend imputation on the cost of capital has been discussed in the literature with a focus on further developing the traditional one-period model (Monkhouse 1993; Officer 1994; Boyle 1996; Monkhouse 1996; Wood 1997; Lally & van Zijl 2003; Dempsey & Partington 2008). Much of the research is based on the assumption that the Australian market is segregated and this gives rise to the argument that the value of franking credits is impounded in share prices. In this scenario undistributed franking credits are valuable to the shareholders in the company. Yet, the value of franking credits at the company level is not so clear when Australia is viewed as a small part of an integrated world financial market (Officer 1994; Wood 1997; Gray & Hall 2006, 2008). If franking credits are not valuable to the marginal investor then franking balances will be uncorrelated with share value.

The identity of the marginal investor has proven to be an important consideration in this literature given the restrictions placed on non-resident shareholder access to franking credits. If the marginal investor cannot benefit from franking credits then the price of the share will not impound this benefit (Officer 1994). Indeed, the possibility of restricting non-resident shareholder access to franking credits while allowing resident investors full access to the credits is specifically catered for in the literature. In an integrated market there may be a tendency for resident investors and non-resident investors to form tax based investment clienteles that are attracted to particular companies on the basis of the level of fully franked dividends paid by the company (Wood 1997). Wood predicts that the market value of franking credits in a small, integrated market characterised by these two classes of investor is essentially zero but this model ignores the liquidity costs that foreign investors face with investment in the thinly traded shares of small Australian companies.

Argument about whether franking credits are actually valued in the market has continued with the observation that the models used by regulators may not be internally consistent. On the basis of the Officer model, it is suggested that dividend yields would need to be set at excessively high levels to justify the franking credit value proposed in the literature (Gray & Hall 2006, 2008).

Indeed, Gray and Hall argue that setting the value of franking credits to zero appears to be more consistent with observed dividend yields. The response to this proposition is generally based on the presumption that franking credits are valuable to shareholders (Lally 2008; Truong & Partington 2008). A further view is that the value of franking credits is approximately 50% of their theoretical value (Hathaway & Officer 2004) on average across the market. The question remains as to whether franking credits are actually valuable to shareholders and, if so, which shareholders attach value to these credits?

If franking credits are valuable then the introduction of the dividend imputation system should have some impact on corporate finance decisions. There is evidence to support an imputation driven change in capital structure away from debt and towards equity with the introduction of the imputation system in 1987 (Twite 2001; Pattenden 2006) through to the late 1990s. There is also evidence of imputation effects in the price drop that occurs on the dividend ex date, supporting the existence of valuable imputation tax benefits.[4] Yet, virtually all of the period covered by these studies is marked by fairly lax enforcement of the non-resident franking credit benefit rules, with a number of schemes providing non-resident investors with access to the franking credit benefits specifically denied them under the legislation. This changed on 1 July 1997, with the introduction of a set of regulations by the Australian Government. These regulations made it considerably more costly for non-resident shareholders to access franking credits using simple trading strategies. It is argued that these restrictions had a considerable impact on the benefit of franking credits to non-resident investors (Cannavan *et al.* 2004).

Two recent studies that include the post July 1997 period focus on dividend ex date tax effects and while they rely on similar data sets and produce similar coefficient estimates their interpretations differ.[5] Hathaway and Officer calculate the magnitude of the drop off, which is less

[4] (Walker & Partington 1999; Hathaway & Officer 2004; Beggs & Skeels 2006).

[5] It is difficult to reconcile the two data sets. The Beggs and Skeels data set spans the period from April 1984 to May 2004 and includes around 5511 observations (Beggs & Skeels 2006). Their sample excludes small company observations (market capitalisation less than 0.03 in the All Ordinaries share price index), observations with company events reported around the dividend ex date, special dividends and dividends reported in October 1987. Sample size is carefully reported throughout this paper. The Hathaway and Officer data set includes 6870 observations and covers the

than one, which implies that the marginal investor on average attaches a value to franking credits of about 50% (Hathaway & Officer 2004). Beggs and Skeels focus solely on statistical tests of the ex dividend date tax arbitrage relationship. They reject the tax arbitrage explanation for the dividend ex date effect, finding that the franking credit coefficient is only statistically significantly different from zero in the later part of the study period (1998, 1999 and 2002 to 2004). These studies focus on all available dividends that meet their sample criteria. There is no attempt to test for the possibility of tax clienteles.

The valuation of franking credits has proven a difficult task. The work of Cannavan, Finn and Gray (2004), Beggs and Skeels (2006) and Hathaway and Officer (2004) provide examples of recent research in the area. Yet, there is still some contention as to whether franking credits are of value to shareholders. Further, there has been no analysis of whether franking balances held by Australian companies are valuable to the marginal investor, particularly following the tax regulation changes that took effect from 1 July 1997.

3. Modelling and hypothesis development

Officer models corporate cash flows accruing to shareholders in terms of perpetuity equivalents for profit to shareholders, X_i, dividends paid to shareholders, D_i, operating income of the company, X_O, interest paid on loans, X_D, and Corporate tax rate, T (Officer 1994). The Australian corporate tax paid by the company is defined, $CTP_i = T(X_O - X_D)$, with the proportion of franking credits that shareholders access in equilibrium being the franking credit proportion, γ_i. It should also be possible to write this as a function of dividends such that $\gamma_i CTP_i = \gamma_i T(X_O - X_D) = \gamma_i T \phi_i D_i = \theta_i D_i$, where $(X_O - X_D) = \phi_i D_i$. Essentially, companies can only pay franked dividends out of income that is subject to Australian corporate tax and so not all

period, August 1986 to August 2004 (Hathaway & Officer 2004). This data set excludes dividends distributed by companies outside the ASX/S&P500 index though it is difficult to identify the final data set used in analysis as sample sizes are not reported in Table 3 of the paper.

dividends need be franked. Further, companies may choose not to distribute all of the profit subject to Australian corporate tax and so undistributed franking credits may accumulate over time.

The proportion of credits optimally distributed to shareholders could depend on the mix of resident and non-resident shareholders in the company and the impact of imputation credits on price will be determined by the marginal investor (Wood 1997). Thus, the profit attributable to share *i* can be decomposed into two terms (Officer 1994). Officer assumes that not all after tax earnings need create franking credits in the hands of the resident shareholder consistent with $\gamma_i \in (0,1)$. Thus, the benefit to resident shareholders is a function of dividends received and the proportion of franking credits attached to these dividends.

$$D_i + \gamma_i T(X_O - X_D) = D_i(1+\theta_i) \tag{1}$$

For simplicity, both dividend and franking credits are assumed to be expressed as perpetuities and discounted at the rate (k) to give the value of the shares in the company (S_i).[6]

$$S_i = \frac{D_i + \gamma_i T(X_O - X_D)}{k} = \frac{D_i(1+\theta_i)}{k} \tag{2}$$

The key prediction from this relationship is that equity value is increasing in the value of franking credits and this can vary across companies with variation in the franking credit factor, γ_i. It is also decreasing in the discount rate, which varies across companies with changes in systematic risk. The required rate of return could be specifically modelled using either a one factor market model (Sharpe 1964; Lintner 1965) or a multifactor model like the three-factor model proposed by Fama and French (Fama & French 1993). But, in this study fixed effects panel data analysis is relied upon to capture the impact of unobservable company specific effects such as discount rate and franking credit proportion. The approach is chosen because of the difficulty of accurately measuring required rates of return for many of the small thinly traded shares that account for a large percentage of the sample.

[6] An appropriate discount rate will reflect the risk attached to the sum of these perpetuities.

If it is assumed that a company distributes all available franking credits and that the marginal investor can fully use these distributed franking credits then if $\gamma = 1$ the share price fully reflects available franking credits. If $\gamma = 0$ then franking credits have no value to the marginal investor and share price is a function of the dividend perpetuity alone. If $0 < \gamma < 1$ then franking credits are partially impounded into share prices. To get a sense of the impact that franking credits could have on share price, assume that a company earns $10 per share in perpetuity, paying corporate tax of $3.00 per share and distributing a dividend of $7.00 per share. The discount rate is 0.05 and this is applied to both dividends and franking credits. It is assumed for this example that the rate is the appropriate ICAPM rate that applies to shares traded in a small open economy. If we set $\gamma = 0.5$, as is often assumed in the literature (Hathaway & Officer 2004), then the factor applied to Australian corporate tax payments is $\frac{\gamma}{k} = \frac{0.5}{0.05} = 10$ and the value of franking credits in the hands of Australian residents is $30. If $\gamma = 1$ then this factor is 20 and franking credits would be valued at $60 by Australian residents. Table 1 provides a summary of the hypothetical value of these shares to Australian residents in a small open economy under each of the three scenarios. The greater the franking credit factor, the more valuable are franked dividend paying shares in the hands of a resident shareholder. The value of franking credits for a non-resident investor is lower because of the cost of setting up a scheme to recoup the value of franking credits and so a fully franked share is assumed to be less valuable to non-resident investors, at worst being equal in value to an otherwise equivalent unfranked dividend paying share.

[Insert Table 1 about here]

The reliance on equivalent perpetuities is important in these simple valuation models. The actual cash flows generated by a company could differ considerably over the life of the company and it is likely that the distribution of franked dividends will vary over time, reflecting variation in

investment opportunities and business conditions. Thus, franking balances will tend to increase in some periods and decrease in other periods, regardless of whether these credits are of value to the marginal investor. If the marginal investor is a non-resident investor and share price does not reflect franking credits then franking balances will be uncorrelated with the value of the company, all else held constant. If a resident shareholder is the marginal investor then franking credits and franking balances will be valuable to the shareholder and this value will be reflected in share price. This leads to the first hypothesis.

Hypothesis 1

Null: The value of franking balances is uncorrelated with the value of the company.
Alternate: The value of franking balances is positively correlated with the value of the company.

As indicated in equation (2), the share price can be written in terms of the sum of the present value of an equivalent perpetuity of dividends and the present value of an equivalent perpetuity of franking credits. Under the null, franking balances have no value to the marginal investor in company i at time t and so the value of equity is the present value of the dividend perpetuity:

$$S_{it} = \frac{(1+\theta_i)}{k_i} D_{it} \tag{3}$$

Taking natural logs results in the linear form:

$$s_{it} = d_{it} + k_i^* \tag{4}$$

where $s_{it} = \ln(S_{it})$ = the natural log of the share price of company i at time t,
$d_{it} = \ln(D_{it})$ = the natural log of dividend perpetuity for company i at time t,
$k_i^* = \ln((1+\theta_i)/k_i)$ = the natural log of the discount rate for company i,

Both share value and dividends are likely to be non-stationary yet correlated in a fundamental way, given the dividend perpetuity pricing relationship (Kleidon 1988a, 1988b; Cuthbertson & Hyde 2002; Heaney 2003) and so the model is restated in error correction form. Assuming the discount

rate is constant over the study period for each company, adding and subtracting d_{it-1} on the left hand side and subtracting s_{it-1} from both sides of the equation gives:

$$s_{it} - s_{it-1} = k_i^* + d_{it} - d_{it-1} - (s_{it-1} - d_{it-1}) \quad (5)$$

Using dummy variables (fixed effects) to capture unobservable company effects (including the discount rate), α_{i0}, and time effects, α_{t0}, and with the addition of error term, ε_{it}, this model can be written as:

$$ds_{it} = \alpha_{i0} + \alpha_{t0} + \alpha_1 dd_{it} + \alpha_2 ECT_{it-1} + \varepsilon_{it} \quad (6)$$

where $ds_{it} = s_{it} - s_{it-1}$
$dd_{it} = d_{it} - d_{it-1}$
$ECT_{it-1} = s_{it-1} - d_{it-1}$

If franking credits are valuable then franking balances (fcb_{it}), accumulated over time by Australian companies, are also valuable to shareholders and so the franking balance will be positively correlated with company value. Equation (5) is supplemented with the change in the natural log of franking balance, $dlfcb_{it}$, and a residual term, ν_{it}, to give the equation used to test hypothesis 1 within a fixed effects panel framework.

$$ds_{it} = \alpha_{i0} + \alpha_{t0} + \alpha_1 dd_{it} + \alpha_2 ECT_{it-1} + \alpha_3 dlfcb_{it} + \nu_{it} \quad (7)$$

where $dlfcb_{it}$ = the change in the natural log of the franking balance

There is little reason to expect resident investors to want companies to delay dividend payments, regardless of their marginal tax rate (See Appendix 1). Yet, there is considerable incentive for non-resident investors who face a classical tax system (e.g. US investors) to delay dividend payment in lieu of capital gains. This is particularly the case where this group of investors are denied access to franking credit benefits. Further, in small open economies, non-resident investors favour large, liquid companies with an international focus and diversified shareholding. This is evident both in Taiwan (Lin & Shiu 2003) and in Sweden (Dahlquist &

Robertsson 2001) and it is expected that these characteristics will also be attractive to non-resident investors who invest in Australian companies. Given the difficulty in identifying the true marginal investor in a company, these company characteristics are used to proxy non-resident investor effects on company share price. This gives rise to the second hypothesis, concerning the relation between non-resident ownership and franking balances. If non-resident investors prefer capital gains to dividends and they control the firm, then franking balances will accumulate more rapidly over time than would occur where resident shareholders control the company. Australian resident shareholders, all else held constant, would prefer zero franking balances.

Hypothesis 2

Null: Undistributed franking balances are independent of company characteristics conducive to non-resident investment

Alternate: Undistributed franking balances are greatest for those companies most attractive to non-resident shareholders.

It is expected that the magnitude of the franking balances will be correlated with the incidence of non-resident marginal investor. As indicated above, non-resident shareholders favour larger liquid companies that have an international focus and diversified shareholdings when investing in a small, open economy. Non-resident shareholders, subject to a classical tax system, will prefer capital gains to dividends and it is predicted that where these investors are the marginal investor there will be a steady build up of franking balances over time. The test of this hypothesis is also set within a fixed effects panel data framework with error term, η_{it}, as follows:

$$lfcb_{it} = \beta_{i0} + \beta_{t0} + \beta_1 LBVA_{it} + \beta_2 SHRC_{it} + \beta_3 INTF_{it} + \eta_{it} \qquad (8)$$

where $lfcb_{it}$ = natural log of the franking balance for company i at time t,
$LBVA_{it}$ = natural log of the book value of assets for company i at time,
$SHRC_{it}$ = ratio of the shares held by the largest shareholder to the shares held by the top 20 shareholders for company i at time,
$INTF_{it}$ = ratio of non-resident revenue to total company revenue for company i at time.

The natural log scaling simplifies analysis with $\beta_1 = \frac{dfcb/fcb}{dBVA/BVA} = \xi(fcb, BVA)$, being the elasticity of the franking balance with respect to the company size. The coefficient, $\beta_2 = \frac{dfcb/fcb}{dSHRC}$, is the rate of change in the franking balance that occurs with a change in shareholder concentration and the coefficient, $\beta_3 = \frac{dfcb/fcb}{dINTF}$, is the rate of change in the franking balance occurring with a change in international focus.

4. Data

The initial data set used in analysis is drawn from the population of listed Australian companies covered by Aspect Huntley over the period 2001 through to 2006.[7] While some quite large companies like Rio Tinto do not report franking balances in their annual reports over this period, many Australian listed corporations do disclose this information in the notes to their annual report. Information on shareholder concentration, non-resident revenue and dividend buyback is also manually collected from the notes to the financial accounts. Total dividend paid, market value of shares in the company, book value of assets and book value of shareholders equity, as well as the control variables, are obtained from the Aspect Huntley data set with gaps filled manually from the original pdf copies of the financial accounts or from individual company web sites.

The natural log of the market value of shares in the company, s_{it}, the change in the natural log of the market value of shares in the company, ds_{it}, the natural log of the sum of dividends and share buy backs, d_{it}, the change in this variable, dd_{it}, the change in the natural log of franking balances, $dlfcb_{it}$, and control variables are included in tests of hypothesis 1. Tests of hypothesis 2 require the natural log of franking balances, $lfcb_{it}$, as well as variables chosen to capture the level of non-resident investment in individual companies and control variables. The natural log of the book

[7] I thank Steve Easton and Howard Chan for their suggestion to focus only on those companies that report franking balances.

value of assets is used as a proxy for size, $LBVA_{it}$. The proxy for shareholder concentration is the ratio of the shares held by the largest shareholder to the shares held by the top 20 shareholders, $SHRC_{it}$ and international focus is captured by the ratio of foreign revenue to total revenue, $INTF_{it}$. Control variables include measures of leverage (LEV_{it}), earnings ($EARN_{it}$) and growth options (RD_{it}).

The measurement of the equivalent dividend perpetuity amount is a difficult task. We rely on historical data to proxy for this perpetuity amount, using the sum of dividends plus share buybacks paid out during the current year as a proxy.[8] The analysis is also run excluding share buyback data from the dividend perpetuity calculation with little impact on final analysis.

Control variables include leverage (LEV_{it}, total liabilities to total assets), earnings ($EARN_{it}$, net profit after tax to total revenue) and growth options (RD_{it}, R&D to total revenue). Given the range of firms that are included in the sample there are some extreme values for each of these control variables and so we windsorise the data at the 2.5% and 97.5% values, rather than drop firm-year observations from the sample. This involves sorting the variables and identifying the values ranked 2.5% and 97.5%. The 2.5% (97.5%) value is then used to replace all values ranked lower than 2.5% (higher than 97.5%). This gives rise to the windsorised variables, $LEVw_{it}$, $EARNw_{it}$ and RDw_{it}.

Sample characteristics and descriptive statistics for dividends and franking balances are reported in Table 2. The initial sample of companies available for analysis ranges from 1250 companies in 2001 through to 1536 companies in 2006 but this paper focuses only on those companies that report franking balances (described in columns 2 through 5). Nevertheless, the number of companies with franking balances (512 companies on average each year) exceeds the number of companies paying dividends (449 companies on average each year) which suggests that any bias arising from self selection should not be too severe. There are also some companies that

[8] This definition does not appear too extreme given the fairly sticky nature of dividends over time (Fama & French 2002).

report share buybacks over the study period (31 companies on average each year). Total franking balances for the sample increase over the sample period, rising from a total of $5 billion in 2001 through to $17 billion in 2006 and the average franking balance for these companies is $21 million over sample period. It should be noted that the method of calculating franking balances was changed with the Business Tax Reform's Simplified Imputation System, which became effective from 1 July 2002. This required that franking balances as at 30 June 2002 be converted to reflect the credit balances on a tax paid basis rather than on an after tax distributable profits basis. The tax paid balances basically represent the imputation tax credits that are available for distribution. A factor of 30%/70% is applied to the 2001 and 2002 franking balances to bring them into line with later year balances.

[Insert Table 2 about here]

Data description is provided in Table 3 with descriptive statistics reported in Panel A and correlation coefficients in Panel B. While not reported separately, the average market value of corporate equity is $1.363 billion with a maximum of $174 billion over the 6-year period for all sample firm-year observations. The average dividend paid by a company across all franking credit reporting companies over the 6-year period is $45 million and the average company year share buy back is $104 million.[9] The shareholder concentration ratio over all company years is 34%, indicating the importance of the shareholding of the largest shareholder relative to the largest 20 shareholders for the sample as a whole. This is expected given the number of small companies in the sample. The ratio of foreign revenue to total revenue averages 9% across all firm-years available for the franking credit reporting companies. The leverage measure, liabilities to assets, averages 0.45 with median of 0.46 and the earnings measure, net profit after tax to total revenue,

[9] Average dividends and average share buybacks are calculated as averages over all of the companies in the sample that report franking credits. It should be noted that few companies institute share buy backs during the study and not all companies pay a dividend in each year.

averages -0.05 with median of 0.06. The median for R&D to sales is 0.0000. The averages for leverage, earnings and R&D tend to reflect the impact of numerous small to medium companies that fall within the sample. Correlation coefficients are reported in the Panel B of Table 3. There are a number of statistically significant correlation coefficients (at the 5% level), though the correlation between the change in the log of the market value of equity and the change in the log of the franking balance.

[Insert Table 3 about here]

5. Analysis

Fixed effects panel data analysis is used in testing hypotheses 1 and 2 as proposed in Section 3. The first hypothesis involves a test of whether company value is correlated with franking balances. Under the second hypothesis, if non-resident marginal investor preference for capital gains explains the build up of franking balances at the company level then company characteristics attractive to non-resident investors like size, shareholder concentration or international focus will be correlated with franking balances. Separate analysis is reported for the full sample, for those companies that fall within the largest 100 companies by total book value of assets as well as those that do not fall within the largest 100 companies. The largest 100 companies are identified each year using the full sample of companies that are available for the year and the franking credit reporting companies are allocated to the two groups each year according to where they fall within this ranking. There is evidence that franking credits may not be valued by shareholders in large Australian companies (Cannavan *et al.* 2004; Beggs & Skeels 2006) though this rather extreme position is questioned by Hathaway & Officer (Hathaway & Officer 2004) who propose that franking credits are valued at approximately 50% of their theoretical value on average across Australian shares.

If non-resident access to franking credit benefits is restricted then, given the substantial non-resident shareholding evident in Australian listed companies, franking credits may indeed be valued at less than their theoretical value where the marginal share holder is a non-resident shareholder. Recent dividend ex date based analysis has tended to focus on the impact of known dividend payments on share prices averaged across a large sample of Australian shares (Hathaway & Officer 2004) though there has been little attention directed to determining whether franking balances held by the company are valuable to particular groups of shareholders.

5.1 Value of franking balances

The analysis described in this section focuses on the sensitivity of equity value to franking balances. If franking credits accumulated by the company are valuable then share value will be correlated with franking balances after controlling for dividends and company specific effects. The empirical tests reported in this section are based on equation (6) and equation (7) and estimated using unbalanced fixed effects panel analysis. The coefficient estimates are reported in Table 4 for both the simple pricing model, equation (6), and the expanded model that includes the change in franking balances, equation (7). Panel A focuses on the simple models described above while the analysis reported in Panel B includes additional variables to capture the impact of the marginal investor, earnings, leverage and growth options. Each of the estimated models reported in Panel A of Table 4 are statistically significant at the 5% level of significance. There is also support for the use of fixed effects panel data analysis with the fixed effect dummy variables taken as a group being statistically significantly different from zero and considerable correlation evident between the explanatory variables and the fixed effect dummy variables.

[Insert Table 4 about here]

Coefficients are reported for the basic model, equation (6), and the extended model, equation (7) in Panel A of Table 4. The coefficient estimated for the change in dividends is positive and statistically significant as predicted by the dividend discounting valuation model. Further, the error correction term coefficient is negative and statistically significant. These results hold regardless of the sample chosen for analysis. The estimated franking balance coefficients are positive and statistically significant for the all companies sample and for the small company sub-sample (not being one of the largest 100 companies) though this coefficient is not statistically significant for the large company sub-sample. The lack of consistency between the small company and large company analysis suggests that franking balances are valued differently for these two sub-samples, consistent with non resident marginal investors in large companies and resident marginal investors in smaller companies. Certainly, the literature on non-resident investment in small open economies, suggests that non-resident investors prefer to invest in larger companies (Dahlquist & Robertsson 2001; Lin & Shiu 2003). This interpretation is also consistent with the results reported by Cannavan, Finn and Gray (2004), who analysed low exercise price option (LEPO) and individual share futures contract based arbitrage relationships for large listed Australian companies.[10] Thus, it would appear that franking balances may be of little value to marginal investors in the larger, more liquid Australian stocks.

It is important to test the sensitivity of these results to alternative explanations for the change in share value. While there is support in the literature for the dividend discounting model it is useful to allow for the possibility of confounding effects. Thus, the model is extended to include a measure of earnings (net profit after tax to total revenue), growth options (R&D to total revenue) and leverage (total liabilities to book value of total assets) as well as measures of size, shareholder concentration and international focus as defined above. Interaction terms are also included to test for the possibility of an interaction between the franking balance and each of the four variables,

[10] The *Cannavan, Finn and Gray (2004)* study focused on franking credit-stripping schemes using low exercise price options (LEPOs) and individual share futures contract. These derivatives are rarely traded on companies that fall outside the largest 100 companies listed on the stock exchange.

size, shareholder concentration, international focus and change in dividends. The results for the extended model are reported in Panel B of Table 4. Consistent with the simple model reported in Panel A of Table 4, both the dividend and the error correction terms are statistically significant. Further, the franking balance coefficient is positive and statistically significant at the 5% level for the full sample and at the 10% level for the small company sub-sample. Again, this coefficient is not statistically significant for the large company sub-sample. Thus, franking balances appear to be value relevant for the smaller firms in the sample though not for the large firms.

While some of the control variable coefficients are statistically significant the interaction term coefficients are of particular interest as they offer further insight into the impact of franking balances on the value of listed Australian companies. For the full sample, coefficients estimated for the interaction between franking balance and both size and international focus are negative and statistically significant at either the 5% or the 10% level. This suggests that the sensitivity of share price to a change in franking balance is negatively related to size and international focus. Thus franking balances are less valuable to shareholders in large Australian companies with an international focus than they are to shareholders in smaller, less internationally focused companies.

The difference in the valuation of franking credits in large companies relative to small companies is further borne out in the sub-sample size interaction coefficient. This coefficient is not statistically significant for either the large company sub-sample or the small company sub-sample, consistent with the size based interaction effect existing between these two groups rather than within them.

The coefficient for the international focus interaction term is statistically significant for the large company sub-sample but not for the small company sub-sample. This is consistent with the argument that marginal investors in smaller Australian companies are Australian residents who tend to value franking credits regardless of the international focus of the company. This is not the case for larger companies as the international focus interaction coefficient is statistically significant and negative when estimated using the large company sub-sample. Thus, within the top one hundred

companies, the share price of those companies with greater international focus is less sensitive to changes in franking balances than the share price of those companies with lower levels of international focus.

Finally, the interaction term for franking balance and dividends is statistically significant at the 10% level of significance for the largest 100 firms while not being statistically significant for either the full sample or the smaller firm sub-sample. Within the large firm sub-sample the sensitivity of share price to franking balance is increasing in dividends. This is an important result because it suggests that even among those firms that fall within the largest 100 firms, there is evidence that the share price of high dividend paying firms is more sensitive to the level of franking balances than the share price of low dividend paying firms.

It would seem that foreign investors who tend to favour large liquid companies with an international focus (Dahlquist & Robertsson 2001; Lin & Shiu 2003) and who have limited ability to benefit from franking credits (Cannavan *et al.* 2004) are the marginal investors in large Australian listed companies. As a result, franking credits have little impact on the value of shares in these companies. The marginal investor in smaller companies appears to value franking credits, consistent with these investors being Australian resident investors. While the null under hypothesis 1 cannot be rejected for companies falling within the top 100 companies by size, it is rejected in favour of the alternate hypothesis for both the small company sub-sample and for the full sample.

The analysis is extended to the franking balances themselves in the following section to assess whether the variation in the magnitude of these balances also reflects variation in access to franking credits.

5.2 Determinants of franking balances

The second hypothesis is concerned with explaining the level of franking balances that a company chooses to hold. It is expected that non-resident shareholders, subject to a classical tax system, will prefer to reduce the level of dividend payments that a company makes if they are

unable to benefit from franking credits. In this situation, franking balances would build up over time due to relatively low dividend payout rates, all else held constant. Given there is evidence that non-resident shareholders favour large liquid companies with a foreign focus and diversified shareholdings (Dahlquist & Robertsson 2001; Lin & Shiu 2003) it is expected that company variables that capture these characteristics would be correlated with the level of franking balances that companies accumulate over time.

The model used to test this proposition is described in equation (8) and the coefficients estimated for this model are reported in Table 4 for the three samples; all companies, those falling within the largest 100 company group and the remaining smaller companies. Each of the estimated models reported in Table 5 are statistically significant at the 5% level of significance. The fixed effect dummy variables taken as a group are statistically significantly different from zero for each of the estimated models and the correlation between the explanatory variables and the fixed effect dummy variables is also quite large.

[Insert Table 5 about here]

The size coefficients are positive and statistically significant. These coefficients are measures of the elasticity of franking balance with respect to company size. They indicate the percentage change in franking balance associated with a one percent change in company size. The elasticity is considerably greater for large companies (1.2666) than it is for the smaller companies (0.40). Indeed it is more than three times the magnitude. For large companies, franking balances increase more than proportionately with increases in company size while for small companies franking balances are much less sensitive to variation in company size. This result is consistent

with a classically taxed non-resident shareholder who is relatively insensitive to the accumulation of franking balances being the marginal investor in larger companies.[11]

The shareholder diversification coefficient is negative in all cases and statistically significant for the full sample and for the smaller company sub-sample. This supports the argument that increases in the diversification of shareholding are associated with increases in the rate of change of franking balances. While this result supports the non-resident investor preference argument the statistical strength of the results for the small company sub-sample suggests an alternative explanation. Perhaps resident owner controlled small companies distribute franking credits as soon as it is feasible to do so.[12] This will result in smaller franking balances for resident controlled companies, all else held constant. This alternative explanation is particularly salient given that owner controlled companies are rarely found among the large 100 company group.

While there is no evidence of a statistically significant international focus effect in the analysis reported in Table 5, the size effect and shareholder concentration results are consistent with hypothesis 2. These results are robust to inclusion of control variables to capture leverage, earnings and growth options.

The analysis in table 5 focuses on the natural log of franking balances to obtain an estimate of the elasticity of the franking balance with respect to firm size. As a robustness test, this analysis is repeated using franking balances scaled by the market value of equity in lieu of the log of franking balance. If franking credits are valuable to the marginal investors in a firm then it is expected that these balances would be kept to a minimum, with franking credits distributed when available. The size coefficient estimated for the firms that fall within the largest 100 firm sub sample is statistically significant and positive. It would seem that franking balances are allowed to build up to a greater extent in the larger firms in this group, consistent with the argument that the marginal investors in the largest firms place less value on franking balances, and this is found even

[11] Non-resident shareholders subject to a classical tax system who cannot benefit fully from franking credits tend to prefer capital gains to dividends and this may explain the proportionately greater sensitivity of franking balance to firm size for the largest firms in the sample.

[12] As indicated in the appendix there is no tax-based reason for a resident shareholder to prefer delayed payment of fully frank dividends.

among the firms that fall within the largest 100 firms sub sample itself. There is a statistically significant negative relation between ratio of franking balance to the market value of equity and size for both the full sample and the smaller firm sub sample and the absolute value of the size coefficient for the small firm sub sample (-0.2231) is less than half that estimated for the sub sample consisting of the largest firms (0.5789). Given that the market value of equity is positively correlated with the book value of assets, this negative coefficient could be explained by spurious correlation. A further explanation lies with the large proportion of very small firms in the sample. A number of these firms are in financial distress though they have franking balances on their books. In this situation, as both the market value and the book value of the firm falls the scaled franking balance is increasing.

[Insert Table 6 about here]

6. Conclusions

The question of whether franking credits are valuable is important both for regulators and for the analysts. This paper provides some insight into the impact of franking credits on share prices through analysis of the relation that exists between the market value of shares in the company and reported franking balances as well as providing some analysis of the determinants of the magnitude of franking balances. The main contribution of the paper is the insight that it provides with respect to the value of franking credits to the marginal investor. There are marked differences in the literature as to the value of franking credits. Some argue that franking credits have no value while others propose that franking credits are valuable. In this paper it is proposed that there are two tax clienteles. The first consists of non-resident shareholders who are the marginal investor in large Australian firms. These investors appear to attach little value to franking credits. The second

clientele consists of resident shareholders who are the marginal investor in smaller Australian shares and who value the franking credits that are distributed to them.

Tests of the first hypothesis show that franking balances are correlated with company value for the full sample, suggesting that franking credits are of value to the marginal investor on average. But, while there is support for the existence of valuable franking balances for the small company sub sample, this is not apparent for companies that fall within the largest 100 companies sub sample. Thus, there is support for the existence of two tax clienteles in the Australian share market and that these clienteles have an impact on the pricing of Australian shares.

There is also some support for the tax clientele argument in tests of the second hypothesis. While foreign focus explains little of the variation in franking balances in the sample, company size is an important explanatory variable. The estimated size coefficient, measuring the elasticity of franking balance with respect to size, is positive and statistically significant with the coefficient exceeding one for the large companies and being less than one for the small companies. Franking balances appear to be more sensitive to changes in company size for large companies than for small companies. This lends further support for the argument that non-resident shareholders, being the marginal investors in large companies, are less averse to the build up of franking credits over time than resident shareholders would be. The shareholder concentration results also support this argument.

Appendix 1, Should Australian shareholders prefer to delay dividend payments?

Is it possible that Australian resident shareholders with high marginal rates of tax prefer corporate retention of dividends? Assume a company can either pay earnings out as dividends when they are earned or accumulate the earnings over time and pay one dividend at some future time *T*.[13] Where dividends are paid as they are earned it is assumed the investors can reinvest the dividends in the company. Further, it is assumed the company chooses to pay out all earnings (E) after corporate tax (t_c) as dividends $\left(D = E(1-t_c)\right)$ for each period from $t = 1$ to T. The personal tax rate, t_p, I fixed and the value of the franking credits is the corporate tax paid, Et_c. The required rate of return for the company is *k*.

For the case of regular dividend payments, the company pays dividends to the investor equal to earnings after corporate tax each period. At the end of each period the dividend, reduced by investor personal tax and increased by the franking credit, is paid to the investor and this is reinvested in the company until time *T* at the required rate of return, *k*. The future value to the investor of this stream of *T* one period dividends reinvested in the company is provided in equation (A.1).[14]

$$\left(E(1-t_c)+Et_c\right)(1-t_p)(1+k)^{T-1}+\left(E(1-t_c)+Et_c\right)(1-t_p)(1+k)^{T-2}+\ldots+\left(E(1-t_c)+Et_c\right)(1-t_p)$$

$$=\left(E(1-t_c)+Et_c\right)\left(\frac{(1+k)^T-1}{k}\right)(1-t_p) \qquad \text{(A.1)}$$

Alternatively, if the company pays one dividend at the end of *T* periods then the after corporate tax earnings must be compounded forward and the franking credit (Et_cT) is then received at the end of period *T*.

[13] I would like to thank Bruce Grundy for raising this issue and for his suggestion on how best to structure this argument. I also thank Gillian Dale-Jones for her suggestions concerning the correct structure of the cash flows modelled in this appendix.

[14] It is assumed that distributed franking credits equal Australian corporate tax paid when dividends are paid each period, ensuring that the regular dividend payments are taxed at the investor's personal tax rate.

$$\left[\left[E(1-t_c)(1+k)^{T-1}+E(1-t_c)(1+k)^{T-2}+...+E(1-t_c)\right]+Et_cT\right](1-t_p)$$

$$=\left[E(1-t_c)\left(\frac{(1+k)^T-1}{k}\right)+Et_cT\right](1-t_p) \qquad \text{(A.2)}$$

The difference between these two streams is the value to the investor of receiving dividends each period rather than receiving a final dividend payment at the end of the period *T*.

$$\left[\left(E(1-t_c)+Et_c\right)\left(\frac{(1+k)^T-1}{k}\right)-E(1-t_c)\left(\frac{(1+k)^T-1}{k}\right)-Et_cT\right](1-t_p)$$

$$=\left[Et_c\left(\frac{(1+k)^T-1}{k}\right)-Et_cT\right](1-t_p) \qquad \text{(A.3)}$$

This difference is positive given $T>1,\ 0\le t_p<1$ and positive k,E,t_c. Under these conditions, a resident investor prefers the receipt of regular dividends rather than one deferred dividend because of the impact of the time value of money on the franking credit benefits attached to dividend payments. This result is independent of the magnitude of the personal tax rate and the corporate tax rate.

Appendix 2, Key changes in the dividend imputation system

Date	*Change*
1 July 1987	The dividend imputation system was introduced. Australian resident shareholders were to be granted a credit called a franking credit for Australian corporate tax paid by Australian companies on dividend paid out of those earnings. This meant that Australian companies with overseas interests had to account for those earnings that were subject to Australian Corporate tax and those earnings that were not subject to Australian corporate tax. Under this system the total income tax paid by an Australian resident shareholder on dividends from earnings that were subject to Australian corporate tax was the personal income tax rate applicable to that shareholder. Companies could accumulate franking credits over time and the resulting franking balance was maintained on an equivalent taxed dividend basis.
1 July 1997	Non-resident shareholder access to franking credit stripping schemes were severely restricted with a series of regulations including the introduction of the 45 day rule.
1 July 2000	Australian Resident shareholders were allowed to claim a cash rebate from the tax office equal to the excess of franking credits received over tax payable. Previously, this excess was essentially lost for low taxed shareholders including individuals with little income and superannuation funds that face a marginal tax rate of 15%. [15]
1 July 2002	The Simplified Imputation system was introduced. These changes included the requirement that the franking balance be maintained on a tax paid basis with the account balance as at 30 June 2002 being converted using the factor 30 / 70. Corporations were now to be treated the same way as individuals for the purposes of applying franking credits received from investments to reduce Australian corporate tax paid or to claim a cash rebate if applicable. Further, a franking credits deficit tax was also introduced where excess franking credits are distributed.

[15] This change could have had implications for accounting though Australian Accounting Standards Board argued that there was no need to consider adjusting the accounting standard because there was no diversity in accounting practise evident in Australia and this issue could be raised as part of an International Accounting Standards Board review. This was noted in the Standards Board agenda decision dealing with the recognition of franked dividend revenue, December 2007.

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Table 1, Example of the effect of franking credits on share value

This example describes the impact of the dividend imputation franking credit on the value of a share. Gamma is the proportion of the dividend imputation credit attached to the dividend. The share in this example pays a dividend of $7 per annum in perpetuity. All earnings after tax are distributed as dividends and that the corporate tax rate of 30% results in corporate tax of $3 per annum in perpetuity. The discount rate is 5% per annum. The dividend component of the share value is $7 / 0.05 and the franking credit component of the share value is $3 * gamma / 0.05 where gamma takes on the values of 0.0 (no franking credit attached to the dividend), 0.5 and 1.0 (fully franked dividend).

	Unfranked Dividends	*Partially franked dividends*	*Fully franked dividends*
Gamma	0.00	0.50	1.00
Corporate tax	0.30	0.30	0.30
Dividend perpetuity amount	$7	$7	$7
Corporate tax paid perpetuity amount	$3	$3	$3
Discount rate	0.05	0.05	0.05
Dividend component of price	$140	$140	$140
Franking credit component of price	$0	$30	$60
Final share price	$140	$170	$200

Table 2, Sample characteristics, dividend and franking balance details

Apart from the count of the number of companies in the initial sample (Column 2) the remaining statistics refer to those companies that report their franking balance details in their annual reports for the years, 2001 through to 2006. The number of available companies in each year along with the number of companies that report franking balances, the number of companies that pay dividends and the number of companies with share buy backs appear in columns 2 through 5. The total franking balances for the year ($millions) and average franking balance per company ($millions) are reported by year as well as for the full period in the last two columns.

Year	*Number of Companies in initial sample*	*Companies With franking balances*	*Companies paying dividends*	*Companies with buybacks*	*Total franking balance ($ Millions)*	*Average franking balance ($ Millions)*
2001	1250	450	320	17	4937	11
2002	1251	460	310	31	5457	12
2003	1328	510	339	37	11084	22
2004	1372	535	378	29	12783	24
2005	1473	576	422	20	15383	27
2006	1536	540	431	10	16995	31
Total	8210	3071	2200	144	66638	
Average	1368	512	367	24	11106	21

Table 3, Data description

Summary statistics for all company-year observations available for franking balance reporting companies for the years, 2001 through to 2006. Descriptive statistics including the mean, median, standard deviation, minimum, maximum and number of observations (Number) are reported in Panel A and Pearson correlation coefficients are reported in Panel B. s_{it} is the natural log of the market value of shares in the company, ds_{it} is the change in s_{it}, d_{it} is the natural log of the sum of dividend and share buy backs, dd_{it} is change in d_{it}, ECT_{it-1} is the error correction term, $lfcb_{it}$ is the natural log of the company's franking balance, $dlfcb_{it}$ is the change in $lfcb_{it}$, $LBVA_{it}$ is the natural log of the book value of total assets, $SHRC_{it}$ is the ratio of the shareholding of the largest shareholder to the total shareholding of the top 20 shareholders, $INTF_{it}$ is the ratio of the foreign revenue to total revenue. Control variables include $LEVw_{it}$, the ratio of total liabilities to total assets, $EARNw_{it}$, the ratio of net profit after tax to total revenue and RDw_{it}, the ratio of R&D to total revenue. The last three variables ($LEVw_{it}$, $EARNw_{it}$ and RDw_{it}) are windsorised to the 2.5% and 97.5% values, such that all values exceeding (less than) the value ranked at the 97.5 (2.5) percentile take on the 97.5 (2.5) percentile value because of the existence of a number of extreme values in the original variables. * (+) is statistically significant at the 5% (10%) level.

Panel A, Descriptive statistics

Variable	Mean	Median	Standard Deviation	Minimum	Maximum	Number
s_{it}	18.4863	18.3359	2.2034	12.7156	25.8823	2975
ds_{it}	0.1577	0.1545	0.5333	-3.2574	3.3699	2200
d_{it}	15.7992	15.6556	2.1146	0.0000	22.9658	2232
dd_{it}	0.1969	0.1670	1.0791	-7.6015	15.2808	1553
ECT_{it-1}	3.3369	3.2474	0.9791	-3.8418	17.5906	1519
$lfcb_{it}$	14.8302	14.9940	2.2667	0.0000	20.8361	3071
$dlfcb_{it}$	0.2470	0.1221	1.1091	-13.0000	7.3672	2253
$LBVA_{it}$	18.6533	18.4143	2.2391	8.1605	26.9070	3068
$SHRC_{it}$	0.3440	0.2787	0.1835	0.0905	0.9537	3012
$INTF_{it}$	0.0891	0.0000	0.2073	-0.1258	1.0177	3066
$LEVw_{it}$	0.4548	0.4629	0.2396	0.0200	0.9503	3068
$EARNw_{it}$	-0.0489	0.0565	0.7206	-3.7149	0.9077	3066
RDw_{it}	0.0002	0.0000	0.0012	0.0000	0.0073	3066

Panel B, Correlations

	s_{it}	ds_{it}	d_{it}	dd_{it}	ECT_{it-1}	$lfcb_{it}$	$dlfcb_{it}$	$LBVA_{it}$	$SHRC_{it}$	$INTF_{it}$	$LEVw_{it}$	$EARNw_{it}$
ds_{it}	0.11*											
d_{it}	0.90*	-0.03										
dd_{it}	0.05*	0.10*	0.25*									
ECT_{it-1}	0.15*	-0.04	0.01	0.64*								
$lfcb_{it}$	0.65*	0.02	0.61*	0.02	0.04+							
$dlfcb_{it}$	0.05+	0.15*	0.01	0.02	0.03	0.32*						
$LBVA_{it}$	0.91*	0.01	0.84*	0.02	0.09*	0.62*	0.03					
$SHRC_{it}$	-0.13*	-0.04	-0.14*	-0.03	0.01	-0.02	-0.02	-0.13*				
$INTF_{it}$	0.31*	-0.04+	0.26*	0.01	0.12*	0.16*	-0.02	0.26*	0.00			
$LEVw_{it}$	0.25*	0.04	0.25*	0.01	-0.02	0.24*	0.01	0.44*	-0.05*	0.08*		
$EARNw_{it}$	0.12*	0.13*	0.15*	0.13*	0.03	0.04	0.03	0.05*	-0.05*	-0.05*	-0.31*	
RDw_{it}	0.06*	-0.02	0.04+	0.00	0.04+	-0.01	0.00	0.01	-0.02	0.22*	0.02	-0.02

Table 4, Equity value and franking balances

Fixed effects panel data analysis is used in the estimation of the relation between the change in natural log of the market value of shares in the company, ds_{it}, and the set of explanatory variables. These include the change in the natural log of the sum of the dividends paid and share buy backs, dd_{it}, the error correction term, ECT_{it-1}, and the change in the natural log of franking balance, $dlfcb_{it}$. Results are reported for all companies that report franking balances as well as for those franking credit reporting companies that fall within the largest 100 companies for the year (both with and without franking balances) by book value of assets and for those that do not fall within this group. In Panel A, Model A is the basic valuation model which relates the change in the value of the company to the change in dividends and the error correction term. Model B adds the variable, change in franking balances, to test whether this variable provides additional explanatory power over the value of the company's equity. The results from estimation of an extended form of model B are reported in Table B. Additional variables include proxies for size (natural log of the book value of asset, $LBVA_{it}$), shareholder concentration (the ratio of the shareholding of the largest shareholder to that of the largest 20 shareholders, $SHRC_{it}$), international focus (the ratio of foreign revenue to total revenue, $INTF_{it}$), leverage (ratio of liabilities to book value of total assets, $LEVw_{it}$), profit (the ratio of net profit after tax to total revenue, $EARNw_{it}$), growth options (the ratio of R&D expenses to total revenue, RDw_{it}), and interaction terms for the change in franking balances with respect to size ($LBVA_{it}$ x $dlfcb_{it}$), shareholder concentration ($SHRC_{it}$ x $dlfcb_{it}$), international focus ($INTF_{it}$ x $dlfcb_{it}$) and change in dividends (dd_{it} x $dlfcb_{it}$). N is the number of observations used in estimation of the model. *F-test (β=0)* is a test of the restriction that the estimated parameters are zero. *Corr (u,Xb)* is the correlation between the fixed effects company specific constants and the exogenous variables and *F-test (u=0)* is a tests of the joint significance of the fixed effects terms. * (+) is statistically significant at the 5% (10%) level.

Panel A, Franking balance effects within dividend discount model

Variable	*Full Sample (Model A)*	*Full Sample (Model B)*	*Largest 100 company (Model A)*	*Largest 100 company (Model B)*	*Not Largest 100 company (Model A)*	*Not largest 100 company (Model B)*
dd_{it}	0.1655*	0.1570*	0.1491*	0.1253*	0.1660*	0.1625*
	(9.08)	(8.71)	(4.50)	(3.97)	(7.64)	(7.55)
ECT_{it-1}	-0.2512*	-0.2421*	-0.2699*	-0.2527*	-0.2466*	-0.2419*
	(-10.56)	(-10.31)	(-5.70)	(-5.63)	(-8.82)	(-8.74)
$dlfcb_{it}$		0.0353*		-0.0058		0.0463*
		(3.78)		(-0.38)		(4.15)
N	1519	1498	338	329	1181	1169
Groups	472	467	102	101	388	384
F-test (β=0)	56.19*	39.64*	16.26*	10.71*	39.17*	30.30*
Corr (*u,Xb*)	-0.40	-0.37	-0.51	-0.49	-0.37	-0.35
R-square	0.02	0.03	0.02	0.03	0.02	0.03
F-test (*u=0*)	1.97*	1.89*	1.89*	1.93*	1.92*	1.85*

Panel B, Franking balance effects within extended dividend discount model

Variable	*Full sample*	*Largest 100 company*	*Not largest 100 company*
dd_{it}	0.1398*	0.0887*	0.1445*
	(7.53)	(2.83)	(6.47)
ECT_{it-1}	-0.2311*	-0.2462*	-0.2272*
	(-9.70)	(-5.46)	(-8.06)
$dlfcb_{it}$	0.2644*	-0.1482	0.3079+
	(2.39)	(-0.50)	(1.75)
$LBVA_{it}$	0.0481	0.0394	0.0557
	(1.40)	(0.70)	(1.27)
$SHRC_{it}$	-0.1294	0.3790	-0.2132
	(-0.81)	(1.30)	(-1.11)
$INTF_{it}$	-0.0356	0.2485*	-0.1695
	(-0.44)	(2.53)	(-1.43)
$LEVw_{it}$	-0.3526*	0.1160	-0.4704*
	(-2.29)	(0.39)	(-2.61)
$EARNw_{it}$	0.2211*	0.4508*	0.1880*
	(3.55)	(3.40)	(2.64)
RDw_{it}	31.1644	-0.6723	46.6470
	(1.20)	(-0.02)	(1.27)
$LBVA_{it}$ x $dlfcb_{it}$	-0.0120*	0.0069	-0.0140
	(-2.17)	(0.52)	(-1.51)
$SHRC_{it}$ x $dlfcb_{it}$	0.0415	0.0570	0.0244
	(0.65)	(0.46)	(0.33)
$INTF_{it}$ x $dlfcb_{it}$	-0.0778+	-0.1559*	-0.0657
	(-1.67)	(-2.73)	(-1.03)
dd_{it} x $dlfcb_{it}$	0.0094	0.0474+	0.0023
	(0.72)	(1.96)	(0.14)
Observations	1490	323	1167
Groups	465	100	383
F-test ($\beta=0$)	11.9	5.08*	8.95*
Corr (u,Xb)	-0.44	-0.53	-0.44
R-square	0.04	0.06	0.03
F-test ($u=0$)	1.89	2.03*	1.85*

Table 5, Determinants of franking balances

Fixed effects panel data analysis is used in the estimation of the relation between the natural log of the franking balance, $lfcb_{it}$, and the set of explanatory variables, the natural log of the total book value of assets, $LBVA_{it}$, the ratio of the shareholding of the largest shareholder to the that of the largest 20 shareholders, $SHRC_{it}$, and the ratio of non-resident revenue to total revenue, $INTF_{it}$. Control variables include leverage (ratio of liabilities to book value of total assets, $LEVw_{it}$), profit (the ratio of net profit after tax to total revenue, $EARNw_{it}$), growth options (the ratio of R&D expenses to total revenue, RDw_{it}). Results are reported for all companies that report franking balances as well as for those franking credit reporting companies that fall within the largest 100 companies for the year (both with and without franking balances) by book value of assets and those that do not fall within this group. N is the total number of observations with groups referring to the number of separate companies with franking balances over the period of the study. *F-test (β=0)* is a test of the restriction that the estimated parameters are zero and *Corr (u,Xb)* is the correlation between the fixed effects company specific constants and the exogenous variables and *F-test (u=0)* is a tests of the joint significance of the fixed effects terms. * (+) is statistically significant at the 5% (10%) level.

Variable	*Full Sample*	*Largest 100 companies*	*Not one of the 100 largest companies*
$LBVA_{it}$	0.4758*	1.2666*	0.4011*
	(11.77)	(6.51)	(9.80)
$SHRC_{it}$	-0.5709*	-0.0433	-0.6750*
	(-2.33)	(-0.04)	(-2.72)
$INTF_{it}$	0.2067	-0.0417	0.2793
	(1.32)	(-0.12)	(1.56)
$LEVw_{it}$	-0.4047*	-3.7073*	-0.2307
	(-2.17)	(-3.60)	(-1.25)
$EARNw_{it}$	0.0096	0.1186	0.0204
	(0.19)	(0.23)	(0.43)
RDw_{it}	73.0301*	113.2660	58.6345
	(2.11)	(0.25)	(1.61)
Observations	3005	453	2552
Groups	783	120	688
F-test (β=0)	27.55*	8.63*	20.12*
Corr (*u,Xb*)	0.23	-0.44	0.27
R-square	0.40	0.10	0.29
F-test (*u=0*)	8.56*	7.23*	8.77*

Table 6, Determinants of franking balances relative to equity market value

Fixed effects panel data analysis is used in the estimation of the relation between the natural log of the ratio of franking balance to equity market value, $lfcbmve_{it}$, and the set of explanatory variables, the natural log of the total book value of assets, $LBVA_{it}$, the ratio of the shareholding of the largest shareholder to the that of the largest 20 shareholders, $SHRC_{it}$, and the ratio of non-resident revenue to total revenue, $INTF_{it}$. Control variables include leverage (ratio of liabilities to book value of total assets, $LEVw_{it}$), profit (the ratio of net profit after tax to total revenue, $EARNw_{it}$), growth options (the ratio of R&D expenses to total revenue, RDw_{it}). Results are reported for all companies that report franking balances as well as for those franking credit reporting companies that fall within the largest 100 companies for the year (both with and without franking balances) by book value of assets and those that do not fall within this group. N is the total number of observations with groups referring to the number of separate companies with franking balances over the period of the study. *F-test (β=0)* is a test of the restriction that the estimated parameters are zero and *Corr (u,Xb)* is the correlation between the fixed effects company specific constants and the exogenous variables and *F-test (u=0)* is a tests of the joint significance of the fixed effects terms. * (+) is statistically significant at the 5% (10%) level.

Variable	*Full Sample*	*Largest 100 companies*	*Not one of the 100 largest companies*
$LBVA_{it}$	-0.1572*	0.5789*	-0.2231*
	(-3.79)	(3.09)	(-5.23)
$SHRC_{it}$	-0.0054	0.0393	-0.0957
	(-0.02)	(0.04)	(-0.37)
$INTF_{it}$	-0.0220	-0.1336	0.0239
	(-0.14)	(-0.39)	(0.13)
$LEVw_{it}$	0.2738	-3.3320*	0.4878*
	(1.43)	(-3.37)	(2.55)
$EARNw_{it}$	-0.0562	-0.3600	-0.0384
	(-1.09)	(-0.73)	(-0.76)
RDw_{it}	34.0320	50.5307	25.3359
	(0.96)	(0.59)	(0.67)
Observations	2945	448	2497
Groups	770	119	675
F-test (β=0)	3.29*	3.12*	5.94*
Corr (*u,Xb*)	0.11	-0.55	-0.04
R-square	0.08	0.04	0.03
F-test (*u=0*)	8.20*	6.85*	8.37*