# Dividend Reductions and Signaling in an Imputation Environment

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# Dividend Reductions and Signaling in an Imputation Environment


## Abstract

In contrast to the double taxation system prevailing in the U.S., Australian firms operate within an imputation tax environment with respect to dividend payments. We argue that the dividend imputation tax system increases the signaling potential of dividend reductions and our empirical findings strongly support this view. We find that the size of the dividend reduction is related to the tax credit status of the dividend. Abnormal changes in profitability are negative in the year following dividend reductions and are negatively related to the dividend reduction; similar signaling effects are found in terms of price reactions. Overall, our study conclusively demonstrates that dividend reductions in Australia have strong signaling power and, as such, our results are at variance with the results obtained in the U.S.



Keywords: Price reaction, Australia, Dividend Reductions, Signaling, Franked and Unfranked, Interim and Final.

JEL classification: G14, G35

# Dividend Reductions and Signaling in an Imputation Environment

One of the foremost issues in corporate finance is the dividend signaling hypothesis. Despite the plethora of research in the U.S. the jury is still out as to whether changes in dividend policy convey credible signals regarding the future prospects of the firm. Although theoretical studies (Bhattacharya 1979, John and Williams 1985, Miller and Rock 1985) imply that dividend changes signal future prospects, several studies (Penman 1983, DeAngelo, DeAngelo and Skinner 1996, Benartzi, Michaely, and Thaler 1997, Grullon, Michaely, Benartzi and Thaler 2005) fail to empirically support the proposition. We argue that there are two major reasons behind the absence of widespread support for the signaling hypothesis in the U.S. First, there has been a decreasing propensity of U.S. firms to pay dividends (Fama and French 2001). In fact, the fraction of dividend payers falls steadily from 42% in 1980–1989 to 28% in 1995–2004 (Skinner 2008). We would argue that if most firms do not pay dividends then we cannot necessarily expect dividend changes to convey effective signals of firm value to investors. Second, managers could be driven by other factors besides future earnings in determining the level of dividends. These could be tax efficiency, financing new projects, and shoring up the financial position of the firm. In the U.S., since dividends are subject to double taxation, dividend distributions are sub-optimal from a tax perspective.

A pertinent question in this regard is whether signaling through dividend changes would function well in an environment where paying dividends is much more prevalent. Additionally, it would be interesting to examine whether signaling would be more effective if the optimal tax-induced policy favored dividends as compared to other forms of distribution to shareholders. We

argue that the imputation tax system in Australia can provide new and important insights into the dividend signaling phenomenon and, in particular, the articulation between dividend signals and earnings.

Our research is motivated by two major differences in the Australian setting regarding the payment of dividends as compared to the U.S. The first major difference pertains to the taxation of dividends in the hands of shareholders that we elaborate below while the second difference relates to the payment frequency. In contrast to the double taxation system prevailing in the U.S., Australian firms follow the imputation system with respect to dividend payments. A dividend imputation tax system effectively reduces or eliminates the double taxation of dividends. Under the Australian system, companies provide resident shareholders with a credit for corporate tax paid that can be used to offset personal tax on dividend income.[1] The dividends paid out of companies' after tax profits (when tax is paid in Australia) carry imputation credits, and are referred to as franked dividends. Profits that are earned and taxed outside Australia cannot be paid out to investors as franked dividends. Any dividends arising from the profits earned outside Australia will be unfranked and therefore subject to tax at the shareholders' marginal income tax rate. Thus a major difference between the U.S. and Australian system is that, in Australia, franked dividends do not suffer from a tax disadvantage as compared to other forms of distribution such as stock repurchases.

The effect of the dividend imputation system is to make the payment of cash dividends much more prevalent than in countries that follow the double-taxation system with respect to the payment of dividends. Pattenden and Twite (2008) use the introduction of dividend imputation in Australia in 1987 as a natural experiment for testing the managerial responses to the

[1] A description of the Australian dividend imputation tax system can be found in, for example, Cannavan, Finn and Gray (2004).

alternative tax systems. They find that gross and net dividend payout ratios and dividend initiations increased subsequent to the introduction of the imputation system. Furthermore, a dividend reduction in a system that favors dividend payments will have increased signaling potential and this implication could be exploited by empirically testing the relative signaling effects of franked and unfranked dividends.

There are three major consequences of the imputation system. Firstly, firms will prefer to issue equity as compared to debt, ceteris paribus, since investors can receive imputation credits with dividends but not with interest income.[2] Secondly, investors would prefer a dollar of dividend income to a dollar of capital gains because of the imputation credits. In such a scenario, a dividend reduction would be anticipated to have a greater importance. In particular, managers will be reluctant to reduce franked dividends due to their tax efficiency, with the consequence that reductions in franked dividends would have stronger signaling potential than unfranked dividend reductions. Thirdly, via the recovery of the tax credit against corporate taxable profits, the articulation between dividends and earnings is reinforced. We argue that these features of the imputation system strengthen the signaling efficacy of dividends. That is, the signaling power of a reduction in dividends will be stronger since this constitutes a cut relative to the tax preferred situation and management will be even more reluctant to reduce dividends in such a scenario. Therefore, dividend reductions in an imputation environment constitute strong signals regarding the future profitability of the firm as managers reduce not only the dividends but also the imputation benefit to shareholders. The power of our study is enhanced by testing propositions in terms of the franking status of the dividends. Such a testing structure will, then, provide direct evidence as to the tax effects upon signaling.

[2] Twite (2001) argues that companies should optimally issue more equity and less debt under the imputation system. See also DeAngelo and Masulis (1980) and Fung and Theobald (1984) for a theoretical analysis of the dividend vs. debt and capital gains decisions across differing tax systems.

We therefore re-examine the signaling motive as the basis of dividend reductions in the Australian context. Given the reluctance of managers to reduce dividends under the imputation environment, the act of reducing or omitting dividends arguably constitutes a bigger surprise than a dividend initiation or resumption.[3] Although, a subset of papers (Healy and Palepu 1985, Michaely, Thaler, and Womack 1995, and Liu, Szewczyk and Zantout 2008) has explicitly addressed the validity of the signaling hypothesis by studying dividend reductions in the US, we are not aware of any published study that examines the signaling implications of dividend reductions in Australia. Furthermore, a study of dividend reductions will be timely in that the current financial crisis has already led to announcements of a number of dividend reductions.

The other major difference between the U.S. and Australian system pertaining to dividends concerns the payment frequency. In the U.S., dividends are paid on a quarterly basis, the amount of dividend paid each quarter being more or less equal. In Australia, most firms pay dividends twice a year, the two payments being termed as interim and final dividends. Interim dividends are declared and paid prior to the availability of the annual accounting results. Final dividends are announced and paid after the firm has finalised its annual accounts. Clearly the quantum of information available to investors prior to the payment of final dividend is higher as compared to the time when interim dividends are paid. Another important difference between interim and final dividend payments is the relative amounts paid: interim dividend payments are typically much smaller than final dividends.

We expect to find stronger evidence regarding the signaling motive in Australia due to the full imputation environment. We find that dividend reductions are associated with negative stock price reactions and that the magnitude of price reaction varies directly with the size of

[3] Jensen and Johnson (1995, p 33) argue that dividend reduction in a stable dividend payment firm is clearly departure from its established dividend policy, and dividend reductions are more informative than dividend increases.

dividend reduction. The market reacts more negatively to interim dividend reductions than to final dividend reductions. Empirical results using a matched sample procedure indicate that abnormal changes in profitability are negative both during the year of dividend reductions as well as in the following year. Thus, our study provides evidence that dividend reductions in Australia signal a decrease in future profitability of the firm. Furthermore, we do find a significant impact deriving from franking status on the signaling power of the dividend reductions and this effect manifests itself most strongly via the interaction between franking status and variables such as the dividend reduction size. We also find that franking status has significant influence on the choice of the size of the reduction.

The plan of this paper is as follows. Section 1 discusses hypothesis development, while Section 2 presents a discussion of our data and methods employed. In section 3, we analyze the factors that determine the level of the dividend reduction. In section 4, we examine the relation between dividend reductions and abnormal changes in profitability and provide empirical evidence regarding the market response to dividend reductions. Finally, our conclusions are presented in Section 5.

## 1. Hypothesis development

There are two aspects of an efficient signaling system with respect to dividend payments. First, managers should reveal future prospects through changes in dividend payments. Second, it is imperative that the stock market react to the dividend changes in a consistent manner. In order to analyze the efficacy of signaling under the imputation system, we develop hypotheses related to both features of the signaling mechanism discussed above.

A signaling equilibrium will exist where the marginal benefits deriving from the signal are equal to the marginal costs of making that signal. One contributory factor to the signaling cost is the potential differential tax cost of making a dividend payment. With a tax imputation system this tax cost effect will be reduced or eliminated. Brown and Howard (1992) contend that the imputation system creates a bias towards high dividend payouts in Australia. Furthermore, Monkhouse (1993) derives a CAPM within an imputation system and shows that the optimal dividend policy is for a firm to distribute its imputation credits since they lose value over time. Thus, resident shareholders in Australia would prefer to receive fully imputed dividends as compared to other forms of distribution that include capital gains. Fung and Theobald (1984) demonstrate in a time-state preference framework that a positive dividend equilibrium relative to gains will occur under a firm and stockholder credit imputation system when $t(d) \leq t(g)\ (1-F) + F$, where t(d) (t(g)) is the income (capital gains) tax rate for the investor and F the firm tax credit. That is, when $F >= (t(d)-t(g))/(1-t(g))$. Since the Australian tax code taxes capital gains at income tax rates this condition will be fulfilled for the Australian case, with non-zero F.[4] That is, a dividend equilibrium will exist in Australia with the payment of franked dividends providing a tax viable strategy. As a consequence, dividend reductions will have greater power and impact, particularly in the case of franked dividends.

The reduction of the tax cost associated with dividends will mean that dividend signaling will be more readily employed in Australia since lower marginal benefits will warrant signaling in this tax setting. Furthermore, since, in normal circumstances, dividends will figure within a tax induced time-state preference equilibrium, a reduction in dividends in Australia will provide a stronger signal than in non-imputation tax systems. Where, however, the dividend tax credit

[4] If the stock has been held for at least 12 months, the maximum rate of capital gains tax for an individual will be half of their marginal tax rate on their ordinary income.

cannot be recovered against corporate tax liabilities, the marginal cost of dividends will increase leading to a tax induced rationale for the dividend reduction.[5]

The dividend signaling hypothesis would predict that dividend changes are positively related to future earnings changes. The signaling efficacy of dividends has been found to be weak in the US, perhaps due to the declining propensity of firms to pay dividends and the existence of other motives to retain cash.[6] However, as we argued previously there are major differences between the US and Australia with respect to a firm's distribution policy that strengthen the preponderance, and therefore the signaling efficacy, of dividends in Australia. With this increase in the likelihood and signaling power of dividends we would anticipate a stronger articulation between changes in dividends and changes in earnings numbers. Therefore, we have the following hypothesis:

*H1: Under an imputation environment, dividend reductions will be followed by future declines in a firm's profitability, other things being equal*.

Essentially, then, within an imputation system the linkage between dividends and profitability/earnings streams is made stronger. There is, however, a further underlying factor that drives this earnings/dividends linkage arising from the tax credit recovery being dependent upon taxable profits. Following this line of argument it would be anticipated that the dividend reductions would be more likely to occur when a firm has insufficient franking credits to pass on to shareholders. On the other hand, there will be a strong reluctance on the part of managers of firms with sufficient franking credits to reduce dividends, since Australian resident shareholders

[5] Although there will be an associated signalling effect regarding the strength of earnings not permitting tax credit recovery.

[6] Chetty and Saez (2005) find that firms responded to the 2003 U.S. dividend tax cut by initiating dividends or increasing dividend payout. The tax rate on equity income was reduced to 15% in the US in 2003, which equalizes the dividend tax rate (from 38.6% to 15%) and capital gain tax rate (from 20% to 15%) for individual investors which is a necessary condition for a positive dividend equilibrium in a classical tax system (see DeAngelo and Masulis (1980)).

will prefer franked dividends in order to receive the imputation credit. As a consequence, then, we have the following hypotheses:

*H2(a): Franked dividend reductions will provide stronger signals regarding future profitability than unfranked dividends.*

*H2(b): The magnitude of the dividend reductions in year t will be smaller for firms that paid a franked dividend in year t-1 than for the unfranked dividend case, other things being equal.*

There is a subtle difference between H2(a) and H2(b). H2(a) relates to a stronger statistical association between dividend reductions and future profitability when firms have sufficient franking credits as compared to a situation when they lack franking credits. H2(b) is a direct test of managerial reluctance to cut dividends which, as a consequence, would deprive Australian resident shareholders of imputation credits. Implied in this argument, is the incentive of managers to reduce dividends steeply when they do not have sufficient franking credits to pass on to shareholders. They are incentivised to take a "big bath" during bad years and subsequently after the financial position of the firm recovers, continue the payment of dividends with franking credits.

Our second set of hypotheses relates to the market reaction to dividend reduction announcements. Since we argue that, under an imputation environment, dividend reductions constitute strong signals of future prospects, we expect stock price reactions to correspond to the size of dividend reductions. Therefore, we have:

*H3: The size of dividend reductions will be negatively related to price reactions.*

We have argued that signaling is stronger when firms posses sufficient franking credits to distribute than when they lack such credits, and, as a consequence, we have:

*H4(a): The price reaction will be more strongly negative to reductions in franked than unfranked dividends, cet.par.*

We have argued previously that managers will be reluctant to reduce franked dividends and that the strength of the signaling impact will depend upon the magnitude of the dividend reduction. Consequently, there will be an interaction between franked status and dividend reduction size which will impact upon dividend signaling. For example, the combination of a large reduction in franked dividends will have a proportionately stronger signaling effect than for a reduction in unfranked dividends of the same size leading to

*H4(b): The signaling power (both in terms of future profitability and price reactions) of a dividend reduction will derive from an interaction between the franking status of the dividend and the magnitude of the reduction.*

The franking status would include not only the franked versus unfranked status of the dividend but also the more general availability of the franking credit within the firm.

Another aspect of the signaling hypothesis is the timing of dividend reductions. Faced with declining future prospects, managers have the choice of reducing interim dividends versus postponing the reductions to final dividends. We argue that interim dividend reductions constitute stronger signals of firm value changes as compared to final dividend changes. We base this argument on the quantity and quality of information that is available to both managers and outside investors. Extant research studies show that the impact of new information on stock prices depends on the magnitude of the surprise as well as the quantum of pre-disclosure information before the announcement of new information. During the period of announcement of interim dividends both managers and outside investors have incomplete information regarding

the profitability of the firm during the current year to date. However, managers have inside access to information that is not available to outsiders. Furthermore, when interim dividends are announced, outside investors have few competing sources of information regarding the future prospects of the firm. Managers may choose to convey a signal based on their private information set via interim dividends. By having just one opportunity (rather than three, as in the U.S.) to convey dividend related information prior to the final, the manager is able to concentrate the information content more strongly at the interim.

On the other hand, when final dividends are announced, the information environment is finer since both the firm's insiders and outsiders have access to additional information, such as audited financial statements. There is also the potentiality of management deferring the announcement of bad information; thus, when an interim dividend is cut, the signal is interpreted as being the stronger (and unavoidable). Furthermore, since there is more noise in the interim earnings number, the tax credit recovery position is less clear at that stage, with the result that the dividend reduction will derive more strongly from a signaling, rather than tax, perspective. Therefore, we have the following hypothesis:

*H4(c): Interim dividend reductions will produce a stronger price reaction as compared to final dividend reductions, other things being equal.*

## 2. Data and Methodology

In this section we describe the sample selection procedure and distribution of dividend reductions; firms characteristics between interim and final dividend reductions; matching procedure to calculate abnormal changes in profitability for the year of the dividend reduction and for the year after; and abnormal return generation and test statistics.

## 2.1 Data and Sample Selection

Initial interim and final dividend reductions are identified for Australian companies, where there are no dividend reductions (either interim or final) during the two-year period immediately preceding the initial interim and final reductions for the period between January 1995 and December 2006 using the IRESS and Bloomberg databases.[7] A dividend reduction is defined relative to the previous year's value, i.e. there is a reduction if the interim (final) dividend per share in year *t* is less than the interim (final) dividend per share paid in year *t-1*.[8] We find 269 dividend reductions in total, 125 interim dividend reductions and 144 final dividend reductions. We find that 87 (96) firms paid fully franked dividends, 30 (38) firms paid unfranked dividends and 8 (10) firms paid partially franked dividends during the year prior to the interim (final) dividend reductions. We consider only initial dividend reductions since they are likely to provide a stronger signal as opposed to subsequent reductions which may be anticipated and wherein the innovation in the dividend series will be much less.

**Insert Table 1 near here**

Panel A of Table 1 contains the distribution of our sample across the years classified into interim reductions, and final reductions. The sample is not strongly dominated by any one year, although the first year of our sample frame, 1995, did contain by far the smallest sample size (at 9 reductions, in total). In Panel B of Table 1, we present the industry classifications for interim and final dividend reductions. We find that two of the industry sectors, viz., Materials and Capital Goods account for over 30% of our sample of dividend reductions. Diversified

[7] We have excluded the dividend reduction events that are announced simultaneously with share buybacks or stock splits or seasoned equity offerings or merger or acquisition or convertible bond issues.
[8] This study focuses on initial interim and final dividend reductions. We do not examine final dividend reductions that follow an initial dividend reduction at the interim level since they are more likely to be expected.

financials, Food, Beverage and Tobacco, Real Estate and Retailing together account for about 29% of the sample. The other 41% of the sample is distributed across all other sectors.

## 2.2 Firm Characteristics of Dividend Reducing Firms

Table 2 provides information on total assets, prior year profitability (annual net profits after tax standardised by total assets), changes in profitability during the year of dividend reduction (standardised annual net profits after tax in year t - standardised annual net profits after tax in year t-1), prior year standardised net operating cash flow, changes in net operating cash flow during the year of the dividend reduction, the riskiness of the firm measured as the standard error of the market model regression of daily stock returns over the period from day –260 to day –61 for each dividend reduction announcement, ownership concentration (top 20 shareholders ownership and blockholders holding 5% or above), market capitalization, and the book to market ratio (a measure of growth and investment opportunities) for the firms that reduce their interim or final dividends.

**Insert Table 2 near here**

We find that the prior year profitability, as measured by $NPAT/TA_{t-1,}$ is lower for the interim reductions as compared to the final reductions sub-sample. The median current period profitability is also significantly lower for firms that reduce interim dividends as compared to final dividend reducing firms. Furthermore, the change in profitability, as depicted by $\Delta NPAT/TA_t$, with $\Delta$ the change operator, is significantly more negative for interim dividend reducers as compared to final dividend reducers. Taken together, these results indicate that firms which face lower profitability and steeper declines in profitability tend to prefer reductions in interim dividends rather than postpone the reductions to the final stage. Another interesting fact that emerges is that the market value of interim dividend reducers is statistically significantly

lower than for final dividend reducers. The book-to-market ratio at the balance sheet date immediately prior to the year of dividend reduction is higher for interim dividend reducers than that of final dividend reducers. This finding plausibly implies that firms with higher growth opportunities (or lower tangible assets) tend to defer their dividend reductions to a future period. We do not find any significant difference in ownership concentration (top 20 shareholders ownership or blockholders holding 5% or above) between interim and final dividend reducers. Finally, we find that interim dividend reducers have significantly higher idiosyncratic risk as compared to final dividend reducers. These findings denote that smaller and riskier firms (i.e. essentially lower quality firms) prefer to conserve cash by choosing to go for interim reductions instead of deferring their reductions to the final dividends.

### 2.3 Abnormal Earnings, Signaling and Dividend reductions

To examine the signaling power or information content of dividend reduction announcements, we investigate how the percentage of dividend reductions (interim and final) is related with abnormal changes in profitability for the financial year of the dividend reduction and the year after. We define abnormal changes in profitability as the paired difference in net profit after tax to total assets between dividend reduction firms and control firms selected using a matching procedure suggested by Barber and Lyon (1996). We select control firms based on the following criteria in order of importance: earnings performance for the year immediately prior to the dividend reduction is between 90% and 110% of the sample firm, same sub industry classification, and book to market ratio is between 70% and 130% of the sample firm (BM). Details of the procedure employed to select control-sample firms are as follows:

Exhibit

| Matching Criteria | Number of Matches | |
|---|---|---|
| | Interim | Final |
| Performance ± 10%, BM ± 30% and same industry sub classification -level 2 | 53 | 67 |
| Performance ±10%, and same industry sub classification based on Global Industry Classification standard 24 industry groups | 22 | 28 |
| Performance ±10%, BM ±30% and same industry sub classification-level 1 | 17 | 8 |
| Performance ±10% and same industry classification based on Global Industry Classification standard 10 industry sectors | 1 | 5 |
| Performance ±10% and BM ±30% | 27 | 29 |
| Performance ±10% | 2 | 7 |
| No matching | 3 | 0 |
| **Total** | **125** | **144** |

### 2.4 Return generating processes and test statistics

The market model (MM) is used to examine the daily abnormal returns around announcement dates. Model parameters are estimated using 200 observations, commencing 260 days prior to the event, with the Australian All Ordinaries Share Index used as the market proxy. This study uses the t-test statistic (standardized residual test statistic) to report the significance levels of the price reaction. The daily returns are measured using logarithmic returns after the adjustment for dividends on ex-dates. The abnormal returns for announcement periods are generated for different events windows: - day -2 to day 2 (two days before to two days after the announcement), day -1 to day 1 (the day before to the day after the announcement), and day 0 to day 1. These event windows are used to control for leakages and for "after hours" announcements (which are particularly likely for announcements of bad news).

## 3. Determinants of the size of the dividend reduction

We conduct Tobit regressions using the percentage dividend reduction as the dependent variable to identify the factors that determine the dividend reduction size. The results are displayed in Table 3. In Panel A, we display the results for the full sample. The decline in future profitability measured as the matched difference in profitability between sample firms and control firms in year t+1, $A\Delta NPAT/TA_{t+1}$, has a negative sign indicating that firms facing a steeper decline in future profitability tend to make deeper cuts in dividends, a result consistent with *H1*.[9] We therefore provide strong support for the signaling hypothesis.

Importantly, we find that the franking status of the dividend for the year immediately prior to the dividend reduction, as encapsulated in the PERFRANK (percentage of franking) variable, has a statistically significant impact upon the size of the dividend reduction. That is, the higher the degree of franking prior to the dividend reduction, the lower the size of the dividend reduction, which is consistent with management's reluctance to reduce dividends and H2(b). Thus we have empirically established that franking status is associated with the dividend reduction decision as posited in section 1 and providing some justification for the usage of dividend reduction size and franking status interaction variables (as argued in H4(b)).

**Insert Table 3 near here**

We include a number of control variables such as previous year's profitability, current year profitability, idiosyncratic risk, firm size, and book-to-market ratio. Prior year profitability, as measured by $NPAT/TA_{t-1}$ has a negative coefficient, indicating that firms with lower prior year profitability tend to have larger dividend reductions, other things being equal. The decline in current year profitability measured as the matched difference in profitability between sample

[9] In the case of final dividend reduction the relation between dividend reduction and abnormal changes in profitability is significantly negative only when we use abnormal changes in profitability as the only regressor.

firms and control firms during the year of the dividend reduction (year t), $A\Delta NPAT/TA_t$, also has a negative sign indicating that firms facing a steeper decline in profitability tend to make deeper cuts in dividends. Idiosyncratic risk has a positive and highly significant coefficient in the regressions. Firms with high idiosyncratic risk tend to make steeper reductions in dividends other things being equal. Finally the coefficient of LMV (logarithm of the market value of the firm) is negative, denoting that large firms tend to make lower reductions in dividends as compared to smaller firms, ceteris paribus. Panel B and C of Table 3 show the results for the sub-sample of interim and final dividend reductions respectively. We find similar results for interim and final sub samples as for the total sample.[10] However, we find that the interim dividend reduction is more strongly related, both in magnitude and significance, to the contemporaneous decline in earnings than the final dividend reduction. The franking status has less significance for the interim which is consistent with tax effects having less impact here due to the tax recovery position being less clear at this stage due to greater noise in earnings numbers.

Summing up, we find strong empirical evidence supporting the signaling hypothesis. We find that the decline in future year profitability is significantly related to the level of dividend reductions, affirming the basic foundation of the signaling theory. The franking status impacts upon the dividend change, with a plausibly greater impact at the final stage. As a consequence, the signaling impact of franking status is somewhat more subtle, manifesting itself via its interaction with the size of the dividend reduction. Firms with higher risk and lower market capitalisation tend to cut dividends more steeply, implying that they are most vulnerable to downturns.

[10] We also find that decision to reduce dividends at the interim level rather than delay to the final stage depends on prior year profitability and size of the firm.

## 4. Empirical Evidence of Signaling

As discussed in section 1, we have two sets of hypotheses pertaining to signaling through dividends. We provide evidence regarding the relation between changes in dividends and the dividend/earnings articulation in section 4.1 and focus on the stock market reaction in section 4.2.

### 4.1 Dividend reductions and abnormal changes in earnings

We empirically examine the efficacy of signaling future earning changes via dividend reductions by using the control sample procedure outlined in section 2.3. We compare the profitability of our sample firms (and each of the four sub-samples) with those of control firms. Our results are reported in Table 4.

#### 4.1.1 Univariate results on abnormal change in profitability

Panel A of Table 4 contains the profitability for the year of dividend reduction for sample firms and their matched control firms and abnormal changes in profitability for sample firms, for the total sample as well as interim and final dividend reductions. For the overall sample, as well as samples based on interim and final reductions, we find that the performance, as denoted by $NPAT/TA_{t-1}$ is similar for the dividend reduction sample and the control firms during the year prior to dividend reductions. This demonstrates that the profitability of both the sample firms and control firms are similar in the year prior to the dividend reductions and the success of our matching procedures.

**Insert Table 4 near here**

We next examine the difference in profitability between the sample and control firms, during the year of dividend reductions, denoted by $A\Delta NPAT/TA_t$ and the year after, denoted by $A\Delta NPAT/TA_{t+1}$. The average and median abnormal changes in profitability are negative in year

t and t+1 for the overall sample, as well as the interim and final dividend reductions sub-samples, indicating that dividend reducers experience earnings declines during the year of dividend reduction and the year after.

Our results differ from those of Nissim and Ziv (2001), and Lie (2005) who studied dividend reductions in the U.S. They report no significant declines in future earnings of firms that reduce their dividends. This difference is potentially due to our study focussing on the initial dividend reduction rather than all dividend reductions and/or due to the imputation tax system in Australia particularly in the case of franked dividends. We explore the impact of franking status on dividend signaling using cross sectional regression analyses in section 4.1.2.

### 4.1.2 Franking status, abnormal changes in profitability and dividend reductions

Further evidence regarding the association between dividend reductions and changes in future profitability is provided by regressing abnormal changes in profitability on percentage reductions in dividends for the total sample as well as for sub samples of interim, final, unfranked and franked dividend reductions. The results, which are reported in Panel B of Table 4, demonstrate that there is a strong statistical association between the level of the dividend reduction and the deterioration in future profitability. This supports *H1* outlined in section 1, which predicts that there should be an articulation between dividend declines and poor future profitability.[11] The dummy variable DIOF (interim versus final reduction) does not have any significant impact on the earnings signaling power.[12] The significance levels for the association between abnormal changes in future profitability and dividend reductions are stronger for reductions in franked dividends than for reductions in unfranked dividends for the total sample as

[11] Similar results are obtained when we use current year (year t) abnormal changes in profitability as the dependent variable (not reported).
[12] We do, however, find an impact of DIOF in price reaction (see section 4.2.2).

well as for the interim and final reduction sub-samples, thereby providing some support for H2(a).

The franked dividends are the tax–favored distribution method in Australia. Any franked dividend reductions are construed as bad news as hypothesised at H2(a). Australian managers are more reluctant to reduce dividends as compared to their U.S. counterparts and this has rendered dividend reductions to be a stronger signaling device in Australia as compared to the U.S. To examine further the impact of franking on the relation between abnormal changes in profitability and the dividend reduction, we introduce the franking status of the dividend for the period prior to the dividend reduction [percentage of franking of dividend (PERFRANK) as well as dummy variables DFD (an indicator variable for a franked dividend in year t-1) and DUFD, (an indicator for unfranked dividend in year t-1)], dummy variable $DREDFRANK_{t-1}$ reflecting the reduction in the franking percentage in year t-1 relative to year t-2, the reduction in franking credit during the year of dividend reduction (RFC)[13] and composite variables reflecting interactive effects between franking status, reduction in franking credit and the magnitude of the dividend reduction in the cross sectional regressions. The results are reported in panel C of Table 4 for both the total sample (models 1-9) and a subsample of reductions in franked dividends (models 10-15). RFC is an important franking variable since, as can be seen from its definition, it incorporates both the reduction in the dividend and the change in degree of franking.

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[13] This is measured for interim reductions as $= \left( \frac{\text{IntDiv}_{\text{t-1}} xPerFrank_{t-1} - \text{IntDiv}_{\text{t}} xPerFrank_{t}}{\text{IntDiv}_{\text{t-1}} xPerFrank_{t-1}} \right)$

This is measured for final reductions as $= \left( \frac{\text{FinDiv}_{\text{t-1}} xPerFrank_{t-1} - \text{FinDiv}_{\text{t}} xPerFrank_{t}}{\text{FinDiv}_{\text{t-1}} xPerFrank_{t-1}} \right)$

As can be seen in panel C of table 4, we do not find any significant impact for franking status in year t-1 (percentage of franking in models 1 and 2 or the dummy variable DUFD in model 3). We also further examine the impact of franking status by allowing different coefficients on the reduction in franked and unfranked dividends and report the results in model 4. The coefficients on franked/unfranked dividend reductions are both negative and significant. The coefficients are not significantly different between franked and unfranked dividend reductions (using a Wald test). We also examine the impact of the reduction in franking credit and its interaction with franking status in models 5 and 6, and the impact of the reduction in franking credit and its interaction with franking status and dividend reductions in models 7, 8 and 9. The interaction variable comprising the reduction in franking credit and the franked dividend dummy variable (that is RFC*DFD) is highly significantly negative (at the 1% level) whereas the unfranked dummy is significantly negative at the 5% level in models 5 and 6 and the franking credit reduction, franked dummy and reduction size interaction variable (that is RFC*DFD*DRED) is similarly highly significant at the 1% level whereas the unfranked dummy and reduction size interaction variable (that is DUFD*DRED) is significantly negative at the 5% level in models 8 and 9. We also examine the impact of RFC and its interaction with dividend reductions for the subsample of franked dividend reductions and find significant support for RFC in signaling reduction in profitability. Effectively, then, we have provided strong empirical support regarding the articulation between dividend franking status and abnormal changes in profitability as encapsulated in H1, H2(a) and H4(b). The results indicate that the interrelation between franking status and profitability is somewhat more complicated than a simple articulation, arising from the relationship being multifactorial and deriving from variable interactions as presented in Section 1.

### 4.2 Market Reaction to Dividend Reductions

As a final investigation of the signaling hypothesis, we examine stock market reactions to dividend reductions. We analyze the stock market reaction using an event study methodology in section 4.2.1 and report results using cross-sectional regressions in section 4.2.

#### 4.2.1 Announcement effects

Table 5 contains the results regarding the stock price reaction to dividend reductions. We report mean and median abnormal returns and the standard residual t-tests (SRT) employing the market model to dividend reductions for the periods: two days before the announcement date to two days after (day-2 to day +2); the day before the announcement date to the day after (day-1 to day +1); the day of announcement and the day after (day 0 to day 1). The results from Table 5 indicate that the 3-day mean CAR surrounding the announcement of all reductions is a highly statistically significant (at the 1% level) -3.14% indicating that dividend reductions do have strong price signaling power in Australia. Interim dividend reductions induce a much stronger negative response of -4.35% as compared to -2.08% for final dividend reductions. Both results are statistically significant at the 1% level. The magnitude of price reaction is significantly more negative for interim dividend reductions than final dividend reductions at the 5% level. The results reported for the other event windows such as (-2, +2), (0,+1) provide similar results, indicating that the results are not sensitive to the event window. Interim dividend reductions are seen as bad news while final dividend reductions are viewed less negatively, but still bad news. This implies that the market is able to infer the deteriorating performance of firms that subsequently reduce interim dividends. In the case of firms that reduce final dividends, the market holds a more benign, though still pessimistic, view regarding future prospects. The empirical results indicate support for hypothesis *H4(c)*.

**Insert Table 5 near here**

### 4.2.2 Cross sectional analysis of price reaction

In this section, we empirically test whether the magnitude of the stock price reaction varies directly with the level of dividend reductions via a cross sectional specification, after controlling for other variables that may influence the price reaction. Importantly, we investigate the impacts of the franking status of dividends upon the magnitude of the price reaction, both in simple terms and via interaction effects as suggested by H4(b). Since the results are robust to the event date window we use the abnormal return from day -1 to day 1 as the dependent variable in the cross-sectional model. The set of explanatory variables and their anticipated signs (in parentheses) are: DRED (-) is the percentage reduction in dividend (both interim and final), deriving from H3; DIOF (+) equals 1 if the firm reduces its dividend at the interim level and zero if the firm reduces the dividend at the final level. The rationale for the inclusion of this explanatory variable derives from H4(c), that interim dividend reductions have stronger information content than final dividends. $PERFRANK_{t-1}$ (-) is percentage of franking credit incorporated into the interim and final dividends for the year prior to the interim and final dividend reductions. That is, the higher the franked percentage of dividends, the stronger the signaling power, deriving from H4(a). $DREDFRANK_{t-1}$ (+) is a dummy variable that equals 1 if the firm reduces the percentage franking on a dividend paid in t-1 relative to t-2 and zero otherwise. We expect a positive coefficient for this variable as the market will react less negatively for a dividend reduction event that had a reduction in franking for the period immediately prior to the dividend reduction corresponding with H4(a).DFD, DUFD and RFC are variables as previously defined. A number of franking status interaction terms are included within the specifications corresponding with the predictions of H4(b).

**Insert Table 6 near here**

The results of the cross-sectional analyses are contained in Table 6. The dividend reduction (DRED) variable has the expected sign and is statistically significant in all models, consistent with

*H3*. We take this as strong support for dividend signaling. The dummy variable DIOF has the expected sign and is statistically significant at the 5% level. This is consistent with our hypothesis *H4(c)*, that an interim dividend reduction provides a greater "shock" as compared to final dividend reductions. We do not find any significant impact for franking status in year t-1 (in terms of the percentage of franking). We also further examine the impact of franking status by allowing different coefficients on reductions in franked and unfranked dividends and report the results in models 9 and 10. The coefficients on franked/unfranked dividend reductions are both negative and significant. The coefficients are not significantly different as between franked and unfranked dividend reductions (using Wald test). Similarly, the interaction between the reduction in franking credit and franked status of the dividend (that is RFC*DFD) has a significant impact at the 5% level whereas DUFD is significant at the 5% level in model 11. The multiple interaction variables (that is RFC*DFD*DRED) have more statistically significant impact, than DUFD*DRED in models 13-15.

The coefficient of $BM_{t-1}$ is not significant indicating that investment / growth opportunities do not play a significant role in determining the stock price reactions. PRECAR is negative and statistically significant, as expected, indicating that prior anticipation of bad news attenuates the price response at the announcement of dividend reductions. LMV, and the Gearing $ratio_{t-1}$ are not statistically significant. These results indicate that there is no difference in stock price response for large firms as compared to small firms and that leverage is not associated with the magnitude of the stock price response.

Summing up, the market reacts more negatively to dividend reductions when the percentage of cuts is larger, when interim rather than final dividends are reduced, and when reductions are anticipated (or leaked) prior to the actual announcements providing strong evidence in support of our signaling hypothesis. Additionally, we provide evidence to support the notion that franking

status does impact upon the magnitude of the price reaction, and that this effect manifests itself via an interaction with the size of the reduction.

## 5.0 Conclusion

We have argued that dividend signaling is likely to have more prevalence and power in Australia due to its financial and fiscal systems. Since dividends figure in a tax induced equilibrium a reduction in dividends will provide strong signals to the market, both in terms of price reactions and in terms of future profitability. Reductions in franked dividends should provide the stronger signal. In setting the dividend reduction level, such signaling type phenomena should determine the extent of the reduction.

In this paper we examine the stock price reactions to dividend reductions made by Australian firms during the period 1995-2006 and find that reductions are associated with negative stock price reactions. The reaction is an increasing function of the size of the reduction. When we incorporate the interactions between dividend reduction size and franking status we find a statistically significant franking impact upon price reactions. Interim reductions produce stronger negative abnormal returns as compared to final dividend reductions. Firms will reduce their dividends at the interim rather than delay to the final stage when they are in dire straits; the immediacy of the dividend reduction is likely responsible for the stronger market reaction. We also find that the magnitude of the dividend reduction depends on the riskiness of the firm (idiosyncratic risk), size of the firm, prior year profitability, abnormal changes in the profitability during the year of dividend reduction, abnormal changes in the profitability during the year after the dividend reduction and the proposition of franking credit incorporated into the dividend payment.

We examine whether dividend reductions signal future reductions in profitability by using a matched sample procedure. We find that abnormal changes in profitability are negative both during the year of dividend reductions as well as in the following year and negatively related to the dividend reduction. The significance level for the relation between abnormal change in profitability and dividend reductions is statistically significantly stronger for dividends with associated tax credits. However, the relation between dividend reduction and reduction in future profitability does not vary between interim and final reductions. That is, while the market perception/reaction is different as between the interim versus final dividend, the managerial signaling decision does not vary.

Overall, our study shows conclusively that dividend reductions in Australia constitute a strong signal regarding the future prospects of the firm and, as such, our results are at variance with the results obtained in the U.S. We argue that the difference is due to differences in the taxation and the timing of dividends. That is, the greater reluctance to reduce franked dividends will cause such dividends to have greater signaling power. This contention is supported in terms of signaling future earnings, market reactions and figures in the determination of the degree of dividend reduction either directly or via interacting with reduction size. Our principal contribution is to highlight the role played by institutional features in determining the efficacy of signaling devices in corporate finance and, as a consequence, our paper has implications for policy makers.

## Table 1: Description of Dividend Reductions Sample

**Panel A - Dividend Reduction Year By Year Analysis**

| Year | Interim reductions | Final reductions | Total |
|---|---|---|---|
| 1995 | 4 | 5 | 9 |
| 1996 | 13 | 14 | 27 |
| 1997 | 4 | 10 | 14 |
| 1998 | 6 | 8 | 14 |
| 1999 | 15 | 13 | 28 |
| 2000 | 5 | 16 | 21 |
| 2001 | 19 | 17 | 36 |
| 2002 | 13 | 9 | 22 |
| 2003 | 14 | 15 | 29 |
| 2004 | 7 | 8 | 15 |
| 2005 | 11 | 11 | 22 |
| 2006 | 14 | 18 | 32 |
| Total | 125 | 144 | 269 |

Panel B : Dividend Reductions industry by industry analysis

| Industry | Interim reductions | Final reductions | Total | |
|---|---|---|---|---|
| | | | Number | % |
| Automobiles & Components - 2510 | 4 | 5 | 9 | 3.35 |
| Banks - 4010 | 5 | 1 | 6 | 2.23 |
| Capital Goods- 2010 | 13 | 22 | 35 | 13.01 |
| Commercial Services & Supplies -2020 | 6 | 11 | 17 | 6.32 |
| Consumer Durables & Apparel - 2520 | 5 | 6 | 11 | 4.09 |
| Consumer Services - 2530 | 1 | 4 | 5 | 1.86 |
| Diversified Financials- 4020 | 8 | 11 | 19 | 7.06 |
| Energy – 1010 | 4 | 2 | 6 | 2.23 |
| Food & Staples Retailing -3010 | 2 | 3 | 5 | 1.86 |
| Food Beverage & Tobacco – 3020 | 9 | 15 | 24 | 8.92 |
| Health Care Equipment & Services – 3510 | 2 | 5 | 7 | 2.60 |
| Insurance -4030 | 4 | 2 | 6 | 2.23 |
| Materials- 1510 | 28 | 18 | 46 | 17.10 |
| Media -2540 | 4 | 6 | 10 | 3.72 |
| Oil &Gas 1010 | 1 | 0 | 1 | 0.37 |
| Industrial Conglomerates - 2015 | 1 | 0 | 1 | 0.37 |
| Real Estate - 4040 | 5 | 12 | 17 | 6.32 |
| Retailing- 2550 | 9 | 9 | 18 | 6.69 |
| Software & Services -4510 | 4 | 3 | 7 | 2.60 |
| Technology Hardware & Equipment- 4520 | 5 | 1 | 6 | 2.23 |
| Telecommunication Services – 5010 | 0 | 1 | 1 | 0.37 |
| Transportation -2030 | 5 | 4 | 9 | 3.35 |
| Utilities -2040 | 0 | 3 | 3 | 1.12 |
| Total | 125 | 144 | 269 | 100.00 |

## Table 2: Some Basic Univariate Tests

This table provides univariate statistics on firm characteristics for total sample, interim reductions and final reductions. This table also provides nonparametric Mann Whitney statistics for the difference in median between two sub groups: interim reductions and final reductions. $NPAT_t/TA_t$ : Net profit after tax in period t standardised by total assets in period t; $NOCF_t/TA_t$: Net operating cash flow in period t standardised by total assets in period t; Δ: First difference operator; MV: Market value; $BM_{t-1}$: Book/Market value ratio in period t-1; BH: Blockholders holding 5% or more of common stock at the balance sheet date immediately prior to the dividend reduction announcement;; Top20: the proportion of shares held by top 20 shareholders at the balance sheet date immediately prior to the dividend reduction announcement; IDYRISK: the idiosyncratic risk measured as the standard error of the market model regression of daily stock returns over the period from day –260 to day –61 for each dividend reduction announcement; and TA: total assets. *Significantly different from zero at 10% level, ** significantly different from zero at 5% level and *** significantly different from zero at 1% level.

| Interim versus final dividend reductions | | | | | |
|---|---|---|---|---|---|
| | | All | Interim Reductions | Final Reductions | MW test |
| Total Assets $_{t-1}$ | Mean ($M) | 1511.22 | 1404.56 | 1603.81 | |
| | Median ($M) | 105.19 | 92.44 | 112.23 | 1.33 |
| $NPAT_{t-1}/TA_{t-1}$ | Mean % | 6.51 | 4.93 | 7.89 | |
| | Median% | 5.96 | 5.03 | 6.29 | 1.91* |
| $NPAT_t/TA_t$ | Mean % | 0.62 | -1.33 | 2.32 | |
| | Median% | 3.40 | 2.41 | 3.81 | 2.82*** |
| $NOCF_{t-1}/TA_{t-1}$ | Mean % | 7.73 | 7.55 | 7.88 | |
| | Median% | 7.59 | 6.75 | 7.80 | 0.43 |
| $NOCF_t/TA_t$ | Mean % | 6.29 | 5.77 | 6.74 | |
| | Median% | 5.92 | 6.16 | 5.70 | 0.59 |
| $\Delta NPAT/TA_t$ | Mean % | -5.89 | -6.25 | -5.58 | |
| | Median% | -2.53 | -3.29 | -2.15 | 2.03** |
| $\Delta NOCF/TA_t$ | Mean % | -1.44 | -1.78 | -1.14 | |
| | Median% | -1.40 | -1.39 | -1.43 | 0.19 |
| MV | Mean ($M) | 910.54 | 682.08 | 1108.86 | |
| | Median | 80.16 | 54.69 | 105.18 | 2.26** |
| $BM_{t-1}$ | Mean | 0.89 | 0.92 | 0.86 | |
| | Median | 0.89 | 0.94 | 0.85 | 2.23** |
| Top 20 | Mean % | 68.15 | 66.42 | 69.66 | |
| | Median % | 71.90 | 68.62 | 75.72 | 1.23 |
| BH | Mean % | 43.69 | 42.04 | 45.13 | |
| | Median % | 45.01 | 43.53 | 48.08 | 1.13 |
| IDYRISK | Mean % | 2.56 | 2.73 | 2.42 | |
| | Median % | 2.18 | 2.44 | 2.08 | 2.11** |
| Sample Size | | 269 | 125 | 144 | |

## Table 3: Determinants of dividend reductions

This table provides Tobit regression results. The dependent variable is DRED: percentage of dividend reduction; Independent variables are *IDYRISK*: the idiosyncratic risk measured as the standard error of the market model regression of daily stock returns over the period from day –260 to day –61 for each dividend reduction announcement; *LMV*: the logarithm of the market value of the issuing firm; $NPAT/TA_{t-1}$ :net profit after tax to total assets at one year before the dividend reduction announcement date; $A\Delta NPAT/TA_t$: abnormal changes in net profit after tax to total assets in year *t* measured as difference in NPAT/TA between sample firms and control firms, $A\Delta NPAT/TA_{t+1}$: abnormal changes in net profit after tax to total assets in year *t+1* measured as difference in NPAT/TA between sample firms and control firms, BM: book to market ratio, Top 20: the proportion of shares held by top 20 shareholders, $PERFRANK_{t-1:}$ percentage of franking credit incorporated into the interim and final dividends for the year prior to the interim and final dividend reductions. Panel A reports the full sample results. Panel B the results for interim dividend reductions. Panel C the results for final dividend reductions. Significantly different from zero at the 10% level, ** significantly different from zero at the 5% level, and ***significantly different from zero at the 1% level.

| | Panel A: Full Sample | | | | | Panel B: Interim Dividend Reductions | | | | | Panel C: Final dividend Reductions | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Constant | 0.8029 (6.73)*** | 0.7411 (6.05)*** | 0.5292 (24.36)*** | 0.5146 (22.84)*** | 0.3107 (6.81)*** | 0.7377 (4.58)*** | 0.6672 (3.83)*** | 0.5903 (18.09)*** | 0.5789 (17.38)*** | 0.4130 (6.92)*** | 0.8797 (5.17)*** | 0.9028 (5.51)*** | 0.4779 (16.92)*** | 0.4601 (15.58)*** | 0.2383 (3.41)*** |
| $NPAT/TA_{t-1}$ | -0.4989 (-2.35)** | -0.4806 (-2.53)** | | | | -0.9257 (-4.14)*** | -0.9713 (-2.87)*** | | | | -1.0053 (-2.62)*** | -1.0493 (-2.81)*** | | | |
| $A\Delta NPAT/TA_t$ | -0.3985 (-3.04)*** | -0.3457 (-2.51)** | -0.5119 (-3.96)*** | | | -0.6447 (-3.27)*** | -0.7458 (-1.98)*** | -0.5616 (-3.35)*** | | | -0.1938 (-1.76)* | -0.1950 (-1.78)* | -0.4408 (-3.05)*** | | |
| $A\Delta NPAT/TA_{t+1}$ | | -0.2840 (-2.12)** | | -0.6450 (-4.51)*** | | | -0.3448 (-1.81)* | | -0.5980 (-3.28)*** | | -0.0773 (-0.43) | | | -0.7247 (-3.53)*** | |
| IDYRISK | 5.7641 (4.22)*** | 5.5336 (4.09)*** | | | 9.6258 (5.76)*** | 4.3445 (2.33)** | 4.1404 (2.23)** | | | 8.0187 (4.26)*** | 8.4235 (4.72)*** | 8.6427 (4.91)*** | | | 10.4854 (3.67)*** |
| LMV | -0.0488 (-5.13)*** | -0.0428 (-4.35)*** | | | | -0.0342 (-2.27)** | -0.0283 (-1.77)* | | | | -0.0549 (-4.43)*** | -0.0560 (-4.68)*** | | | |
| BM | -0.0083 (-0.15) | 0.0147 (0.26) | | | | -0.0085 (-0.11) | 0.0199 (0.26) | | | | -0.0810 (-1.11) | -0.0947 (-1.35) | | | |
| Top 20 | -0.0741 (-0.81) | -0.0722 (-0.76) | | | | 0.0164 (0.13) | 0.0257 (0.18) | | | | -0.0821 (-0.68) | -0.0843 (-0.72) | | | |
| $PERFRANK_{t-1}$ | -0.1432 (-3.37)*** | -0.1444 (-3.33)*** | | | | -0.1088 (-1.66)* | -0.1262 (-1.87)* | | | | -0.1895 (-3.31)*** | -0.1875 (-3.40)*** | | | |
| Adj R-Squared | 0.3250 | 0.3306 | 0.0562 | 0.0543 | 0.1736 | 0.2218 | 0.2309 | 0.0588 | 0.0437 | 0.1190 | 0.3638 | 0.3613 | 0.0368 | 0.0576 | 0.2023 |
| N | 266 | 255 | 266 | 255 | 269 | 122 | 114 | 122 | 114 | 125 | 141 | 144 | 144 | 141 | 144 |

## Table 4: Dividend reductions and abnormal changes in profitability

Panel A of this table provides profitability as measured by NPAT/TA for the year prior to the interim/final dividend reductions for the sample of firms reduced their dividends and control firms who do not reduced their dividend. This panel also reports abnormal changes in profitability for the year of the dividend reductions and the year after, measured as difference in NPAT/TA between sample firms and control firms. Wilcoxon signed ranked test statistics (WSR) is also reported to test whether median abnormal changes in profitability is different from zero. Panel B provides regression results between abnormal changes in profitability in t+1 and dividend reductions. Panel C provides the impact of franking status on the relation between abnormal changes in profitability in t+1 and dividend reductions. DRED: percentage dividend reduction; DIOF: equals 1 if the firm reduces its dividend at the interim stage and zero if the firm reduces the dividend at the final stage; DREDFRANK $_{t-1:}$ is a dummy variable equals 1 if the firm reduces percentage of franking credit on dividend in t-t relative to t-2 and zero otherwise, DFD is a dummy variable if the firm paid franking (full or partial) dividend in the year t-1 and zero for unfranked dividend in the year t-1, DUFD is a dummy variable if the firm paid unfranked dividend in the year t-1 and zero for franking (full or partial) dividend in the year t-1 and RFC is percentage of reduction in franking credit in year t at the interim (final) dividend reduction relative to interim (final) dividend in year t-1.White Heteroskedasticity-Consistent t-statistics are reported in parenthesis for Panel B. Significantly different from zero at the 10% level, ** significantly different from zero at the 5% level, and ***significantly different from zero at the 1% level.

Panel A: profitability and abnormal changes in profitability

| | | Sample Firms $NPAT/TA_{t-1}$ | Control Firms $NPAT/TA_{t-1}$ | $A\Delta NPAT/TA_t$ | $A\Delta NPAT/TA_{t+1}$ |
|---|---|---|---|---|---|
| All | Mean (%) | 6.51 | 6.40 | -4.85 | -4.22 |
| | Median (%) | 5.96 | 6.02 | -2.20 | -2.47 |
| | WSR | (12.80)*** | (12.60)*** | (5.02)*** | (6.62)*** |
| | N | 269 | 266 | 266 | 255 |
| Interim | Mean | 4.93 | 4.82 | -5.83 | -3.69 |
| Reductions | Median | 5.03 | 5.21 | -2.72 | -2.31 |
| | WSR | (8.08)*** | (7.98)*** | (4.92)*** | (2.97)*** |
| | N | 125 | 122 | 122 | 114 |
| Final | Mean | 7.89 | 7.77 | -4.05 | -4.48 |
| Reductions | Median | 6.29 | 6.56 | -1.54 | -2.58 |
| | WSR | (9.99)*** | (9.80)*** | (4.40)*** | (4.08)*** |
| | | 144 | 144 | 144 | 141 |

Panel B – Regression analysis: Abnormal changes in profitability in year *t+1* ($A\Delta NPAT/TA_{t+1}$) versus dividend reductions (dependent variable - $A\Delta NPAT/TA_{t+1}$)

| | C | DRED | DIOF | Adj R | F statistic | p-value | N |
|---|---|---|---|---|---|---|---|
| | | | dividend reductions | | | | |
| All | 0.0092 | -0.0948 | | 0.0575 | 16.49 | 0.0001 | 255 |
| | (0.78) | (-3.75)*** | | | | | |
| All | 0.0026 | -0.0994 | 0.0202 | 0.0595 | 9.04 | 0.0002 | 255 |
| | (0.20) | (-3.94)*** | (1.25) | | | | |
| Interim | 0.0231 | -0.0998 | | 0.0513 | 7.11 | 0.0088 | 114 |
| | (1.27) | (-2.65)*** | | | | | |
| Final | 0.0024 | -0.0990 | | 0.0650 | 10.74 | 0.0013 | 141 |
| | (0.16) | (-2.91)*** | | | | | |
| | | | Reduction in unfranked Dividend | | | | |
| All | 0.0328 | -0.1276 | | 0.0486 | 4.37 | 0.0404 | 67 |
| | (1.00) | (-2.41)** | | | | | |
| All | 0.0176 | -0.1353 | 0.0474 | 0.0535 | 2.86 | 0.0644 | 67 |
| | (0.52) | (-2.57)** | (1.11) | | | | |
| Interim | 0.0725 | -0.1453 | | 0.0273 | 1.79 | 0.1925 | 29 |
| | (1.20) | (-1.69)* | | | | | |
| Final | 0.0125 | -0.1276 | | 0.0578 | 3.27 | 0.0789 | 38 |
| | (0.34) | (-1.94)* | | | | | |
| | | | Reduction in Franked Dividend | | | | |
| All | 0.0034 | -0.0833 | | 0.0518 | 11.22 | 0.0010 | 188 |
| | (0.27) | (-2.90)*** | | | | | |
| All | 0.0002 | -0.0861 | 0.0100 | 0.0485 | 5.77 | 0.0037 | 188 |
| | (0.02) | (-2.99)*** | (0.61) | | | | |
| Interim | 0.0143 | -0.0935 | | 0.0608 | 6.43 | 0.0131 | 85 |
| | (0.79) | (-2.27)** | | | | | |
| Final | -0.0027 | -0.0794 | | 0.0388 | 5.12 | 0.0258 | 103 |
| | (-0.16) | (-1.98)** | | | | | |

Panel C – Regression analysis: Abnormal changes in profitability in year *t+1* ($A\Delta NPAT/TA_{t+1}$) versus dividend reductions and reduction in franking credit (dependent variable - $A\Delta NPAT/TA_{t+1}$)

| | All | | | | | | | | | DFD=1 | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| C | -0.0025 (-0.11) | -0.0002 (-0.01) | 0.0024 (0.18) | -0.0043 (-0.35) | -0.0052 (-0.45) | -0.0104 (-0.74) | -0.0013 (-0.10) | -0.0086 (-0.95) | -0.0153 (-1.34) | 0.0002 (0.02) | 0.0080 (0.52) | 0.0085 (0.55) | 0.0091 (-0.92) | -0.0105 (-0.85) | -0.0091 (-0.92) |
| DRED | -0.0974 (-3.88)*** | -0.0981 (-3.89)*** | -0.1003 (-3.93)*** | | | | -0.1207 (-3.26)*** | | | -0.0861 (-2.99)*** | | -0.0426 (-0.86) | | | |
| DIOF | 0.0199 (1.21) | 0.0194 (1.19) | 0.0204 (1.24) | 0.0206 (1.23) | | 0.0138 (0.83) | 0.0208 (1.26) | | | 0.0100 (0.61) | 0.0030 (0.18) | 0.0045 (0.26) | | 0.0038 (0.22) | |
| $PERFRANK_{t-1}$ | 0.0060 (0.28) | 0.0057 (0.26) | | | | | | | | | | | | | |
| DREDFRANKt-1 | | -0.0220 (-0.77) | | | | | | | | | | | | | |
| DUFD | | | 0.0024 (0.11) | | -0.0514 (-2.15)** | -0.0522 (-2.21)** | 0.0203 (0.83) | | | | | | | | |
| DFD*DRED | | | | -0.0828 (-3.20)*** | | | | | | | | | | | |
| DUFD*DRED | | | | -0.0892 (-2.84)*** | | | | -0.0794 (-2.50)** | -0.0811 (-2.57)** | | | | | | |
| RFC | | | | | | | | | | | -0.0914 (-3.15)*** | -0.0517 (-1.18) | -0.0907 (-3.10)*** | | |
| RFC*DRED | | | | | | | | | | | | | | -0.0782 (-2.78)*** | -0.0773 (-2.75)*** |
| RFC*DFD | | | | | -0.0652 (-2.63)*** | -0.0675 (-2.72)*** | 0.0276 (0.82) | | | | | | | | |
| RFC*DFD*DRED | | | | | | | | -0.0745 (-2.86)*** | -0.0783 (-2.98)*** | | | | | | |
| Adj R | 0.0561 | 0.0541 | 0.0558 | 0.0482 | 0.0212 | 0.0201 | 0.0539 | 0.0475 | 0.0482 | 0.0485 | 0.0587 | 0.0543 | 0.0641 | 0.0549 | 0.0602 |
| F statistic | 6.04 | 4.63 | 6.01 | 5.29 | 3.75 | 2.73 | 4.62 | 7.33 | 5.28 | 5.77 | 6.33 | 4.28 | 12.71 | 5.97 | 11.95 |
| p-value | 0.0006 | 0.0013 | 0.0006 | 0.0015 | 0.0247 | 0.0443 | 0.0013 | 0.0008 | 0.0015 | 0.0037 | 0.0022 | 0.0061 | 0.0005 | 0.0031 | 0.0007 |
| N | 255 | 255 | 255 | 255 | 255 | 255 | 255 | 255 | 255 | 188 | 188 | 188 | 188 | 188 | 188 |

# Table 5: Price Reaction to Dividend reductions

This table reports mean and median abnormal returns and the standard residual t-tests (SRT) employing the market model for dividend reduction for the periods: the day before the announcement date to day after (day-1 to day +1); the day of the announcement date to day after the announcement date (day 0 to day +1) and the two day before the announcement day to two days after the announcement date (day-2 to day+2) to all dividend reductions, interim dividend reductions and final dividend reductions. This table also provides parametric t-test statistics for the difference in mean abnormal returns between two sub groups: interim reductions and final reductions. , *Significantly different from zero at the 10% level, ** significantly different from zero at the 5% level and *** significantly different from zero at the 1% level.

**Price reaction: interim dividend reductions versus final dividend reductions**

| | | All | Interim Reductions | Final Reductions | t-test |
|---|---|---|---|---|---|
| Day -1 to day +1 | Mean (%) | -3.14 | -4.35 | -2.08 | 2.39** |
| | Median (%) | -1.37 | -1.71 | -1.08 | |
| | SRT | (-20.84)*** | (-19.43)*** | (-10.38)*** | |
| Day 0 to day +1 | Mean (%) | -2.76 | -4.09 | -1.59 | 2.60*** |
| | Median (%) | -0.86 | -1.35 | -0.49 | |
| | SRT | (-17.80)*** | (-18.35)*** | (-7.23)*** | |
| Day -2 to day +2 | Mean (%) | -3.36 | -4.75 | -2.15 | 2.41** |
| | Median (%) | -1.33 | -1.64 | -0.82 | |
| | SRT | (-22.58)*** | (-20.66)*** | (-11.62)*** | |
| Sample Size | | 269 | 125 | 144 | |

## Table 6: Analysis of Price Reaction

Table 6 provides cross-sectional results for the dividend reductions firms. The dependent variable is three-day abnormal returns, employing the market model. Independent variables are the percentage dividend reduction (DRED), pre-announcement abnormal returns from day -60 to day -2 (PRECAR), the natural logarithm of the market value (LMV), book to market ratio (BM), gearing ratio (equity to total assets), PERFRANK $_{t-1:}$ percentage of franking credit incorporated into the interim and final dividends for the year prior to the interim and final dividend reductions, dummy variable DIOF where DIOF equals 1 if the firm reduces its dividend at the interim stage and zero if the firm reduces the dividend at the final stage, DREDFRANK $_{t-1:}$ is a dummy variable equals 1 if the firm reduces percentage of franking credit on dividend in t-t relative to t-2 and zero otherwise, DFD is a dummy variable if the firm paid franking (full or partial) dividend in the year t-1 and zero for unfranked dividend in the year t-1, DUFD is a dummy variable if the firm paid unfranked dividend in the year t-1 and zero for franking (full or partial) dividend in the year t-1 and RFC is percentage of reduction in franking credit in year t at the interim (final) dividend reduction relative to interim (final) dividend in year t-1. *Significantly different from zero at the 10% level, ** significantly different from zero at the 5% level and *** significantly different from zero at the 1% level.

| Variable | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| C | -0.0113 (-1.95)* | -0.0059 (-0.84) | -0.0064 (-0.95) | 0.0154 (0.70) | 0.0256 (0.87) | 0.0332 (0.88) | 0.0289 (0.76) | 0.0263 (0.89) | -0.0116 (-2.06)** | -0.0034 (-0.51) | -0.0027 (-0.34) | -0.0047 (-0.58) | -0.0164 (-3.62)*** | -0.0092 (-1.67)* | -0.0109 (-1.92)* |
| DRED | -0.0360 (-2.53)** | -0.0308 (-2.35)** | -0.0271 (-2.20)** | -0.0310 (-1.94)* | -0.0315 (-1.95)* | -0.0339 (-1.87)* | -0.0332 (-1.84)* | -0.0325 (-2.00)** | | | | | | | |
| DIOF | | -0.0178 (-1.97)* | -0.0194 (-2.09)** | -0.0198 (-2.10)** | -0.0198 (-2.09)** | -0.0198 (-2.09)** | -0.0201 (-2.11)** | -0.0203 (-2.14)** | | -0.0185 (-2.00)** | -0.0201 (-2.16)** | -0.0202 (-2.16)** | | -0.0191 (-2.08)** | -0.0192 (-2.08)** |
| PRECAR | | | -0.0778 (-2.27)** | -0.0797 (-2.30)** | -0.0811 (-2.33)** | -0.0798 (-2.30)** | -0.0837 (-2.32)** | -0.0843 (-2.38)** | | -0.0762 (-2.16)** | -0.0806 (-2.23)** | -0.0819 (-2.25)** | | -0.0771 (-2.19)** | -0.0789 (-2.21)** |
| $BM_{t-1}$ | | | | -0.0086 (-0.73) | -0.0073 (-0.58) | -0.0078 (-0.56) | -0.0067 (-0.54) | -0.0064 (-0.50) | | | | | | | |
| LMV | | | | -0.0026 (-0.90) | -0.0027 (-0.92) | -0.0031 (-0.93) | -0.0033 (-1.00) | -0.0032 (-1.06) | | | | | | | |
| Gearing $ratio_{t-1}$ | | | | | -0.0200 (-0.72) | -0.0200 (-0.73) | -0.0202 (-0.74) | -0.0205 (-0.73) | | | | | | | |
| $PERFRANK_{t-1}$ | | | | | | -0.0061 (-0.49) | -0.0023 (-0.17) | | | | | | | | |
| DREDFRANKt-$_1$ | | | | | | | 0.0227 (1.54) | 0.0238 (1.79)* | | | | 0.0114 (0.94) | | | 0.0137 (1.14) |
| DFD*DRED | | | | | | | | | -0.0385 (-2.32)** | -0.0377 (-2.23)** | | | | | |
| DUFD*DRED | | | | | | | | | -0.0261 (-1.91)* | -0.0317 (-2.18)** | | | -0.0236 (-1.65) | -0.0246 (-1.71)* | -0.0227 (-1.58) |
| RFC*DFD*DRED | | | | | | | | | | | | -0.0332 (-1.91)* | -0.0227 (-2.25)** | -0.0325 (-1.88)* | -0.0308 (-1.79)* |
| DUFD | | | | | | | | | | | -0.0244 (-1.97)** | -0.0224 (-1.81)* | | | |
| RFC*DFD | | | | | | | | | | | -0.0354 (-2.04)** | | | | |
| Adj R-Squared | 0.0216 | 0.0304 | 0.0626 | 0.0593 | 0.0583 | 0.0568 | 0.0582 | 0.0617 | 0.0201 | 0.0762 | 0.0667 | 0.0645 | 0.0289 | 0.0685 | 0.0669 |
| F-statistics | 6.92 | 5.20 | 6.96 | 4.38 | 3.76 | 3.31 | 3.07 | 3.52 | 3.75 | 6.15 | 5.79 | 4.69 | 4.99 | 5.93 | 4.84 |
| P-value | 0.0090 | 0.0061 | 0.0002 | 0.0008 | 0.0013 | 0.0022 | 0.0025 | 0.0013 | 0.0248 | 0.0001 | 0.0002 | 0.0004 | 0.0074 | 0.0001 | 0.0003 |
| Sample size | 269 | 269 | 269 | 269 | 269 | 269 | 269 | 269 | 269 | 269 | 269 | 269 | 269 | 269 | 269 |

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