

The Dividend Substitution Hypothesis: Australian Evidence

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Abstract

Using data prior to the Jobs & Growth Tax Relief Reconciliation Act of 2003 Grullon and Michaely (2002) find that firms in the US are financing repurchases with funds that would otherwise have been used to increase dividends. This finding supports the hypothesis that firms are substituting from dividends towards repurchases. This paper examines the relation between share repurchases and dividend changes in a dividend imputation tax environment, where dividends are not as tax disadvantaged relative to capital gains as they are in a classical tax system such as the US. In Australia, which operates under a full dividend imputation system, we find that repurchase yield is positively related to dividend increases, suggesting that Australian firms are not buying back shares with funds generated by altering dividend policy. Our findings have important implications for our understanding of the effect of taxation on firms' payout policy.

Key Words: payout, imputation, franking, buyback, repurchase, off-market, equal access

JEL Classification: G30, G32, G35

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1. Introduction

Share repurchases were not an important form of corporate payout when Lintner's (1956) seminal research on dividend policy was conducted. However, in the US which has the longest history of share repurchases, share repurchases have grown to become the most important method of cash distribution to shareholders. Grullon and Michaely (2002) show that share repurchases in the US grew at an average rate of 26.1% over the period 1980 – 2000 and surpass ordinary dividends in the dollar value of cash distributed to shareholders from 1999 onwards.

The theory of payout policy was established by Miller and Modigliani (1961). They show that when capital markets are perfect and frictionless, dividends and share repurchases are perfect substitutes and that the size of the payout has no effect on firm value. Whether introduction of market frictions in the form of agency costs, information asymmetries and taxation affect the Miller and Modigliani propositions has been the focus of numerous theoretical and empirical studies. Imperfections could imply that the size of the distribution matters, the form of distribution matters, or that they both matter.

Recent studies on payout policy integrate dividend and share repurchases as alternative forms of cash disbursement, and attempt to answer whether these two mechanisms are complements or substitutes. Whether repurchases act as a substitute for dividends is termed the 'substitution hypothesis'. Brav et al (2005) conduct surveys and interviews with CFOs and conclude that dividends and share repurchases are not viewed as pure substitutes; managers value the flexibility inherent in share repurchases in contrast to the relative rigidity of dividends. The reticence to increase dividends found by Lintner (1956) is also reflected in the finding of Brav et al that managers would not use a hypothetical reduction in repurchases to increase dividends. This view is supported by

Grullon and Michaely (2002) who find that companies in the US are buying back shares with funds that would have otherwise been used to increase dividends. This result is consistent with the view expressed in Brav et al that once free of historical constraints on dividend payouts, managers would substitute from dividends towards repurchases.

Grullon and Michaely (2002) find that the differential tax between capital gains and dividends is a significant determinant of the market reaction to share repurchase announcements. But these authors and others have argued that taxes alone do not explain the extent of repurchases activity in the US. For instance Brav et al (2005) find that managers view tax considerations as of second order importance in the choice of disbursement mechanism. Preliminary evidence provided by Chetty and Saez (2004) and Julio and Ikenberry (2004) suggests that in the US dividend increases and initiations are on the rise since the tax changes introduced in the Jobs & Growth Tax Relief Reconciliation Act of 2003.² Even after these reforms dividends in the US remain slightly tax disadvantaged due to the ability of investors to delay capital gains. Further research may resolve the extent to which lowering the tax disadvantages to dividends will reduce the tendency for US firms to substitute repurchases for dividends.

Based on the results from research conducted in the US, the extent to which differential taxes between repurchases and dividends affect the payout decision is an unresolved issue. However further insight into this issue can be gained by conducting an experiment similar to that of Grullon and Michaely (2002) in a tax environment where dividends are not so tax-disadvantaged relative to capital gains. Australia, which operates

² The 2003 tax reform results in dividends being taxed at a rate of 15 percent instead of facing the regular income tax schedule with a top rate of 35 percent.

under a full dividend imputation system, provides exactly that environment.³ For certain shareholders dividends are tax advantaged because they carry imputation tax credits which can be used to offset personal income tax liabilities. Therefore our primary objective in this paper is to use the unique opportunity provided by the tax environment in Australia to investigate the relation between repurchase activity and dividend payout in a non-classical tax environment.

There are a number of interrelated factors that potentially affect firms in their decision to repurchase. We control for these firm characteristics in investigating the relation between repurchase yield (defined as dollar volume repurchased divided by market value of the firm in the previous period) and changes to dividend payout. The aim of our paper is to test the substitution hypothesis that firms are substituting repurchases for dividends. If increases in dividends above a model forecast are associated with lower repurchase yield we take this as evidence in support of the substitutability of repurchases and dividends and the results of Grullon and Michaely (2002). If, on the other hand, firms that pay unexpectedly more in dividends also increase repurchase yield we take this as evidence against the substitution hypothesis and in favour of treating the two forms of disbursement as complements.

This paper contributes to the literature by increasing our understanding of the effects of taxation on payout policy. Overall we find no evidence that Australian firms are substituting repurchases for ordinary dividends. In addition we find that certain financial characteristics significantly influence the proportion of shares that firms repurchase. It is apparent that firms may use repurchases to signal that they are

³ Other countries operating full or partial imputation systems include the U.K., New Zealand, Mexico, Finland, Norway, Ireland, France, Italy, Canada.

undervalued by the market. Firms with higher leverage tend to repurchase less and larger firms tend to repurchase more.

The rest of this paper is organised as follows. In Section 2 we describe the environment for share repurchases in Australia, and summarise the payout behaviour of the repurchasing firms in our sample over the period 1995-2003. Section 3 discusses dividends and repurchases in the context of theoretical and empirical evidence on the effect of taxes, information asymmetries and agency costs on motivations for repurchasing and on the choice between repurchasing and paying dividends. Section 4 describes the data used in the study. The model that is used to examine the relation between repurchase yield and changes to dividend payout is developed in Section 5. Analysis, results and discussion are presented in Section 6. Finally, Section 7 concludes.

2. Share repurchases in Australia

The study of repurchases in Australia⁴ is driven by two legislative issues: company law enabling buybacks and legislation determining the tax treatment of the buyback price for participating shareholders. In 1989 legislation was introduced that allowed companies to repurchase shares. But it was not until December 1995 when the rules were considerably simplified, that repurchase activity surged. Firms can now repurchase their shares through two main vehicles: on-market or off-market repurchases⁵. Off-market repurchases can be categorised into equal access, selective or minimum holding. The

⁴ Harris and Ramsay (1995) and Balachandran and Faff (2004) investigate announcement day effects; Lamba and Ramsay (2005) look at the impact of deregulation on repurchases; Mitchell and Robinson (1999) provide a study of the regulatory environment and the motivations for repurchases prior to the first Corporate Law Simplification Bill of December 1995 which simplified the process for firm undertaking buybacks.

⁵ The terms 'repurchase' and 'buyback' are used interchangeably throughout the paper. In the US on-market repurchases are generally referred to as open-market and off-market repurchases are referred to as tender offers. In Australia, as in the US, in an off-market repurchase the buyback price can be fixed or determined through a Dutch auction.

Appendix describes these categories and details the regulations governing repurchases in Australia.

Australia changed from a classical tax system to a full dividend imputation system on July 1, 1987. Under this system dividends paid out by Australian companies carry a tax credit, representing the tax paid by the company on the profits from which the dividend has been distributed. Resident shareholders declare the dividend (grossed up to equal the pre-company-tax profit from which the dividend was paid) as income, and then the tax credit is used to offset personal income tax obligations.⁶ Overseas investors cannot use the franking credits.

Hence under the imputation system resident companies generate imputation or 'franking credits' for the company tax paid. These credits accumulate in the company franking account, maintained to keep track of the income tax credits that can be passed on to shareholders. The franking account increases with franking credits arising from tax instalments or income tax paid and distributions carrying franking credits received from other companies. It decreases when the company makes a franked distribution, when it streams dividends to shareholders⁷ most able to benefit from them, or (under certain conditions) when it buys back shares on-market.⁸

Australia's capital gains tax (CGT) provisions operate to tax capital gains on the sale of assets acquired after 20 September 1985 as assessable income in the year of disposal

⁶ Australian resident individuals, complying superannuation funds, registered organisations and life assurance companies may use distributed franking credits to offset their tax liabilities. If all the franking credits are distributed, and all recipients are able to fully utilise them, then the imputation system effectively eliminates the double taxation of dividends (Officer, 1994).

⁷ Section 204-30 of the *ITAA (Income Tax Assessment Act) 1997* contains legislation regarding streaming of distributions. Anti-dividend streaming legislation prevents 'streaming' franked dividends to a shareholder who would benefit to a greater degree than another shareholder. Non-compliance with these provisions permits the Commissioner of Taxation to deny a shareholder imputation benefits and the debiting of the franking account of the company.

⁸ITAA s.160AQCC, s.160AQE(5).

of the asset. Prior to September 1999 the capital gains tax liability was calculated using the indexation method whereby the inflation adjusted capital gain is included in ordinary income. Under the discount method for assets acquired after September 1999 (and which taxpayers can elect to use for assets acquired prior to that date), fifty percent of the nominal capital gain accrued on assets held for longer than one year is included as income. Capital losses are offset against capital gains in the year of calculation or carried forward.

The major difference between on- and off-market repurchases for Australian shareholders is their tax treatment. As far as the tax liability of the company is concerned, a repurchase is tax neutral. Under the rules governing off-market repurchases in Australia companies may split the repurchase price into capital and dividend components. This split must be confirmed by a ruling from the Commissioner of Taxation subsequent to which companies with accumulated tax credits can fully frank the dividend component of the repurchase. The remainder is treated as capital. The participating shareholder benefits from the imputation credits and may also benefit if the cost base for calculation of CGT implies that the sale results in a capital loss.⁹ This structure has resulted in many off-market repurchases occurring at a discount to the market price. Brown and Efthim (2005) find that the size of the discount of the offer price to the current share price is significantly related to the proportion of the repurchase price offered as a franked dividend.

⁹ The following example provides an illustration of the breakdown between dividend and capital components. On 11 April 2003 Woolworths completed an off-market buyback at a price of \$11.40, of which \$8.52 was designated a fully franked dividend and \$2.88 the capital amount. Participating shareholders use \$2.88 as the sale price for calculation of CGT. The share price on announcement of the repurchase was \$11.04; many participating shareholders could have claimed a capital loss on the sale.

From the shareholder's perspective, on-market repurchases are treated in the same way as any sale of shares, and the proceeds are subject to CGT. However, from the company perspective, an amount is debited from the franking account equivalent to that which would have occurred had the on-market repurchase instead been off-market.¹⁰ Thus companies engaging in on-market repurchases may suffer a deduction from their franking account of imputation credits which could otherwise have been distributed to shareholders.

Brown and Efthim (2005) show that only shareholders on low marginal tax rates are better off selling shares into an off-market buyback (at a discount to market price), when compared to the alternative of simply selling the shares on market. Shareholders on low marginal tax rates may prefer dividends over capital gains. Institutional investors such as Australian superannuation funds, on a marginal tax rate of 15% compared to the company tax rate of 30%, may prefer dividends over capital gains. Thus while the tax disadvantages associated with payment of dividends in a classical tax system are not wholly removed in an imputation system, they are somewhat mitigated, particularly as low tax paying institutions form a very important part of the shareholder base for most companies. For example in the UK, Rau and Vermaelen (2002) argue that firms are influenced by large institutional investors such as pension funds when setting their payout policy.

3. Payout policy

Are dividends and share repurchases interchangeable payout methods? The theoretical answer to this question begins with the seminal work of Modigliani and Miller

¹⁰ See footnote 7.

(1961) who first argued that the value of a firm is entirely determined by its investment policy and is consequently unaffected by the mix of retained earnings and payout. This result relies on perfect capital markets, in which dividends and share repurchases are equivalent. The introduction of market frictions in the form of taxes, information asymmetries and agency costs may affect the equivalence of dividends and repurchases in a number of ways. The following subsections review the theoretical and empirical research on the motivation for repurchases and the relation between repurchases and dividends. We begin with a discussion of taxation, information asymmetry and agency costs. Other motivations for repurchases discussed in the literature are considered last.

3.1 Taxation

The US operates under a classical company tax system where dividends are paid out of after company tax income and until the introduction of the Jobs & Growth Tax Relief Reconciliation Act of 2003 dividend income was taxed at the marginal tax rate of the receiving shareholder.¹¹ This results in dividends being taxed twice. Only tax-exempt investors are neutral with respect to the firm paying out dividends or retaining earnings, all other investors prefer the company to retain earnings.

Repurchases in the US are taxed on a capital gains basis. Since the tax rate on capital gains is generally lower than that on dividend income, most investors would prefer the company to disburse cash via share repurchases rather than dividends (Black, 1976; Barclay and Smith, 1988). So, in an otherwise perfect capital market, the effect of taxation in the US is to induce a preference for payout in the form of repurchases. Grullon and Michaely (2002) find that differential taxation is also important in market reactions to share repurchases with the reaction to repurchases being more positive when

¹¹ The tax rate on dividends was lowered to 15% under the Jobs & Growth Tax Relief Reconciliation Act of 2003.

tax gains on repurchases relative to dividends are larger. They suggest, as do Jagannathan et al (2000), that differential taxation is however not sufficient to fully explain the observed increase in share repurchase activity, since the upsurge in repurchases coincided with legislation that made repurchases less tax effective.¹² Dittmar (2000) finds that repurchasing firms do not have lower dividend payout ratios and argues that it is not the tax benefits of repurchases that cause firms to repurchase stock.

Australia operates a full dividend imputation system as discussed in Section 2. Companies accumulate tax credits in the franking account and must decide when and how these 'franking credits' are to be distributed to shareholders. Prior to legislation enabling share repurchases, the primary method of distributing the tax credits to shareholders was through the payment of fully franked ordinary dividends. Brown and Howard (1992) argue that the Australian imputation tax system is biased towards high dividend payouts. Monkhouse (1993) in deriving the CAPM under an imputation system finds that the optimal dividend policy is for a firm to distribute all its imputation credits, because they lose value as time passes. In addition ITAA s.160AQE governs the extent to which companies can frank a dividend distribution.¹³ Many resident shareholders would prefer to receive returns in the form of fully franked dividends as the tax rate on this form of distribution is lower than that on capital gains.¹⁴ Thus dividends in Australia are not tax disadvantaged to the same extent as they were in the US prior to 2003.

¹² The 1986 Tax Reform Act eliminated the preferential tax treatment for realized capital gains.

¹³ The Income Tax Assessment Act - Entities may frank dividends subject to a benchmark rule which provides that all dividends paid within a franking period must be franked to the same extent. Breaches may result in penalties.

¹⁴ Compare \$1 received as a fully franked dividend versus \$1 paid as a capital gain using the 'discount method' to calculate CGT. Assume personal tax rate p and company tax rate t . After-tax income from a dividend payment is $[1/(1-t)]*(1-p)$ while after-tax income from a \$1 capital gain is $1-0.5p$. Shareholders prefer dividends provided $p < 0.46$, for the current corporate tax rate $t = 0.3$. The top marginal tax rate in Australia during the period of this study was 0.47 (plus the Medicare levy of 0.0125). Thus all shareholders other than those on the top marginal rate prefer dividend income over capital gains. The issue is

On-market repurchases are taxed as capital gains and in addition may result in a deduction from the franking account, and a destruction of franking credits. For this reason on-market repurchases are sometimes conducted at the same time or after an off-market repurchase (which can be used to distribute the franking credits).

Australian firms that have accumulated imputation tax credits in excess of needs under ordinary dividend policy will be influenced in their choice of buyback by tax-related factors such as the size of the franking account, how the payment is taxed when received by shareholders and whether the cash distributed via a repurchase has franking credits attached. Off-market repurchases offer a mechanism for firms to distribute these 'excess' franking credits. Suppose that firms follow an optimal dividend policy and distribute franking credits through ordinary dividends to the maximum extent possible, given the current dividend policy. Firms will be reluctant to use off-market repurchases as a substitute for ordinary dividends, because this action will disadvantage a group of shareholders who do not find it advantageous to participate in the buyback (Brown and Efthim 2005). This suggests that Australian firms will not use substitute from ordinary dividends towards off-market repurchases but may use off-market repurchases as a mechanism to distribute franking credits excess to the requirements of ordinary dividend policy.

Taxes are an important factor in the dividend/repurchase decision (Lie and Lie (1999). However, as argued by inter alia Dittmar (2000), Jagannathan et al (2000), Grullon and Michaely (2002), taxes do not fully explain repurchase activity in the US. Other factors are found to influence firms' motivations for undertaking share repurchases. We now discuss these alternative motivations for firms repurchasing shares.

complicated by the fact that there are different methods for calculation of CGT, and the fact that the CGT may be delayed. See Section 2.

3.2 Other motivations for share repurchases

Grullon and Michaely (2004) argue that the two predominant theories explaining firms' motivations for undertaking repurchases are the information/signalling hypothesis and the free cash flow hypothesis. The information/signalling hypothesis has its root in the information asymmetries that exist between managers and outsiders. It is based on the idea that managers use share repurchases to signal better prospects for the company. Dann (1981), Vermaelen (1981) and Comment and Jarrell (1991) find that the market reacts positively to the announcement of a repurchase, a result which is consistent with the information/signalling hypothesis. However, Stephens and Weisbach (1998), Nohel and Tarhan (1998), Ikenberry et al (2000) and Grullon and Michaely (2004) provide more recent empirical evidence that is not supportive of the signalling hypothesis.

The free cash flow hypothesis is based on the work of Easterbrook (1984) and Jensen (1986). Repurchases and dividends are mechanisms to distribute excess cash to shareholders and lower the agency costs of free cash flow. Based on this hypothesis one would expect firms with large excess free cash flow to repurchase more shares. Stephens and Weisbach (1998), Dittmar (2000), Grullon and Michaely (2004) find support for the free cash flow hypothesis.

There are a number of other explanations for firms' repurchasing behaviour. Firms with high leverage are less likely to repurchase (Bagwell and Shoven, 1988; Lie, 2002). In addition, cross-sectional analysis shows that dividends are used to pay out cash flow that is likely to be permanent whereas share repurchases are used for more volatile cash flows (Jagannathan et al, 2000; Guay and Harford, 2000).

Grullon and Michaely (2002) directly explore the interchangeability of dividends and share repurchases by examining the correlation of share repurchases with deviations

from expected payout policy. Using the Linter (1956) model of expected dividends, and controlling for firm characteristics they find strong evidence that for the period from 1972 to 2000 US firms are completing repurchases using funds that would otherwise have been used to increase dividends. Importantly, market participants are aware of this substitution, as evidenced by the insignificant impact of the announcement of dividend decreases on the share price of repurchasing firms.

3.3 *Summary*

The tax environment is a key component in the relation between dividends and share repurchases. In a classical tax environment such as the US there are clear incentives for companies to distribute cash via repurchases. In contrast we have argued that in an imputation tax system, the bias towards repurchases is not so evident. Assuming that the optimal dividend policy in the Australian environment is to distribute fully franked dividends to the maximum extent possible, it is not expected that companies will substitute from ordinary dividends towards repurchases.

While taxes have been found to be an important factor affecting repurchase activity, certain firm characteristics are also found to significantly influence the repurchase decision. Thus, in investigating repurchase activity in the Australian tax environment, we control for other variables affecting the firm's repurchase decision.

4. Data and descriptive statistics

We collect data for firms that undertook repurchases over the years 1995 to 2003; prior to 1996 there were few repurchases (Lamba and Ramsay, 2005). A database consisting of all on- and off-market share repurchases completed between 1st January

1996 and 31st December 2003¹⁵ was constructed using data sourced from the Securities Data Company (SDC) and the IRESS¹⁶ Signal G Database. We follow Dittmar (2000) and Grullon and Michaely (2002) in omitting banks and insurance companies from the combined sample of on- and off-market repurchases. Firms that used the buyback as a means of privatising, or those that were delisted from the exchange within a month of completing the buyback, were excluded, following the procedure of Vermaelen (1981). We do not include all firms on the sample as we are interested in the behaviour of repurchasing firms. Our approach is similar to Dittmar (2000) who uses a sample of repurchasing firms in the US.

Companies purchasing shares on-market make daily statements to the Australian Stock Exchange detailing the previous days repurchase activity, including the number of shares repurchased and the average price paid. These data are aggregated in order to accurately calculate on-market repurchase activity over each calendar year. The initial on-market sample consisted of 363 announced and completed on-market repurchases. After exclusions, the final on-market sample included 69 firms with a total of 150 individual announcements, buying back on average 2.7% by market value.

The off-market sample is constructed from the SDC database and supplemented with searches of DatAnalysis¹⁷ using the keywords “off-market” or “equal-access,” “selective” and “buyback.”. The results are screened to exclude companies that undertook buybacks in response to a takeover or as an alternative to a pure capital return when

¹⁵ The starting date for the sample period was chosen to avoid any confounding effects of the introduction of the First Corporate Law Simplification Bill in December 1995. The introduction of this Bill reduced the previously stringent regulations governing share buybacks and consequently lowered the high transactions costs associated with initiating a share buyback. Prior to the introduction of the bill only 32 repurchases were undertaken over the period 1989-1995 (Lamba and Ramsay, 2000).

¹⁶ IRESS Market Technology Limited provides share market information across Australia and New Zealand.

¹⁷ DatAnalysis is provided by Aspect Huntley and contains financial data for all companies listed on the ASX from 1997 onwards.

winding up. Companies that bought back ordinary shares and subsequently issued convertible notes are also excluded¹⁸, as are those that did not actually complete the buyback. The final sample consists of 23 off-market share repurchases¹⁹ buying back on average 23.5% of market value. The combined sample of on-and off-market repurchases over the period consists of 170 firm-year observations on 84 companies.

The relevant historical financials²⁰ between 1st January 1995 and 31st December 2003 for the 84 firms are obtained from FinAnalysis²¹, supplemented with information from the AGSM database²² for those companies delisted between 1995 and 1997. Financial year-end data consisting of the following items is collected: market capitalisation (*MV*), book value of shareholders' equity (*BV*), net profit after tax (NPAT) pre abnormal items, book value of total assets (*TA*), cash on the balance sheet (*Cash1*), a measure of free cash flow (*Cash2*), dividends (*Div*) and a measure of leverage (*lev*). Definitions of the financial metrics are given in Table 1.

[INSERT TABLE 1 ABOUT HERE]

Our sample consists of firms that have undertaken either an on- or off-market buyback over the sample period (1996-2003). Sample firms are initially categorised on the basis of whether they paid at least one ordinary dividend. Table 2 reports the descriptive statistics for firms that did not pay dividends over the sample period (Div=0, Rep=1), for firms that did pay dividends (Div=1, Rep=1) and for the complete sample (Div=0,1, Rep=1).

¹⁸ These companies were excluded to avoid debt-for-equity swaps in the sample.

¹⁹ Note that both Minimum Holding and Employee Share Scheme repurchases were excluded from this analysis.

²⁰ Financial items are collected on a firm-specific, financial-year-end basis. However buyback activity is aggregated on a calendar year basis to allow for differences in financial year ends.

²¹ FinAnalysis is provided by Aspect Huntley and contains financial data for all companies listed on the ASX from 1997 to present.

²² The Australian Graduate School of Management (AGSM) Centre for Research in Finance Share Price and Price Relative Database.

[INSERT TABLE 2 ABOUT HERE]

It is of interest to note that for our sample, the combined dollar payout via repurchases exceeds that via dividends. Repurchases have clearly become an important mechanism for some Australian companies to return cash to shareholders, consistent with the findings of Grullon and Michaely (2002). However, this does not imply that repurchases have replaced dividends in the Australian market as the dominant payout method. Over the period of our study approximately \$220.3 billion was returned to shareholders via ordinary dividend payments, whilst around \$25 billion was returned in on- and off-market buybacks. As shown in Table 2, our sample of 23 off-market repurchases disbursed \$8770.8m to shareholders while 150 on-market repurchases disbursed \$4342.5m.

Clearly off-market repurchases, although fewer in number are important in the choice of payout mechanism. Grullon and Michaely (2002) use only open-market repurchases to test the substitution hypothesis, because in the US this is the dominant repurchase method. In the Australian context, off-market repurchases are important in terms of cash disbursed. Moreover, because they can be used as a mechanism for distribution of franking credits they are more likely to be used as an alternative to an ordinary dividend payment. We therefore include both on- and off-market buybacks in the sample.

As highlighted by the work of Guay and Harford (2000), Jagannathan et al. (2000) and Stephens and Weisbach (1998), the financial characteristics and performance of a firm may influence its payout policy choices, particularly in the choice between increasing dividends and undertaking a share repurchase. From Table 2, we observe that the dividend-paying firms in our sample are on average larger and more profitable than

the non-dividend paying firms. They have higher *MB* ratios, which in combination with their larger size, suggests that they are less likely to be undervalued (Dittmar, 2000; Ikenberry et al., 1995; Vermaelen, 1981 and 1984). The variability of their performance, as measured by $\sigma(ROA)$, is also much lower than for non-dividend firms.

5. The model

In order to investigate whether firms are deviating from their normal dividend policy by relating dividends with repurchases, we need a model to forecast dividends one year ahead. There are few studies on the explanatory power of dividend forecast models in an Australian setting. Early studies include XXX. Difficulties in using the standard estimation approach of the Lintner (1956) model for forecasting dividends include having a long enough time series of firms with continuous dividend payments to estimate firm-specific variables.²³ To overcome the lack of data we adopt an approach similar to da Silva et al (2004) and construct a measure of dividend forecasts by running a panel regression of the 84 companies in the sample across the period 1996-2003. We use an adaptive expectations model for earnings as described in da Silva et al. In this model current dividends of firm *i* at time *t* (D_{it}) are expected to be an average of long-run expected earnings.

$$D_{it} = r_i E_{it}^* + u_{it} \quad (1)$$

Because the expectations of earnings for firm *i* at time *t*, E_{it}^* , is not directly observable earnings expectations are assumed to be formed according to the following process:

$$E_{it}^* - E_{i,t-1}^* = a_i (E_{it} - E_{i,t-1}^*) \quad (2)$$

where a_i is the coefficient of earnings expectations. This equation signifies that the expectations about earnings are revised each period by a fraction a_i of the discrepancy

²³ The sample size reduces to XXX if firm level estimation of the Lintner model is attempted.

between the earnings observed in the current period and those that had been anticipated in the previous period. Substituting equation (2) into equation (1) results in an empirically testable form of the Lintner (1956) partial adjustment model given by equation (3):

$$Forecast_{i,t} = \alpha Div_{i,t-1} + \beta NPAT_{i,t} + \varepsilon_{it} \quad (3)$$

where we have substituted *NPAT* for earnings. With the model written in this way the speed of adjustment to the target payout is $(1-\alpha)$ and the payout ratio is $\beta/(1-\alpha)$. With a relatively short time period, a reasonably large cross section of firms and imposing common slope coefficients, this approach allows the target payout ratio to vary across firms in a constrained way, thus capturing the firm-specific dividend payout behaviour.

We estimate equation (3) on an unbalanced panel of 570 observations²⁴ which results in a coefficient on lagged dividends of 0.820 and on *NPAT* of 0.105 with an R^2 for the panel regression of 95.5 percent. These figures correspond to a speed of adjustment parameter of 0.280 and a payout ratio of around 58 percent. Our model is not unrealistic; over the period from 1996 to 2003 the average dividend payout ratio for all Australian listed companies is around 55 percent (Brown, 2004).

We now use this forecast to calculate whether a firm's actual dividend payment is above or below that forecast, measuring the dividend forecast error as

$$DDiv_{i,t} = \frac{(Div_{i,t} - Forecast_{i,t})}{MV_{i,t-1}} \quad (4)$$

where $MV_{i,t-1}$ is the market capitalisation of the firm in the previous period, $Forecast_{i,t}$ is the forecast dollar value of dividends as given in equation (1) and $Div_{i,t}$ represents the actual (total) dollar value of dividends paid by firm i in period t .

²⁴ There are missing observations. For example, firms which do not have a reported figure for *NPAT* do not have a prediction for the following year's dividend.

We combine firm characteristics that have been found to affect repurchase activity with the unexpected change in dividends as measured by equation (4) into the regression model described in equation (5). The dependent variable, repurchase yield, is defined as the dollar value of repurchases in a calendar year divided by the market value of equity at the beginning of the calendar year. Because the dependent variable is observed only if the firm undertakes a repurchase the regression is estimated as a truncated regression model of the form,

$$RYield_{i,t} = \beta_1 + \beta_2 \underset{(+)}{Cash}_{i,t-1} + \beta_3 \underset{(-)}{MB}_{i,t-1} + \beta_4 \underset{(-)}{\ln(TA)}_{i,t-1} + \beta_5 \underset{(-)}{Lev}_{i,t-1} + \beta_6 \underset{(-)}{DDiv}_{i,t} + u_i \quad (5)$$

where we have indicated the expected signs on the independent variables. Our primary focus is the relation between repurchase yield and dividend changes. A positive coefficient (or a non significant negative) on the dividend change variable (positive β_6) will result in the rejection of the substitution hypothesis.

[INSERT TABLE 3 ABOUT HERE]

Table 3 summarises how each of the control variables in equation (3) is measured. *Cash* is used to proxy for free cash flow and is expected to have a positive coefficient (Jensen, 1986; Grullon and Michaely 2004; Nohel and Tarhan, 2000). We have used two different measures of *Cash* as explained in Table 1. If the market to book ratio, *MB*, is used to represent the market's assessment of growth opportunities for the firm, it is expected to have a negative coefficient (Grullon, Michaely and Swaminathan, 2002; Grullon and Michaely, 2004). Market to book can also be used to measure undervaluation, in which case low MB firms should repurchase more and the coefficient will again be negative. The natural logarithm of total assets $\ln(TA)$ has been used as a proxy for information asymmetry; large firms are less likely to be undervalued (Vermaelen, 1981). Therefore if firms are using buybacks as a signal to the market that

the firm is undervalued the coefficient on this variable should be negative. Finally, firms with high debt levels are likely to repurchase less (Bagwell and Shoven, 1988; Lie, 2002), so the coefficient on the leverage variable is expected to be negative.

Since observations of zero repurchases are not included in our sample we use the truncated regression approach pioneered by Hausman and Wise (1976, 1977). The repurchase yield is estimated using maximum likelihood estimation. We use a quadratic hill-climbing optimisation algorithm and use the OLS estimates as the initial starting values for the combined sample of on- and off-market repurchases. Maximising the log-likelihood function with respect to the parameters yields coefficients which capture two effects: an effect on the mean of the dependent variable (modelled using a latent variable approach) given that it is observed, and an effect on the probability of the dependent variable being observed. We decompose these two effects and concentrate on the former because we are interested in examining substitution in firms that actually undertake repurchases. We separate out the marginal effects using the transformation given in Greene (2003).

6. Results and Discussion

We first calculate the simple correlation between repurchase yield and dividend forecast error for each firm over the period. The correlation across the sample is 22.5 percent giving preliminary evidence against the substitution hypothesis in the Australian market. In order to control for other variables that are expected to influence repurchase activity we estimate equation (5), where interpretation of the marginal effects from the truncated regression model requires transformation of the coefficient estimates.

We run the regression for our sample of repurchases, using the two different measures for free cash flow. Table 4, details the results and also gives the marginal

effects.²⁵ Panel A (B) reports the results when using *Cash1* (*Cash2*) as the measure of free cash flow. We find that repurchase yield is positively and significantly related to the dividend forecast error. That is, repurchase yield is positively associated with the extent to which firms increase their dividends above the forecast. Our results confirm the hypothesis that firms are not substituting repurchases for dividends. In contrast to the negative relationship between repurchase yield and dividend forecast error found by Grullon and Michaely (2002), we find a statistically significant positive relationship, after controlling for firm characteristics that influence repurchase yield.²⁶ Marginal effects from Panel A of Table 4 suggest that an increase in dividends of 1% above their forecast level results in a 0.26% increase in the repurchase yield for our sample of repurchasing companies

[INSERT TABLE 4 ABOUT HERE]

The results in Table 4 lend some support for the investment, signalling and leverage hypotheses. Firms that repurchase more have a significantly lower (at 5%) *MB* ratio. This could indicate support for firms that repurchase more having fewer investment opportunities or that firms that repurchase more tend to more undervalued. If *MB* is a proxy for investment opportunities then one might expect excess cash flow to also have an important influence on repurchase yield. In this regard, contrary to the findings of Nohel and Tarhan (1998) and Grullon and Michaely (2004) we do not find support for

²⁵ To ensure the robustness of our results, we also estimate the regressions for the combined and on-market samples with Huber/White corrected standard errors and, separately, modify the truncation point for repurchase yield. The Huber/White standard error correction adjusts for the presence of heteroskedasticity in the errors, which can cause significant problems with truncated regression model estimation. Modifying the truncation point for repurchase yield alters the likelihood of the results being influenced by companies that repurchase very small percentages of total shares on issue. With each of these modified approaches we find no evidence of substitution. We also run the regression for the combined sample with outliers (repurchase yield greater than two standard deviations from the mean for the sample) removed. The significant coefficients in Table 4 remain significant at the same confidence level or greater.

²⁶ It is common for very low repurchase yields to be set to zero. Bagwell and Shoven (1988) use 0.5%, Dittmar (2000) specifies 1% while Stephens and Weisbach (1998) use a 0% truncation. Our results are robust to different truncation points.

the free-cash-flow hypothesis. The coefficients on our measure for free cash flow are positive but not significant. In this case our results are similar to the findings of Dittmar (2000) who finds a positive but insignificant coefficient on the cash variable for a number of the years in her study. Our finding is consistent with the management surveys of Brav et al. (2005) and Mitchell et al. (2001), that management is unlikely to use payout policy to impose self-discipline.

The coefficient on the natural log of total assets is significantly positive at the 1% level, suggesting that larger firms repurchase more. Under the signalling hypothesis larger firms should repurchase less, because they have less information asymmetry. Thus our results suggest that either size is not a good proxy for information asymmetry or alternatively that firms are not motivated to undertake buybacks in Australia because the firm is undervalued. Given the significant negative coefficient on *MB* and the significant positive coefficient on the size variable, our results suggest that larger firms may also be undervalued. This conclusion is supported by the low level of analyst coverage in Australia relative to the US.²⁷ Despite this divergence of analyst coverage our results on the *MB* and $\ln(TA)$ variables are strikingly similar to those of Dittmar's (2000) results for the US.

In addition, firms with lower debt ratios have higher repurchase yield (significant at the 10% level), consistent with the notion that they use repurchases to increase their debt ratio (Lamba and Ramsay, 2005).²⁸ This finding is also consistent with the argument that firms may be using debt funding to repurchase shares with the implication that repurchase yield may not be related to free cash flow (as we find).

²⁷ Chan, Faff and Ramsey (2005) find that analyst following falls away sharply after the first 100-200 firms.

²⁸ It is worth noting that many of the stated intentions of repurchases in the sample are for "capital management purposes". See Mitchell and Robinson (1999) for further evidence.

7. Conclusions

Share repurchases in Australia have become an important form of cash distribution since the regulatory requirements were relaxed in December 1995. We analyse a sample of 84 repurchasing companies using 170 firm-year observations and find that over the period 1996-2003 these companies distributed more cash to shareholders via repurchases than dividends. The sample of 23 off-market repurchases disbursed \$8.8bn to shareholders, while the sample of 150 on-market repurchases disbursed \$4.3bn. Off-market repurchases, although fewer in number, are an important payout mechanism for Australian firms.

Our research provides a number of new results on the relation between repurchases and dividends, and the effects that the tax environment may have on the preference for one form of payout over the other. Consistent with the hypothesis that in an environment where dividends are less tax-disadvantaged relative to capital gains than in a classical tax system, the empirical evidence presented in this paper shows that the increase in repurchase activity witnessed after 1996 in Australia, has not been financed with funds provided by changes in dividend policy.

In contrast to our results, using a sample of open market repurchases in the US, Grullon and Michaely (2002) find that firms are substituting share repurchases for dividends. The tax treatment of both dividends and share repurchases in Australia stands in stark contrast to that in the US. We argue that the dividend imputation tax system and the tax laws governing the treatment of cash received via dividends or share repurchases does not bring about the preference for share repurchases that exists in the US. We reject the substitution hypothesis, and conclude that there is no tendency for Australian

companies to substitute from dividends towards repurchases. Our findings support the management surveys of Brav et al (2005) and Mitchell et al (2001), which conclude that management do not view repurchases as a substitute for dividends in distributing cash to shareholders.

Our results, taken together with those reported by Grullon and Michaely (2002) enable us to compare the relation between dividend and repurchase decisions in different tax environments. This comparison suggests that taxes are an important factor in the payout decision. When dividends carry significant tax advantages as is the situation in Australia, firms do not substitute repurchases for dividends, but have other motivations for undertaking share repurchases. An interesting question for future research is whether recent changes to the tax environment (that reduce the tax disadvantages to dividends) will change the nature of the dividend-repurchase relation in the US.

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Table 1

Description of financial items. Firm statistics collected from FinAnalysis, supplemented by the AGSM database for firms delisted between 1995 and 1997.

Item	Description ²⁹
<i>MV</i>	<i>Market Value of Equity:</i> Market capitalisation of the firm.
<i>BV</i>	<i>Book Value of Shareholders' Equity</i>
<i>TA</i>	<i>Total Assets:</i> Book value of total assets of the firm.
<i>MB</i>	<i>Market to Book ratio:</i> $\frac{MV_t + (TA_t - BV_t)}{TA_t}$ The ratio of market value of firm to book value.
<i>Cash1</i>	<i>Balance sheet cash:</i> $\frac{(Cash_t + \text{short term investments}_t)}{TA_t}$ The ratio of cash plus short term investments to total assets.
<i>Cash2</i>	<i>Free cash flow</i> NPAT – outside equity interests – preference dividends paid
<i>NPAT</i>	<i>NPAT</i> is reported Net Profit after Tax (pre Abnormal items).
<i>Lev</i>	<i>Balance sheet debt:</i> $\frac{(\text{short term debt}_t + \text{long term debt}_t)}{TA_t}$ The leverage of the firm defined as the ratio of short term plus long term debt to total assets.

²⁹ All figures are measured at the firm's balance date (commonly 30th June).

Table 2

Summary of financials for sample firms between years 1996 – 2003. Financial statistics are obtained from FinAnalysis database, supplemented by the AGSM database for firms delisted between 1995 and 1997. Share repurchases calculated from company announcements to the ASX, viewed on IRESS's Signal G database. *Div* represents the dollar value of ordinary dividends paid during the firms' respective financial years. *Rep* is the dollar value of both on- and off-market repurchases made during the firms' financial year. ΣDiv represents the total dollar value of dividends paid by all firms and ΣRep is the total dollar value of repurchases paid by all firms over the period. Other variables are defined in Table 1.

Panel A: There are 84 companies in the sample completing 170 repurchases over the sample period (Div=0,1, Rep=1). Of those, there are 70 companies completing repurchases, that also paid dividends over the period (Div=1, Rep=1). There are 14 companies completing 23 repurchases that did not pay dividends (Div=0, Rep=1).

Panel B: The same statistics presented for the on- and off-market samples separately

<i>Panel A</i>						
	Div=0, Rep=1		Div = 1, Rep=1		Div=0,1, Rep=1	
No. of companies	14		70		84	
No of observations	23		147		170	
$\Sigma(Div)(\$m)$	0		11409.8		11409.8	
$\Sigma(Rep)(\$m)$	95.0		13079.0		13174.0	
	Mean	Median	Mean	Median	Mean	Median
MV(\$m)	60.0	27.8	2967.9	167.8	2574.4	12.6
TA(\$m)	100.0	48.6	3493.4	265.9	3034.3	197.3
MB	0.47	0.74	1.45	1.35	1.32	1.28
Cash(\$m)	14.3	9.7	260.8	14.1	227.4	12.6
Debt	33.57	28.54	23.91	24.07	24.50%	24.70%
ROA	-0.002	0.004	0.055	0.062	0.048	0.059
$\sigma(ROA)$	0.132	0.085	0.056	0.023	0.066	0.027
NPAT(\$m)	3.0	-0.011	160.9	9.9	139.5	8.1
Divs(\$m)	0	0	77.6	5.8	67.1	3.6
Reps(\$m)	4.1	1.3	89	3.5	77.4	2.9
<i>Panel B</i>						
	Off-market			On-market		
No. of companies	20			69		
No of observations	23			150		
$\Sigma(Div)(\$m)$	3174.9			8730.3		
$\Sigma(Rep)(\$m)$	8770.8			4342.5		
	Mean	Median	Mean	Median	Mean	Median
MV(\$m)	3797.0	477.5	2375.6	93.85		
TA(\$m)	3127.3	659.0	2993.1	169.01		
MB	1.44	1.45	1.30	1.26		
Cash(\$m)	177.1	28.1	232.4	12.4		
Debt	18.20	19.60	25.17	25.40		
ROA	0.052	0.071	0.052	0.059		
$\sigma(ROA)$	0.035	0.022	0.070	0.030		
NPAT(\$m)	208.9	58.1	125.6	7.63		
Divs(\$m)	167.1	52.6	58.20	3.22		
Reps(\$m)	384.0	134.3	28.95	1.52		

Table 3

The truncated regression model. This table explains the variables used in the truncated regression model, of the form:

$$RYield_{i,t} = \beta_1 + \beta_2 Cash_{i,t-1} + \beta_3 MB_{i,t-1} + \beta_4 \ln(TA)_{i,t-1} + \beta_5 Lev_{i,t-1} + \beta_6 DDiv_{i,t} + u_i$$

Variable	Description and expected sign
<i>RYield</i>	The repurchase yield, defined as the dollar value of repurchases in a firm's financial year divided by the market value of equity at the beginning of the year. This is the dependent variable in the regression and is only observed if a firm undertakes a repurchase, that is, if repurchase yield is positive
<i>Cash</i>	<i>Cash</i> is used to test the free-cash-flow hypothesis. As defined in table 1 two alternatives measures of cash are used. <i>Cash</i> should be positively associated with repurchase yield
<i>MB</i>	As previously defined in Table 1, this is used as to test the investment and information signalling hypotheses, as it represents the market's assessment of growth opportunities for the firm. <i>MB</i> should be negatively related to repurchase yield
<i>Ln(TA)</i>	The log of the book value of total assets of the firm, defined at the start of the financial year that the repurchases occur. This measure is commonly used to test for information asymmetry so that <i>ln(TA)</i> should be negatively related to repurchase yield
<i>Lev</i>	As previously defined in Table 1, this is used to test the leverage hypothesis. <i>Lev</i> should be negatively related to the repurchase yield
<i>DDiv</i>	We use the Lintner model to predict dividends and test the substitution hypothesis. <i>DDiv</i> is the change in dividends measured as the difference between those forecast and actually paid. If firms are substituting share repurchases for dividends <i>DDiv</i> should be negatively related to share repurchase yield.

Table 4

Truncated regression results for the repurchase sample consisting of 170 firm-year observations. The regression takes the form detailed in Table 3 and equation (1). For this analysis a repurchase yield (*RYield*) truncation point of 0% is used. Panel A reports the results for the cash variable defined as *Cash1*, while panel B reports the results using the variable *Cash2* (as defined in Table 1). Coefficients are estimated using Maximum Likelihood Estimation (Quadratic hill-climbing optimisation algorithm) with convergence achieved in 3 iterations. P-values are reported in parenthesis and predicted signs link to the arguments in Section 3. Marginal effects are calculated as average and median of the truncated sample.

Variable	Predicted Sign	Panel A: Using Cash defined as (<i>Cash_t</i> + short term investments _t) <i>TA_t</i>			Panel B: Using Cash defined as NPAT – outside equity interests – preference dividends paid		
		Coefficient	Marginal effects Average Median		Coefficient	Marginal effects Average Median	
<i>Intercept</i>	?	-0.0369 (0.6917)	-0.0181	-0.0174	-0.0153 (0.8601)	-0.0075	-0.0073
<i>Cash</i>	+	0.0237 (0.6042)	0.0117	0.0112	0.0194 (0.7294)	0.0208	0.0201
<i>MB</i>	-	-0.0401 (0.0066)	-0.0197	-0.0189	-0.0423 (0.0027)	-0.0208	-0.0201
<i>ln(TA)</i>	-	0.0087 (0.0779)	0.0043	0.0041	0.0081 (0.0929)	0.0040	0.0038
<i>Lev</i>	-	-0.1559 (0.0193)	-0.0767	-0.0735	-0.1701 (0.0068)	-0.0836	-0.0807
<i>Ddiv</i>	-	0.5315 (0.0000)	0.2614	0.2504	0.5263 (0.0000)	0.2588	0.2499

Appendix

The table describes the types of share repurchases permitted for ASX (Australian Stock Exchange) -listed companies in Australia under the Corporations Act (2001). To undertake a repurchase, companies must comply with Chapter 2J, Part 2J.1, Division 2 of the Corporations Act (2001). Each type involves different legal and disclosure formalities. In general, companies are able to repurchase up to 10 percent of their ordinary shares in any 12-month period (commonly referred to as the 10/12 limit) and once the transaction is completed the shares must be cancelled and the Australian Securities and Investment Commission (ASIC) notified. Company conduct during the repurchase is constrained by ASX Listing Rules 3.8A, 7.29 and 7.33.

Type of repurchase	Description
On-market	Repurchases undertaken in the course of ordinary trading on the Australian Stock Exchange (ASX). Shareholder approval via an ordinary resolution is only required if the 10/12 limit is exceeded. Legal requirements of share buybacks in Australia are currently contained in Section 257 of the Corporations Act 2001, and company conduct during the repurchase is constrained by Listing Rules 3.8A, 7.29 and 7.33. ³⁰ Cancellation of the shares immediately after they have been registered to the company is governed by Sections 257H and 254Y of The Corporations Act 2001
Equal access	Repurchases where the company makes an offer to each shareholder to repurchase some or all of each shareholder's ordinary shares. Usually they are conducted "off-market" and set at a price specified by the company. The proposed repurchase must be approved by a shareholder-approved ordinary resolution if it exceeds the 10/12 limit.
Selective	Off-market repurchases made by a company where shares are acquired from specified shareholders, to the exclusion of others, at a specified price. Offers may also pertain to holders of shares other than ordinary shares. A selective buyback must be approved by all 75% of shareholders (with no votes being cast by those holders whose shares are to be repurchased).
Minimum holding	Off-market repurchases of all of a holder's shares if the number of shares held is less than a "marketable" parcel. No resolution is required.
Employee share scheme	The acquisition of shares in a company by, or on behalf of, employees or directors who are employed by the company, or a related corporate body. Shareholder approval via an ordinary resolution is only required if the 10/12 limit is exceeded.

³⁰ The consequence of this legal framework can be summarized as follows: (i) When companies announce the buyback they are required to lodge a proforma announcement notice (Appendix 3C). Under Listing Rule 3.8A a company undertaking an on-market buyback must lodge an Appendix 3E, which is a daily notification at least half an hour before the start of trading on the business day after which any shares are bought back. Companies may repurchase shares only if transactions in the company's shares were recorded on ASX on at least 5 days in the three months before it buys back shares (Listing Rule 7.29). A company may buy back shares at a price which is not more than 5% above the average of the market price for securities in that class (Listing Rule 7.33).