

The Relationship between Share Repurchases and Dividends in an Imputation Tax Environment

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Abstract

This paper examines the relationship between share repurchases and dividend changes in a non-classical tax environment, where dividends are not tax disadvantaged relative to capital gains. Using a sample containing on- and off-market repurchases conducted by Australian companies over the 1996-2003 period we explore the determinants of repurchase yield. We find that repurchase yield is positively related to dividend increases, suggesting that firms are not buying back shares with funds generated by altering dividend policy. In the US, which operates a classical tax system, Grullon and Michaely (2002) find that firms are financing repurchases with funds that would otherwise have been used to increase dividends. In contrast our findings indicate that Australian firms are not substituting from dividends towards repurchases.

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

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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. Repurchases acting as a substitute for dividends is termed 'the substitution hypothesis. Brav et al (2005) survey and conduct 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. Further support is provided

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 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 U.S. In addition, managers view tax considerations as of second order importance in the choice of disbursement mechanism (Brav et al). Preliminary evidence provided by Chetty and Saez (2004) and Julio and Ikenberry (2004) suggests that in the U.S. dividend increases and initiations are on the rise since the tax changes of 2003. 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 U.S., 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 in a tax environment where dividends are tax-advantaged relative to capital gains. Australia, which operates under a full dividend imputation system, provides exactly that environment.² Dividends are tax advantaged because they carry imputation tax credits which are of benefit to shareholders. Therefore our primary objective in this paper is to use the unique

² Other countries operating full or partial imputation systems include the U.K., New Zealand, Mexico, Finland, Norway, Ireland, France, Italy, Canada.

opportunity provided by the tax environment in Australia to investigate the relationship 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 relationship between repurchase yield (defined as dollar volume repurchased divided by market value of the firm in the previous period) and changes to dividend payout. If dividend increases result in 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, dividend increases result in higher repurchase yield we take this as evidence against the substitution hypothesis and in favour of treating the two forms of disbursement as complements.

Our 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 in the face of a potentially declining investment opportunity set. Firms with higher leverage tend to repurchase less. On-market repurchase yield is influenced positively by the volatility of firms' earnings.

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 relationship 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 Australia³ 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 repurchases⁴. Off-market repurchases can be categorised into equal access, selective or minimum holding. The Appendix 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

³ 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 Corporations Simplification Act of December 1995 which simplified the process for firm undertaking buybacks.

⁴ The terms 'repurchase' and 'buyback' are used interchangeably throughout the paper. On-market repurchases are referred to as open-market and off-market repurchases are generally referred to as tender offers in the US. In Australia as in the US, in an off-market repurchase the buyback price can be fixed or determined through a Dutch auction.

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.⁵

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 shareholders⁶ most able to benefit from them, or (under certain conditions) when it buys back shares on-market.⁷

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 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.

⁵ 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).

⁶ 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 Tax Commissioner to deny a shareholder imputation benefits and the debiting of the franking account of the company.

⁷ITAA s.160AQCC, s.160AQE(5)

The major difference between on- and off-market repurchases for Australian shareholders is their tax treatment (Ferrier, 2004). 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 Tax Commissioner and allows companies with accumulated tax credits to 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.⁸ This structure has resulted in many off-market repurchases occurring at a discount to the market price. Brown and Efthim (2005) find a significant relationship between the size of the discount of the offer price to the current share price and the proportion of the repurchase price offered as a franked dividend.

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.⁷ Thus companies engaging in on-market repurchases may suffer a deduction from their franking account of imputation credits which could have been distributed to shareholders.

⁸ 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.

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 (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 then dividend income is taxed at the marginal tax rate of the receiving shareholder. 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 markets, 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 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 increase in share repurchase activity, since the upsurge in repurchases coincided with legislation that made repurchases less tax effective.⁹ 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 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 companies are required under ITAA s.160AQE to frank dividends to the extent calculated under the 'required franking amount' rules.¹⁰ Most 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.¹¹ Thus in contrast to the US, dividends in Australia are tax advantaged.

⁹ The 1986 Tax Reform Act eliminated the preferential tax treatment for realized capital gains.

¹⁰ The main purpose of this rule is to prevent companies from paying unfranked dividends ahead of franked dividends.

¹¹ 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 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 is currently 0.47 (plus the Medicare levy of 0.0125). Thus all shareholders other than those on the

Because on-market repurchases are taxed as capital gains and in addition may result in a deduction from the franking account, the imputation system in Australia induces a preference for payout in the form of dividends rather than on-market repurchases. This observation strongly suggests that on-market repurchases will not be used by companies as an alternative to ordinary dividends for disbursing cash to shareholders.

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. However, if firms follow an optimal dividend policy and distribute franking credits through ordinary dividends to the maximum extent possible, then one might argue that off-market repurchases will not be used as a substitute for ordinary dividends. 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.¹²

Taxes are an important factor in the dividend/repurchase decision. However, as argued by inter alia Dittmar (2000), Jagannathan (2000), Grullon and Michalek (2002), taxes do not fully explain repurchase activity in the US. Other factors are found to

top marginal rate prefer dividend income over capital gains. The issue is complicated by the fact that there are different methods for calculation of CGT. See Section 2.

¹² Brown and Efthim (2005) prove that it is only very low marginal tax rate shareholders (for example superannuation funds on a tax rate of 15%) who are better off selling shares in an off-market repurchase (where the offer price is less than or equal to the market price) as against selling on-market. It is therefore hard to justify firms substituting equal access repurchases for dividends, when such a corporate action results in an inequitable distribution of the franking credits.

influence firms' motivations for undertaking share repurchases. We now discuss these alternative motivations for firms repurchasing shares.

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), 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 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, no such bias towards repurchases exists. 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 an environment where repurchases are not tax advantaged, we control for these other variables affecting the firm's repurchase decision.

4. Data and descriptive statistics

We test the hypothesis that Australian firms do not substitute repurchases for dividends on data collected 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 2003¹³ was constructed using data sourced from the Securities Data Company (SDC) and IRESS's 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.¹⁴ 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).

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 DatAnalysis¹⁵ 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 winding up. Companies that bought back ordinary shares and subsequently issued

¹³ The starting date for the sample period was chosen to avoid any confounding effects of the introduction of the First Corporations Law Simplification Bill in December 1995. The introduction of this Bill greatly decreased the previously stringent regulations governing share buybacks and reduced the high transactions costs associated with initiating a share buyback. Prior to the introduction of the bill only 32 repurchases were undertaken [1989-1995] (Lamba and Ramsay, 2000).

¹⁴ Financial companies which are subject to regulation may have different motives for repurchasing.

¹⁵ DatAnalysis is provided by Aspect Huntley and contains financial data for all companies listed on the ASX from 1997 onwards.

convertible notes are also excluded¹⁶, as are those that did not actually complete the buyback. The final sample consists of 23 off-market share repurchases¹⁷ 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 financials¹⁸ between 1st January 1995 and 31st December 2003 for the 84 firms are obtained from FinAnalysis¹⁹, supplemented with information from the AGSM database²⁰ 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 (*Cash*), dividends (*Div*), return on assets (*ROA*) and short- and long-term debt. The data is used to construct the financial metrics in Table 1.

Firms in the sample are initially categorised on the basis of whether they paid at least one ordinary dividend over the sample period (1996-2003). Table 2 reports the descriptive statistics for our sample of repurchasing firms, 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).

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 Australian companies to return cash to shareholders, consistent with the

¹⁶ These companies were excluded to avoid debt-for-equity swaps in the sample.

¹⁷ Note that both Minimum Holding and Employee Share Scheme repurchases were excluded from this analysis.

¹⁸ Financial items presented on a firm-specific, financial-year-end basis. Calendar year aggregation was chosen to allow for differences in financial year ends.

¹⁹ FinAnalysis is provided by Aspect Huntley and contains financial data for all companies listed on the ASX from 1997 to present.

²⁰ The Australian Graduate School of Management database***

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. Brown and O'Day (2005), using a sample of 1768 ASX-listed companies, find that ordinary dividends remain the dominant payout method. They find that over the years 1996-2003 off-market buybacks returned \$12.1bn to shareholders, while on-market repurchases totalled \$10.5bn. In the same period ordinary dividends totalled \$220.3bn and dominated repurchases in each year of the sample. 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 market, off-market repurchases are important in terms of cash disbursed, but 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 or undertaking a share repurchases. 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, and Vermaelen, 1981). The variability of their performance, as measured by $\sigma(ROA)$, is also much lower than for non-dividend firms.

5. The model

Central to our hypothesis is the idea that firms do not undertake repurchases with funds that would otherwise have been used to increase the dividend payout. We use a simple model to construct a measure of dividend changes as follows.²¹ We measure the dividend per share for firm i in period $t-1$, $d_{i,t-1}$, and use this to forecast the total dividend payout in period t . The forecast dividend payout for firm i at time t is given by

$$Forecast_{i,t} = d_{i,t-1} \times \text{Number of shares outstanding at time } t \quad (1)$$

We then use this forecast to measure the change in dividends as

$$Ddiv_{i,t} = \frac{(Div_{i,t} - Forecast_{i,t})}{MV_{i,t-1}} \quad (2)$$

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 in period t .

Empirical evidence suggests that repurchase activity is motivated by several factors, as discussed in Section 3. We combine firm characteristics that have been found to affect repurchase activity with the change in dividends as measured by equation (2) into the regression model described in equation (3). The dependent variable, repurchase yield, is 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. Because the dependent variable is

²¹ This model is not unrealistic. In the survey and interviews conducted by Brav et al (2005) 88 percent of managers very strongly or strongly agree that they consider the level of dividends per share paid in recent quarters when choosing current dividend policy. Ninety-four percent strongly or very strongly agree that they try to avoid reducing dividends. Together, these two results provide strong support for our simple model.

observed only if the firm undertakes a repurchase the regression is estimated as a truncated regression model of the form

$$RYield_{i,t} = \beta_1 + \beta_2 \underset{(+)}{Cash}_{i,t-1} + \beta_3 \underset{(+)}{ROA}_{i,t-1} + \beta_4 \underset{(+)}{\sigma(ROA_{i,t})} + \beta_5 \underset{(-)}{MB}_{i,t-1} + \beta_6 \underset{(-)}{\ln(TA)}_{i,t-1} + \beta_7 \underset{(-)}{Lev}_{i,t-1} + \beta_8 \underset{(+)}{Ddiv}_{i,t} + u_i \quad (3)$$

Our primary focus is the relationship between repurchase yield and dividend changes. A positive relationship (or a non significant negative) between dividend changes and repurchase yield will support the hypothesis that repurchases are not being used as a substitute for dividends. Table 1 describes how each of the control variables in equation (3) is measured.

Cash and *ROA* are used to proxy for free cash flow and are expected to have positive coefficients (Jensen, 1986; Grullon and Michaely (2004); Nohel and Tarhan, 2000). $\sigma(ROA)$ is measured as the standard deviation of return on assets for the three years surrounding the repurchase year. If firms are using repurchases to distribute temporary earnings (Jagannathan et al., 2000) it should be positively related to repurchase yield. The market to book ratio, *MB*, represents the market's assessment of growth opportunities for the firm and is expected to have a negative coefficient (Grullon, Michaely and Swaminathan, 2002; Grullon and Michaely, 2004). 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). 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 discarded from the sample, we use the truncated regression approach pioneered by Hausman and Wise (1976, 1977). The repurchase yield is estimated using maximum likelihood estimation. We follow Hausman

and Wise (1977) and apply the Berndt et al. (1974) [BHHH] optimisation algorithm that uses 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 changes for each firm over the period. Taking the cross-sectional average (median) we find a small positive correlation of 0.091 (0.047), giving preliminary evidence against the substitution hypothesis in the Australian market. In contrast to the US (where Grullon and Michaely (2002) find a negative correlation between dividend forecast error and repurchase activity), Australian firms are not substituting repurchases for dividends. We estimate equation (3) using the combined sample of both on- and off-market repurchases. As previously mentioned, interpretation of the marginal effects from the truncated regression model requires transformation of the coefficient estimates.

We run the regression first for the full sample of on- and off-market repurchases, which includes companies that have not paid dividends over the sample period. Table 4, Panel A, details the results and gives the marginal effects.²² We find that repurchase yield

²² 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

is positively and significantly related to the extent to which firms increase their dividends. 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.²³ Marginal effects from Panel A of Table 4 suggest that for an increase in the dividend forecast error of 1%, there is a corresponding 0.14% increase in the repurchase yield of that company.

Our combined sample of on- and off-market repurchases includes companies that have not paid any dividends over the period. Recall that the simple model for predicting dividends uses last period's dividend per share as an input to the model. When the last period's dividend is zero, the predicted dividend from equation (1) will be zero. Therefore the *Ddiv* variable from equation (2) will be fixed at zero over all years of the sample for these companies. Thus inclusion of these companies in the sample could bias the results in favour of concluding that companies are not substituting repurchases for dividends. We therefore remove non-dividend paying companies from the sample and rerun the analysis. Panel B of Table 4 contains the results. The substitution hypothesis is rejected, as the coefficient on the change in dividend variable is positive (but not significant).

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.

²³ 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.

In both Panels A and B we report support for the investment and leverage hypotheses. Firms that repurchase more have lower investment opportunities as measured by the *MB* ratio. In addition firms with lower debt ratios have higher repurchase yields, consistent with the notion that they may use repurchases to increase their debt ratio (Lamba and Ramsay, 2005).²⁴ Contrary to the findings of Nohel and Tarhan (1998) and Grullon and Michaely (2004) we do not find support for the free-cash-flow hypothesis. 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. There is marginal support in the dividend paying sample that larger companies have higher repurchase yields, which does not support the idea that firms undertake buybacks because they are undervalued.

Grullon and Michaely's (2002) study uses on-market repurchases, whereas we have included both on- and off-market repurchases in our sample. On-market repurchases differ substantially from off-market. Management is under no obligation to repurchase the approved number of shares under an on-market program, whereas off-market repurchases are more rigid.²⁵ Off-market repurchases are generally completed in a short time and tend to be used in preference to on-market repurchases when the proportion of shares to shares outstanding to be repurchased is large. The inherent flexibility in an on-market program might make them more suitable for distributing potentially transitory cashflows (Guay and Harford, 2000, Jagannathan et al., 2000, Stephens and Weisbach, 1998). More importantly, as argued in Section 3, the differences in tax treatment between

²⁴ It is worth noting that many of the stated intentions of repurchases in the sample are for "capital management purposes".

²⁵ Depending on the off-market repurchase type, management will announce a dollar amount or the number of shares sought under the repurchase program.

on- and off-market repurchases affect the extent to which they can be used as a substitute for dividends.

Table 5 reports the coefficient estimates and marginal effects for equation (3) for the sample of on-market repurchases. Panel A contains the full sample and Panel B contains only dividend paying companies that have conducted an on-market repurchase. Again the investment hypothesis is supported on the basis of the significantly negative relationship between repurchase yield and the *MB* ratio. The coefficient on the dividend change variable *Ddiv* is positive (but not significantly different from zero). Thus, there is no support for the substitution hypothesis. The negative coefficient on *Cash* indicates that firms with higher cash ratios repurchase less, a result which is puzzling.²⁶ There is some support for the findings of Guay and Harford (2000) and Jagannathan et al. (2000) that firms use on-market repurchases to distribute potentially temporary cashflows, since the coefficient on $\sigma(ROA)$ is significant at a 10 percent level of confidence. For the dividend paying companies there is some support for the leverage hypothesis.

We do not report the results of performing the same analysis for the off-market repurchase because of the small sample size (23 firms).²⁷

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

²⁶ Dittmar (2000) finds a negative coefficient on the cash variable (which is measured similarly) in some years of her study.

²⁷ However the *MB* variable is negative and significantly (at 1%) and the *Ddiv* variable is positive and significant (at 5%). Results are available from the authors on request.

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.

Grullon and Michaely (2002) find that US 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. Our hypothesis resulting from an analysis of the tax environment is that Australian companies will not substitute repurchases for dividends.

Using the combined sample of on- and off-market repurchases, and the on-market sample we examine the substitution hypothesis using a simple model to calculate changes to dividends. We find no evidence to suggest that firms are employing share repurchases as a substitute for regular dividends: repurchase yield and dividend changes are positively related. 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, combined with those reported by Grullon and Michaely (2002) enable us to compare the relationship 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 relationship 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 ²⁸
<i>MV</i>	<i>Market Value of Equity:</i> Market capitalisation of the firm.
<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>Cash</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>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.
<i>ROA</i>	<i>Return on Assets:</i> $\frac{EBI_t}{(TA_t - \text{outside equity}_t)}$ The ratio of earnings before interest (EBI) to total assets less outside equity interests.
$\sigma(ROA)$	Standard deviation of the <i>ROA</i> measure.
<i>NPAT</i>	<i>NPAT</i> is reported Net Profit after Tax (pre Abnormal items).

²⁸ All figures as at the firm's balance date (commonly either 30th June or 31st December).

Table 2: Summary of financials for sample firms between years 1996 – 2003. Financial statistics 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	3127.3	169.01
TA(\$m)	3127.3	659.0	2993.1	169.01	1.44	1.26
MB	1.44	1.45	1.30	1.26	177.1	12.4
Cash(\$m)	177.1	28.1	232.4	12.4	18.20	25.40
Debt	18.20	19.60	25.17	25.40	0.052	0.059
ROA	0.052	0.071	0.052	0.059	0.035	0.030
$\sigma(ROA)$	0.035	0.022	0.070	0.030	208.9	7.63
NPAT(\$m)	208.9	58.1	125.6	7.63	167.1	3.22
Divs(\$m)	167.1	52.6	58.20	3.22	384.0	1.52
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: $RYield_{i,t} = \beta_1 + \beta_2 Cash_{i,t-1} + \beta_3 ROA_{i,t-1} + \beta_4 \sigma(ROA_{i,t}) + \beta_5 MB_{i,t-1} + \beta_6 \ln(TA)_{i,t-1} + \beta_7 Lev_{i,t-1} + \beta_8 Ddiv_{i,t} + u_i$	
Variable	Description and Expected sign ^[a]
<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. <i>Cash</i> should be positively associated with repurchase yield
<i>ROA</i>	<i>ROA</i> is also used to test the free-cash-flow hypothesis. <i>ROA</i> should be positively related to repurchase yield
$\sigma(ROA)$	The standard deviation of return on assets for the three years surrounding the repurchase year. If firms are using repurchases to distribute temporary earnings $\sigma(ROA)$ should be positively related to 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>	As discussed in section 5 , we use a simple 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 not substituting dividends for share repurchases <i>Ddiv</i> should be positively related to share repurchase yield.
Notes: [a] Each test is a two-tailed test of significance	

Table 4: Truncated regression results for the combined repurchase sample. 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 for the combined sample of on- and off-market repurchases consisting of 170 firm-year observations. Panel B excludes the non-dividend paying firms. Coefficients are estimated using Maximum Likelihood Estimation (BHHH optimisation algorithm). 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: Full sample 170 observations			Panel B: Non-dividend paying companies deleted (147 observations)		
		Coefficient	Marginal effects Average Median		Coefficient	Marginal effects Average Median	
<i>Intercept</i>	?	-0.587 (0.3343)	-0.042	-0.032	-0.477 (0.2418)	-0.014	-0.034
<i>Cash</i>	+	-0.292 (0.2754)	-0.021	-0.016	-0.588 (0.2619)	-0.051	-0.042
<i>ROA</i>	+	-0.228 (0.5906)	-0.016	-0.013	-0.198 (0.7947)	-0.017	-0.014
<i>σROA</i>	+	-0.485 (0.2240)	-0.035	-0.027	0.362 (0.6889)	0.050	0.015
<i>MB</i>	-	-0.185 (0.0113)	-0.013	-0.010	-0.318 (0.0000)	-0.026	-0.023
<i>ln(TA)</i>	-	0.023 (0.4712)	0.002	0.001	0.038 (0.0866)	0.003	0.003
<i>Lev</i>	-	-1.442 (0.0105)	-0.010	-0.080	-0.961 (0.0468)	-0.083	-0.069
<i>Ddiv</i>	+	2.054 (0.0002)	0.147	0.113	1.729 (0.1767)	0.150	0.124

Table 5: Truncated regression results for the on-market repurchase sample. The regression takes the form detailed in equation (1). For this analysis a repurchase yield (*RYield*) truncation point of 0% is used. Panel A reports the results for the whole on-market sample of 150 firm-year observations Panel B excludes the non-dividend paying firms. Coefficients are estimated using Maximum Likelihood Estimation (BHHH optimisation algorithm). P-statistics are reported in parenthesis and predicted signs link to arguments in Section 2. Marginal effects are calculated as average and median of the truncated sample.

Variable	Predicted Sign	Panel A: Full sample 150 observations			Panel B: Non-dividend paying companies deleted (131 observations)		
		Coefficient	Marginal effects		Coefficient	Marginal effects	
			Average	Median		Average	Median
<i>Intercept</i>	?	-0.289 (0.5463)	-0.014	-0.012	-0.245 (0.4319)	-0.024	-0.017
<i>Cash</i>	+	-0.571 (0.0000)	-0.028	-0.023	-0.392 (0.0934)	0.039	-0.027
<i>ROA</i>	+	-0.247 (0.4311)	-0.012	-0.010	-0.272 (0.6230)	-0.027	-0.019
<i>σROA</i>	+	0.897 (0.0533)	0.045	0.036	1.256 (0.0778)	0.125	0.086
<i>MB</i>	-	-0.141 (0.0064)	-0.007	-0.006	-0.138 (0.0003)	-0.014	-0.009
<i>ln(TA)</i>	-	0.003 (0.9022)	0.000	0.000	0.017 (0.2165)	0.002	0.001
<i>Lev</i>	-	-0.296 (0.2858)	-0.015	-0.012	-0.446 (0.0504)	-0.044	-0.031
<i>Ddiv</i>	+	0.153 (0.7248)	0.008	0.006	0.721 (0.2733)	0.072	0.049

Appendix

The table describes the types of share repurchases permitted for ASX-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 exchange at a price no greater than 5% above the average last sale price for each of the last five days on which shares were traded. Shareholder approval via an ordinary resolution is only required if the 10/12 limit is exceeded. Additionally, companies must comply with Chapter 3 of the ASX's listing rules, requiring continuous disclosure of the progress of the repurchase program.
Equal access	Repurchases where the company makes uniform offers to each shareholder to repurchase the same percentage 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.