

The determinants of share repurchase decisions in on-market buy-backs

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ABSTRACT

Australian regulations require direct disclosure of repurchase intentions and activity for on-market buy-backs. This is the first study to use both firm characteristics and managements' disclosed reasons for repurchases to explain buy-back activity. Our analysis models both intended and actual buyback activity. Executives' holdings of options, low growth prospects and firm size consistently explain intended repurchase activity. Managements' disclosure that the buy-back is undertaken in response to undervaluation, capital restructuring and liquidity also consistently explain intended repurchases. Actual buy-back activity is generally less than the level announced and is only explained by change in EPS and the length of the buy-back program in our model.

1. Introduction

On-market share buy-backs have become a popular mechanism for distributing cash to shareholders, with substantial growth in the use of repurchases reported over the 1990s (Grullon and Michaely 2002, 2004; Jagannathan et al. 2000; Stephens and Weisbach 1998). A substantial body of evidence has documented that the market generally perceives the announcement of a buy-back scheme as positive news (e.g. Masulis, 1980; Vermaelen, 1981; Lamba and Ramsay, 2000). However, in Australia, the announcement of an on-market share buy-back does not create an obligation for a firm to proceed with the full repurchase. While some firms actively and quickly commence buy-back activity, other firms repurchase only a small percentage of the announced target number of shares. Thus, it appears that announcing a buy-back provides a firm with an implicit option with respect to payout policy.

In this paper, we investigate factors that may explain the maximum proportion of shares a firm announces it intends to repurchase, and relate this to subsequent buy-back activity. In undertaking our analysis, we consider the effect of company-specific factors both at the announcement date and over the repurchase period. Since the relative percentage of shares repurchased over the buy-back period may reflect increases in the value of the shares in response to the buy-back announcement (Ikenberry, Lakonishok and Vermaelen 1995; Stephen and Weisbach 1998) we measure actual activity as the value of shares repurchased relative to the maximum value of shares the company announced it intended to repurchase.

In order to undertake the study, data is required about the announcement and ongoing buy-back activity. The Australian reporting environment provides an ideal setting for conducting this study. Unlike markets such as the USA, a direct test of our research question is possible due to timely disclosure of buy-back activity from the announcement date through to completion of the buy-back program. Kim et al. (2003), Jagannathan et al. (2000) and Stephens and Weisbach (1998) outline the processes that other researchers have to pursue in order to construct information pertaining to buy-back intention and activity.¹ Lee and Rui (2007) discuss the problems of estimating repurchase activity in the US market. Further,

¹The amended SEC Rule 10b-18, which provides a “safe harbour” from charges of manipulation when repurchasing stock on the open market, requires firms in the US to disclose (ex-post) on a quarterly basis the number of shares repurchased, the average repurchase price, whether the repurchase was part of a publicly announced open market repurchase program, and the maximum number of shares that may yet to be purchased under the program. But it does not require that firms publicly announce their intent to repurchase in order to satisfy the safe harbour requirements. Moreover, US firms do not need to disclose the timing of their trading and it could take up to four months after the repurchase before investors learn about the repurchase program. Consequently, it is difficult for non-insiders to determine whether firms are complying with the regulations, to establish which firms propose to undertake on-market repurchases and to identify the actual number of shares repurchased. See Cook et al. (2003) for an examination of repurchasing firms use of rule 10b-18 in the USA.

compliance with SEC Rule 106-18 which requires disclosure of the number of shares repurchased, and is the basis for much of the extant studies, has effectively operated on a self-monitoring basis which raises the question as to the accuracy of the disclosures (Cook et al. 2004).

In contrast, the Australian regulatory setting provides an opportunity to identify distinct buy-back programs undertaken by firms at particular points in time and collect data on share repurchase activity. Under Australian regulation, listed companies are required to lodge public documentation to the Australian Stock Exchange (ASX) prior to the commencement of, and progressively throughout, an on-market share buy-back program. This documentation includes disclosure of the type of buy-back, the maximum number of shares a company intends to repurchase and the reason for the repurchase. Throughout the buy-back program, companies must disclose the number and price of shares repurchased immediately following any repurchase activity. Finally, companies are required to notify the market on completion of the buy-back program.

The enhanced disclosure of the Australian setting allows us to consider buy-back activity as a two-stage process: the first stage reflects the conditions in existence at the announcement of the buy-back program; and the second stage reflects changes to these conditions during the buy-back program.

The Australian setting has been subject to previous study, and these papers have noted the attractiveness of the disclosure regime from a research perspective. For instance, Mitchell and Dharmawan (2007) examine buy-backs in Australia from 1996-2001 and focus on the incentives that surround a buy-back decision. Their approach is to compare financial attributes of firms that engage in buy-back activity with a sample of control firms. Our contribution is to understand what factors influence the level of intended and subsequent repurchase activity.

Our sample comprises firms that announced on-market buy-backs between October 1997 and July 2003. We record the maximum number of shares the company intends to repurchase and the announced reason for the repurchase for all on-market buy-backs over the sample period. The maximum number of shares that can be bought back by a firm during an on-market buy-back in Australia is limited to 10% over a 12-month period by the *Corporations Act 2001* without an ordinary resolution from shareholders. Approximately 31% of our sample firms stated that they intended to repurchase the maximum 10% of shares through their on-market buy-back, while on average, firms in the sample target only 6% of their stock.

In initial analysis, we investigate whether five traditional explanations for repurchases influence the proportion of shares a firm announces that it intends to repurchase. These explanations are: under-valuation, availability of free cash flows, capital restructuring, dividend substitution and earnings per share dilution. We then determine whether changes to these measures over the buy-back period influence the relative value of shares actually repurchased. That is, the study investigates which factors are associated with buy-back activity, as opposed to traditional approaches that focus only on the factors associated with the buy-back announcement.

The distinction between the announced repurchase activity and the actual repurchase activity is important. Firms are not required to fulfil the quota of shares announced for repurchase. Hence, as noted above, the announcement of a buy-back effectively creates an option for firms as to their buy-back activity, and implicitly their payout policy. The data reveal that firms, on average, repurchase substantially less stock than that originally announced. Around half of the sample repurchases 50% or less of their intended quota, while only 20% of the sample repurchases the announced quota. Thus, we ask what factors lead firms to alter their repurchase plans?

Prior research, has suggested that managers act strategically (see Ikenberry and Vermaelen, 1996; Ikenberry et al., 2000) and opportunistically (Fried, 2001) in their decision-making concerning repurchases. In our analysis we categorise the reasons provided by firms in their disclosures into six main types: capital management, under-valuation, dilution, free cash flows, leverage and liquidity. These categories are similar to the common theoretical explanations of repurchases. Of the reasons provided, 'capital management' is most commonly cited with 47% of firms providing this as the reason for the buy-back. In some cases, firms cite more than one reason for the buy-back. However, disclosure of the reason is typically brief and contains little detail. For these reasons, the actual motivation for the buy-back is not always transparent and as suggested by Mitchell and Robinson (1999) managers may not provide the 'true' reason for the buy-back in their disclosures. Lack of transparency can be illustrated by the use of 'capital management' as a reason for the buy-back. Capital management could cover a host of activities from dividend policy management to corporate restructuring. Our analysis indicates that at least 30% of firms that undertake a buy-back for capital management reasons also state that they are doing the buy-back for capital restructuring, gearing or improving the cost of capital (all classified in this study as capital restructuring).

To undertake the formal analysis, we first regress the proportion of shares intended to be repurchased on a number of firm characteristics. We then regress this variable on just the categorical variables capturing management's reason for the buy-back. Finally we include both firm characteristics and managers' reasons in the regression. This is the first study to include both financial characteristics and managers' actual reasons for the buy-back as explanatory factors of intended buy-back activity. A number of consistent results are found over all three versions of the model. Firms that intend to buy-back a greater proportion of shares have managers with a higher proportion of equity in the form of options, are smaller and have lower growth option. A greater proportion of shares are intended to be repurchased by firms citing under-valuation, leverage and liquidity as the reasons for the buy-back. In the full regression only, free cash flows also explain the proportion of shares a firm intends to buyback.

Less consistent results are obtained for the measures of dilution. In the model containing just firm specific characteristics, a lower earnings per share (EPS) is statistically associated with a higher proportion of shares intended to be repurchased. This result suggests that firms intend to use repurchases to manage EPS levels. However, this result does not persist in the full model. Further, the result for the dilutive effect of options is opposite to that expected. Again the result only persists in the first version of the model, but the result suggests that the more employee options a firm has outstanding the smaller the proportion of shares the company intends to repurchase. This result is supported by the finding on the categorical variable which shows that when managers state that they are undertaking a buy-back to avoid the dilutive effects of things like options, they intend to repurchase fewer shares than when other reasons are given. The results for these measures do not persist in the full model. A possible explanation for this finding is that although the existence of dilutive securities such as options, provide managers with an incentive to repurchase shares the levels of options held by companies tend to be a lot smaller than the 10% of shares companies are allowed to repurchase under the 10/12 limit. For our sample firms, the median level of employee stock options (ESO) was only 1.8% (mean 4.7%) of total ordinary shares outstanding.

Finally, we examine the value of shares actually repurchased relative to the maximum value of shares the firm originally intended to repurchase. At the median, firms only repurchase 51% (mean 74%) of the value they originally intend to repurchase. We use changes in the firm characteristics over the buy-back period to explain the relative value of shares repurchased. The results show an increase in EPS and the length of the buy-back

window are associated with a greater relative value of shares being repurchased. However, the model is generally a poor fit and there is little evidence of any systemic relation between changes in the other motivating factors and actual buy-back activity. On the surface, our results appear suggestive of repurchases being used as an earnings management device consistent with the findings of Hribar et. al. (2006). Given our approach, we cannot conclusively state that our results provide evidence of earnings management, but rather advise that future research consider this issue more closely in the Australian setting.

The remainder of the paper is organised as follows. Section 2 outlines the relevant legislative environment and provides an international comparison. Section 3 develops the hypotheses. The model is described in Section 4 while Section 5 details the sample and data sources. The empirical results are discussed in Section 6 and the conclusions are presented in Section 7.

2. The Australian Institutional Environment

For a number of years, share buy-back regulations in Australia differed on several dimensions from those elsewhere, such as the USA. Regulation surrounding buy-backs in Australia has historically been very restrictive, with regulators loosening requirements in recent years to facilitate the market for buy-backs. Current regulations state that for all classes of buy-backs, other than minimum holdings, listing rule 3.8A of the Australian Stock Exchange Listing Rules requires a firm to release an Appendix 3C announcement “immediately the company decides to buy-back shares.” Further, Section 257 of the *Corporation Act 2001* governs buy-backs and requires firms to give notice to the Australian Securities and Investment Commission (ASIC) of the intention to undertake a buy-back at least 14 days before the resolution is voted on or the repurchase begins. Notice is typically given to ASIC on the same day that the Appendix 3C announcement is released to the broader market. Thus the Appendix 3C represents the most timely and observable public announcement of a firm’s intention to buy-back shares. Information required to be reported in the Appendix 3C in relation to on-market buy-backs includes: the reason for the buy-back; the maximum number of shares intended to be bought back; and the period of time over which the buy-back is intended to take place.

During the program, companies are required to prepare Appendix 3E notification under Australian Stock Exchange (ASX) listing rule 3.8A each time shares are repurchased on-market. This notification is required to be released “at least half an hour before the commencement of trading on the business day after any day on which shares are bought

back.” An Appendix 3F document, or final share buy-back notice, is used to inform the market that a program has become inactive.

Another difference of Australian buy-backs is that shares repurchased by a company are cancelled as soon as the registration of the transfer of ownership is complete. This contrasts with the setting in other countries where repurchased securities comprise a treasury stock which may be reissued. If an Australian company wishes to reissue equity it must do so with a fresh issue of stock.

Finally, a number of restrictions exist in Australia to protect the interests of various stakeholders of the firm. One important restriction governing on-market repurchases is the 10/12 limit, contained in the *Corporations Act 2001*. The 10/12 limit precludes firms from repurchasing more than 10% of the smallest number of votes attaching to voting shares at any time during a 12-month period, without a shareholder resolution being passed. Further restrictions that limit a firm’s ability to manipulate its own stock price are contained in ASX Listing Rules 7.29 and 7.33. These rules limit the premium that a firm can pay to 5% over the average market price for that security as calculated over the last five days on which a trade was completed. If a security has not traded on at least five days in the preceding three months, it may not be repurchased on-market.

3. Hypothesis development

The literature concerning share repurchases has primarily focussed on five motivations that firms may have for undertaking a share an on-market buy-back. These are: (i) under-valuation/signalling; (ii) free cash flows; (iii) dividend substitution; (iv) dilution minimisation and (v) capital structure adjustments. We develop hypotheses initially to explain the proportion of shares intended to be repurchased, and then use changes in these variables over the buy-back program to explain the relative value of shares repurchased.

3.1 Intended buy-back activity

Under-valuation

Under-valuation is well established in the literature as one possible reason for commencing a buy-back program (Vermaelen, 1981; Comment and Jarrell, 1991; Stephen and Weisbach 2000; Ikenberry et al. 2000). Firms repurchase shares in an attempt to signal that an investment in their own stock represents the best net present value opportunity and that the stock has significant potential upside. The risk in announcing a share repurchase

program, however, is that the market may perceive the plans for distribution as evidence of a lack of growth opportunities.

Recent evidence suggests that the under-valuation signal has become weaker over time (Kahle, 2002). The abnormal announcement period return appears to have been steadily decreasing over time implying that, due to factors such as increased analyst coverage of equities, firms are no longer able to send a credible signal of under-valuation (Vermaelen, 1981; Christianto et al. 1997; Kahle, 2002). Further, it appears that the under-valuation signal is not as strong for on-market buy-backs as it is for tender offers (Comment and Jarrell, 1991). However, studies that survey management, still find evidence that under-valuation is a principal motivation for management to repurchase shares (Baker et al. 2003; Brav et al. 2005). On-market buy-backs allow greater flexibility than their alternative, an equal access scheme, which is restrictive and time-consuming. Consequently, an on-market repurchase provides a firm with a more adaptive mechanism for signalling under-valuation to the market. Thus the first hypothesis is presented in its alternate form as follows.

H₁: The proportion of shares intended to be repurchased at announcement date is negatively related to firm value prior to the announcement of the buy-back, ceteris paribus.

Free cash flows

Jensen (1986) finds conflicts of interest between principal and agent over corporate payout policy to be particularly severe when substantial free cash flow is generated. The risk to shareholders is that the surplus funds will be used to fund projects that return less than the cost of capital or be disgorged through increased perquisite consumption. By distributing funds back to shareholders, the potential for underinvestment by management is removed. We predict a positive association between the free cash flow of a company at the announcement of a buy-back program and the number of shares intended to be repurchased. This is stated as the second hypothesis.

H₂: The proportion of shares intended to be repurchased at announcement of an on-market repurchase is positively related to pre-announcement free cash flow.

Dividend Substitution

Prior research provides evidence of an increasing incidence of repurchases and a decline in the payment of dividends (Fama and French, 1999; Grullon and Michaely, 2002). A number of motivations have been proposed to explain this substitution effect.

An implication of the Miller and Modigliani (1958) dividend irrelevancy hypotheses is that share repurchases are substitutes for dividends. Although the matter is complicated by the differential tax treatment of capital gains and dividends, supportive evidence for this type of substitution is provided by Grullon and Michaely (2002). In Australia, a dividend imputation tax has operated since 1987 which effectively treats corporate tax as a prepayment of personal tax and thus eliminates the bias toward capital gains and tax incentive for firms to undertake repurchases. However, to the extent that the top personal marginal income tax rate exceeds the corporate rate at which imputation tax credits can be rebated, there is potentially still some preference for capital gains if the shareholder base comprises high net worth individuals.

Jagannathan et al. (2000) argue that a share buy-back is the most useful way to distribute excess cash the firm considers transitory as it does not heighten investor expectation of future payouts in the same way that a dividend increase does. In essence, this argument follows the 'sticky' dividend policy debate. Interviews of financial executives conducted by Brav et. al. (2005) find that executives are more likely to repurchase stock than increase dividends in the presence of free cash flows. Dividends are viewed as being less flexible than share repurchases as they are more costly to reverse. This suggests that firms with relatively higher dividends per share are less likely to engage in on-market share buy-backs.

H_{3a}: The proportion of shares intended to be repurchased at announcement of an on market repurchase is negatively related to existing dividend payout policy.

Another incentive for dividend substitution arises from the use of stock options to reward executives. When earnings are distributed by means of a dividend, the share price typically drops on ex-dividend date (Boyd and Jagannathan 1994). Where company executives have options over ordinary shares, the decline in share price on ex-dividend date will reduce the value of the options. By distributing at least some portion of funds through the substitute payout mechanism of share repurchases, a firm's executives can insulate the value of their option packages by reducing the average dividend drop-off where options are

not dividend protected.² In practice, executives who set dividend policy, typically hold a greater portion of options than shares relative to the holdings of other shareholders and hence the executives face greater incentives to substitute buy-backs for dividends.

H_{3b}: The proportion of shares intended to be repurchased at announcement in an on-market buy-back is positively related to pre-announcement option holdings of executive directors.

Dilution Minimisation

Share repurchases increase earnings per share (EPS) by reducing the number of shares outstanding. Companies that issue dilutive securities such as options, rights and convertible securities may be motivated to undertake buy-backs to offset the dilutive impact of these securities on EPS. We can infer from market efficiency that actions to manipulate accounting based ratios should not affect firm valuation, thus there should be no incentive for managers to repurchase shares if the market is unconcerned about the dilutive effect of these securities on EPS. Despite this, Bens et al. (2003) find that repurchases appear to be motivated, in part, by the effect of outstanding ESO on diluted EPS. Further, managers of some Australian companies state in their buy-back announcement and in their annual reports that dilution caused by employee share and option plans provide the incentive for the firm undertaking an on market repurchase.³ This has been documented empirically. Mitchell and Robinson (1999) identify that in thirty-nine on-market buy-backs over 1990 to 1995, the second most popular reason provided by managers for the buy-back was to boost EPS and /or net asset backing per share. In a later study, Mitchell et. al. (2001) surveyed Australian managers as to the motivation for buy-backs and found the most highly ranked reason for an on-market buy-back was to improve EPS and net asset backing.

Even where firms do not have dilutive securities, share repurchases will be EPS increasing. Hribar et. al. (2006) consider share buy-backs as an earnings management device in the U.S. setting and find a high incidence of accretive stock repurchases for firms that

² The exception is if each investor in the company holds an equal portion of all ordinary shares and all options, then there are offsetting effects that maintain the relative position of every investor.

³ For instance, the following announcement was found in the notes to the 2003 financial statements of Count Financial Ltd. "As part of capital efficiency to manage the potential dilution effect on earnings per share of issuing new shares under the Company's option plans, Count Financial Limited completed a buy-back scheme from 28 February 2003 to 30 May 2003..." Further, Orotan Ltd states in its 2002 financial statements in relation to its on-market repurchase activities, "It is the Company's intention to maintain the number of shares on issue so that any increases in profit after tax will be mirrored by increases in earnings per share."

would have been likely to miss analysts' forecasts. Thus, both the numerator and denominator of this ratio provide firms with an incentive to manage EPS through repurchases. We expect that the number of shares a firm intends to repurchase is negatively associated with EPS and positively associated with the proportion of dilutive securities such as ESO. This gives rise to two hypotheses in relation to EPS dilution.

H_{4a}: The proportion of shares intended to be repurchased at announcement in an on-market buy-back is negatively related to pre-announcement earnings per share.

H_{4b}: The proportion of shares intended to be repurchased at announcement in an on-market buy-back is positively related to the proportion of existing employee stock options.

Capital Structure Adjustments

Prior research indicates that firms undertake share repurchases in order to manage their capital structure (Opler and Titman, 1996) even though there is debate about the effectiveness of on-market buy-backs for capital structure management. The implication follows that firms with low levels of leverage prior to the announcement of an on-market share repurchase have incentives to repurchase a greater number of shares at announcement date.

H₅: The proportion of shares intended to be repurchased at announcement in an on-market buy-back is negatively related to the existing leverage of the firm.

3.2 Actual repurchase activity

On investigating the actual repurchase activity, we are interested in examining the value of shares repurchased relative to the maximum value of shares the company announced that it intended to repurchase. The reason for focussing on the value of shares repurchased (as opposed to the number of shares) is that the announcement of a buy-back and the buy-back activity itself, have been shown by prior research to increase share price (Ikenberry, Lakonishok and Vermaelen 1995; Stephen and Weisbach 1998). Thus, if a firm is undertaking a buy-back using its available free cash flows, then the level of the buy-back is likely to be a function of the value of shares repurchased relative to the maximum value the firm originally intended to repurchase. We expect that the value of the shares repurchased

will be associated with the change in the variables that explain the proportion of shares the firm intends to repurchase. Our expectation for each of the variables is discussed below.

The proportionate value of the shares repurchased over the buy-back period already incorporates the impact of the change in share price; thus, there is no need to include the change in under-valuation as an explanatory value in the model. However, we expect that change in free cash flows over the buy-back period will be positively associated with the value of shares repurchased. For example, some firms might experience differences in the realized cash flows relative to the expected cash flows at the time of the announcement which would impact the ability of the firm to repurchase shares (Stephens and Weisbach 1998).

Prior research shows that firms choose dividend increases to distribute relatively permanent cash-flow shocks and repurchases to distribute more transient shocks (Guay and Harford 2000). This suggests that if managers are unsure about the permanence or size of the contemporaneous cash flow shock, they may choose a repurchase over a dividend increase to allow them flexibility in abandoning the planned distribution (Guay and Harford 2000). To investigate this issue, we expect that we will observe a smaller proportion of stock value repurchased when shocks are more permanent as reflected by increases in ordinary dividends over the buy-back program. Firms may also distribute free cash flows in the form of special dividends. Special dividends, like repurchases, also avoid the 'sticky dividend' problem associated with ordinary dividends. For this reason, we distinguish between changes in ordinary dividends and payments of special dividends during the buy-back program. Payment of special dividends over the buy-back period is expected to substitute for buy-backs. Thus, we expect a negative association between special dividends and the relative value of shares repurchased. We also expect that a proportionate increase in the level of options held by executives during the period of the buy-back gives them incentive to repurchase and should result in a greater value of shares repurchased.

If more dilutive securities are issued during the buy-back period, the incentive for managers to follow through with the repurchase should be increased. This will be reflected in a negative association with change in EPS and a positive association with change in ESO. Finally, it is expected that the value of shares repurchased will increase until firm leverage reaches some optimal level.

4. Model

The hypotheses generated to explain the intended repurchase activity are tested using Equation (1) below as the base model. OLS regression methods are used to test the significance of the coefficients on the independent variables.

$$ITD_{it} = \alpha_0 + \alpha_1 UV_{it} + \alpha_2 FCF_{it} + \alpha_3 DIVD_{it} + \alpha_4 EXEC_{it} + \alpha_5 EPS_{it} + \alpha_6 ESO_{it} + \alpha_7 LEV_{it} + \alpha_8 SIZE_{it} + \alpha_9 GR_{it} + \varepsilon_{it} \quad (1)$$

The variables used in the model are measured as follows. *ITD* is the maximum number of shares the company states it intends to repurchase divided by the number of ordinary shares outstanding prior to the buy-back announcement. Under-valuation (*UV*) is measured as the value-weighted, market-adjusted return for the calendar year prior to the announcement of the on-market buy-back (this approach follows Dittmar, 2000). Market-adjusted abnormal returns are determined using monthly price and dividend data from the CRIF AGSM data file, and are adjusted for the monthly index value for the market index (All Ordinaries Index).⁴ These values are measured at the end of the last month just prior to the buy-back announcement date.

A number of measures of free cash flow (*FCF*) have been used in prior literature. These measures largely involve some adjusted value of reported earnings or cash flows (Lehn and Poulsen, 1989; Fenn and Liang, 2001; Jagannathan et al. 2000). The measure of free cash flows used in our study is the net cash flows derived from operating and investing activities less preference share dividends deflated by total assets at the start of the year. Free cash flows are measured using the most recent data available either from full year or half year cash flow statements. Data from half year financial statements are annualised using prior year and half year data. The change in free cash flow (ΔFCF) is measured as the change in free cash flow over the buy-back period. This incorporates data from the most recent financial statement prior to the announcement of the buy-back and the next financial statement following the end of the buy-back program

We use the dividend payout ratio (*DIVD*) in the year prior to the announcement of the buy-back to capture the impact of the dividend substitution hypothesis. The dividend payout ratio is measured as the ordinary dividends per share divided by the earnings per share. The second measure for testing this hypothesis captures executive directors' willingness to

⁴ The All Ordinaries Index is based on the aggregate market value of a wide selection of the companies quoted on the Australian Stock Exchange (ASX). There are currently over 300 companies represented in the All Ordinaries Index portfolio. To be included, a company must have a market value of at least 0.2% of all domestic equities quoted on the ASX and must maintain an average turnover on the ASX of at least 0.5% of its quoted shares per month. These companies currently comprise nearly 90% of total market valuation.

substitute share repurchases for dividends (*EXEC*) and is based on the number of executive options outstanding, scaled by the number of total director shares and options outstanding (Bens et al. 2003). Details of executive directors' option and share holdings are hand-collected from annual reports immediately preceding the buy-back program.

The effect of EPS dilution on the intended repurchase activity is measured both directly and indirectly. *EPS* is included in the model to measure the direct association between the level of *EPS* and the intended buy-back activity. *EPS* is measured as the net profit after tax for the financial year ending prior to the announcement of the buy-back divided by the weighted average number of ordinary shares for the same period. The indirect measure used to study the impact of EPS dilution, *ESO*, is the number of ESO outstanding divided by the total ordinary shares of the company at the end of the financial year prior to the announcement. This measure does not capture other dilutive securities routinely issued by Australian firms; however, this approach is consistent with prior studies and the reasons supplied by some sample firms for the buy-back. As such, the measure may understate the impact of dilutive securities.

Leverage (*LEV*) is measured as a firm's total interest bearing debt divided by total assets collected from the most recent balance sheet data prior to the announcement of the buy-back (i.e. either annual or half yearly report). Total assets are used instead of equity because some of the sample firms have negative equity values.

A number of control variables are also included in the model. To the extent that share repurchases mitigate information asymmetry and agency costs, we would expect size to be positively correlated with the number of shares repurchased. However, larger firms are subject to greater external scrutiny than smaller firms, through increased analyst following and higher levels of institutional investment (Allen et al., 2000). This external scrutiny is likely to reduce information asymmetry and agency costs relative to smaller firms, thus reducing the signalling role of repurchases for large firms. Outside investors of small, closely-held firms, are subject to adverse selection costs due to incomplete information compared with inside equity holders. Outside equity holders with incomplete information will require a premium for holding stock of small firms due to the potential for adverse selection. Thus, the on-market repurchase mechanism may provide a viable means for reducing adverse selection costs for small firms. This would lead us to expect a negative association between size and the number of shares repurchased. Given the competing arguments, we do not predict a direction for the relation between buy-back activity and size,

but rather leave this as an empirical observation. Size (*SIZE*) is measured as the natural log of the book value of total assets.

The second control variable included in the model is growth. Firms often buy-back common stock in the absence of alternate positive net present value investment opportunities. An underlying force behind repurchases is often that a mature company has run out of feasible growth prospects and cannot find a superior application of funds. Firms with strong growth prospects are therefore expected to buy-back a smaller proportion of common stock compared to firms with weak growth prospects. In these cases, shareholder wealth is more likely to be maximised by financing the potential investments, than by paying out the discretionary cash flow through share buy-backs. Thus a negative coefficient is expected on the growth variable. Note that this argument also intersects with the availability of free cash flow. Growth (*GR*) is proxied by the market-to-book ratio, following Bens et al (2003).

The analysis conducted in the first part of the study is extended to consider the actual reasons provided by managers in the Appendix 3C for undertaking the buy-back. Six of the main reasons provided by firms' management are incorporated into the model as dummy variables. The model is initially run with only the six dummy variables in replace of the firm characteristics used to test the hypotheses. The model is then rerun including both the firm characteristics and the categorical variables capturing managements' stated reasons.

The second part of our analysis investigates the impact that the change in the above variables, has on the actual repurchase activity over the buy-back period. The second model is set out as Equation (2).

$$SBB\$/ITD\$_{it} = \beta_0 + \beta_1\Delta FCF_{it} + \beta_2\Delta LEV_{it} + \beta_3SDIV_{it} + \beta_4\Delta DPS_{it} + \beta_5\Delta EXOP_{it} + \beta_6\Delta EPS_{it} + \beta_7\Delta ESO_{it} + \beta_8TIME_{it} + \varepsilon_{2it} \quad (2)$$

The dependent variable used to measure the actual repurchase activity, *SBB\$/ITD\$*, considers the total value of the shares repurchased over the program relative to the maximum value that was intended to be repurchased at announcement. This effectively captures the rate of completion of the buy-back taking into consideration that the value of the shares will likely have increased as a result of the buy-back activity. The variables used in this model are largely changes in the variables used in Equation 1. Change is measured as the difference

between each measure at completion of the buy-back program less the comparative measure at the start of the buy-back program.⁵

Apart from moving from levels to changes, the main difference between Equation 1 and 2 is the exclusion of the under-valuation measure and the inclusion of special dividends, *SDIV* (measured as special dividends per share issued over the buy-back program), and the length of time (measured in weeks) over which the buy-back operates, *TIME*. We expect the longer the duration of the buy-back period, the greater the value of shares that are repurchased. The 10/12 limit appears to cap both the number of shares repurchased and the period of time over which the repurchase may operate. However, firms may effectively extend this limit by rolling one buy-back scheme into the next, thus increasing the period over which the buy-back operates and the number of shares which the firm may legally repurchase on-market. Alternatively, firms can always gain shareholder approval to extend the 10% limit. Finally, the control variables *GR* and *SIZE* are not included in the changes model.

Measures of the dependent variables for the two models are derived from documentation lodged with the ASX that advises the market of buy-back activity. *ITD*, in equation (1) is measured as the maximum number of shares company *i* states it intends to repurchase at time *t*, divided by the total number of (ordinary) shares outstanding prior to the commencement of the buy-back. Data for this variable is collected from Appendix 3C documentation lodged with the ASX on announcement of a buy-back and is measured on a program basis. $SBB\$/ITD\%$, in equation (2), is the value of shares repurchased divided by the value of the maximum shares the company intends to buy-back at the announcement date. Repurchase transaction details are collected from Appendix 3C, 3E and 3F.⁶ As some companies do not announce the completion or termination of their buy-back program, the date of completion is determined from announcements of daily buy-back activity. Specifically, if firms do not engage in any repurchase activity for a two-month period, then the program is assumed to have been completed. The last day on which repurchase activity

⁵ Where a measure cannot be determined at close of the buy-back program it is measured at the closest half year or financial year end after the buy-back completion date, depending on the availability of information at that date.

⁶ Appendix 3E notification provides details of repurchase activity. Appendix 3C provides information relating to the date of the announcement, allowable start date, intended completion date and the number of shares the company intends to repurchase. Appendix 3F documents, or final share buy-back notices, were used to record the end date of the buy-back program, the number of shares repurchased and the dollar amount spent.

occurred is taken as the termination date for the purpose of assessing the length of the buy-back program.

Financial accounting data is downloaded from AspectHuntley Fin Analysis database. Where data is not available on this database it is hand collected directly from the half yearly and annual reports of companies. These reports are also accessed from the AspectHuntley Fin Analysis database. Executive and employee option and share holding information was hand collected from the notes to the accounts in company annual reports.

5. Buy-back activity

5.1 Data

A search for all announcements relating to on-market buy-backs is undertaken using the Aspect Dat Analysis database, SIRCA Signal G and announcements from the ASX website. This search results in 1,074 documents relating to share buy-backs for the period from October 1997 to July 2003. Of the 1,074 documents, 355 relate to on-market buy-back programs conducted by 225 different companies. The only comparable study in the Australian market is that of Mitchell and Dharmawan (2007) who identify 315 on-market buy-back announcements from 253 companies over the period June 1996 to July 2001. Further refinement of our sample results in a sample of 282 buy-back programs from 179 companies.⁷

A buy -back program may extend beyond twelve months and this may be conveyed to the market in different ways. A company may announce the extension without releasing a new Appendix 3C or alternatively, release a new Appendix 3C every six months. To distinguish between a new buy-back program and an extension of a buy-back program, we require at least two-weeks break between the announcement of a buy-back and either the last day of repurchase activity (of the previous program), or the intended completion date of the initial program. This requirement reduces the number of programs by fifty-four. Using this definition, the maximum number of programs for a single firm in our sample is four. Nine firms have more than two observations in the sample. Unavailability of financial and share price data for firms that either listed less than one year prior to the buy-back announcement or delisted less than one year after the buy-back announcement, results in the removal of a

⁷ We exclude 4 misclassified buy-back programs, 7 buy-backs completed on foreign exchanges, 8 on-market buy-backs of convertible security, 3 buy-backs that do not gain shareholder approval, 3 observations with missing data points, 43 active buy-back programs, 5 delisted companies without post buy-back financial data.

further fifteen observations. An additional fifteen buy-back programs are removed for extreme values in either the dependent or independent variables, generally due to very small values in ratios. The final sample consists of 195 buy-back programs undertaken by 153 firms. The buy-backs are fairly evenly distributed across years and industries.

5.2. Descriptive Statistics

Figure 1 graphs the distribution of the proportion of shares repurchased under each of the buy-back programs. This indicates that firms most frequently repurchase less than 1% of outstanding shares. Another notable characteristic of the distribution is the discontinuity around the 10% mark. This irregularity stems from the terms of the Australian legislation relating to share buy-backs which limits on-market buy-back activity to 10% of shares outstanding during any twelve month period, unless prior shareholder approval is obtained.

Figure 1 – about here

An examination of the Appendix 3C notifications allows us to identify six general reasons given for on-market buy-backs. Some firms provide multiple reasons for undertaking a buy-back. Table 1 lists the reasons given for buy-backs. For 47% of our sample buy-backs, managers state ‘capital management’ as a reason for the buy-back. Little explanation is given as to what capital management involves, but disclosures suggest that the on-market buy-back assists effective, efficient, flexible and long term capital management. The next two most frequent reasons given are under-valuation (28% of cases) and avoiding dilution (24% of cases). Besides statements that the repurchase was being undertaken due to under-valuation of the firm, explanations such as addressing a ‘deep discount to net asset value’ and maximising shareholder wealth are also classified as reasons pertaining to under-valuation. Reasons classified as relating to avoiding dilution refer to reducing dilution due to ESO, employee share plans, dividend reinvestment schemes and shares issued for an acquisition. Also statements about improving EPS are included here. The capital restructuring category includes comments such as ‘adjusting the company’s gearing’, ‘management of equity capital structure’, ‘balance sheet management’, ‘reducing issued capital’ and ‘reducing the cost of capital’. Free cash flow reasons refer to the use of surplus cash. Other statements provided by management indicate that the buy-back will be value enhancing for shareholders and that the buy-back is not an indication of a lack of further growth opportunities for the firm in the future. Only one of the hypotheses tested in our study, dividend substitution does not appear as a stated purpose for the buy-back.

Table 1 – about here

Details of the actual number of shares repurchased compared to the number of shares announced for the buy-back are presented in Table 2. Similar to Stephens and Weisbach (1998) and Ikenberry et al. (2000), our evidence suggests that the actual share buy-back is only a fraction of the announced number. From this table it is possible to determine that 49% of the sample bought back only up to 50% of the maximum number of shares the firm announced it intended to repurchase.⁸

Table 2 – about here

Table 3 provides summary statistics for variables explaining both the intended repurchase activity (Panel A) and the actual repurchase activity (Panel B). Extreme observations are winsorised at the 1% level. On average, firms announce an intention to buy-back 6.4% of all shares outstanding while the proportion of shares actually repurchased is 3.7% (not reported in the table). From a dollar perspective, at the median, only 51% of the maximum value intended to be repurchased is bought back. These figures confirm the data in Table 2 which show that the number of shares managers announce they intend to buy-back is significantly larger than the actual number or value of shares repurchased. The data in Panel A indicates that at the announcement date the firms, on average, have earned a negative return over the prior 12 months, with the mean value being -4.2%. On average, the firms have positive free cash flow, being 0.7% of total assets. The large difference between the median and the mean proportion of executive director equity in options is partly due to the fact that 33% of sample companies have no executive options. Also of note are the levels of ESO and growth. The median level of ESO is just 1.8% of total ordinary shares outstanding, where the market to book ratio, at the median is close to 1. In Panel B we observe that there is on average an increase in all of the variables in our model over the buy-back period, except for EPS (which is negative at then mean but positive at the median). The median length of a program is just over six months.

Table 3 – about here

Table 4 provides Pearson and Spearman correlation coefficients for the independent variables used in Models 1 and 2. Although there are some statistically significant

correlations, overall, the correlations between the variables tend to be at the lower levels. The most significant correlation exists between the *SIZE* and *EPS* variables in Panel A at 0.648 (using the Pearson correlations). This could result in multicollinearity in Model 1. The correlations are generally as expected. The Spearman rank correlations provide us with a point of reference for the correlations between the dummy variables and the other variables in the model. Here we see that the firms that are stating under-valuation as the reason for the buy-back are less profitable, have more ESO and are smaller. These firms are also less likely to use capital management as the reason for the buy-back. Correlations between the changes variables in Panel B are generally smaller than those in Panel A and there are fewer significant associations.

Table 4 – about here

6. Results

6.1 Buy-back intentions (Model 1)

Table 5 contains the results of the ordinary least squares regression for Model 1.⁹ This model explores the maximum number of shares a company intends to repurchase over the buy-back program. Analysis is conducted for the full sample initially using the firm-specific variables described earlier.

The first column of results in Table 5 shows the results for Model 1. These provide a test for the five hypotheses. Significant results are achieved for the proportion of executive equity in options (*EXOP*), earnings per share *EPS*, the proportion of employee options (*ESO*), growth (*GR*) and size. The coefficient on *EXOP* is 0.015 and significant. This provides support for the dividend substitution hypothesis. The result suggests that the greater the proportion of executive equity held as options, the more shares a firm announces it intends to repurchase. The rationale is that payout to shareholders via repurchases is preferred to dividends because of the impact of the dividend drop-off on the value of the options held by directors, where options are not dividend protected.

EPS has a coefficient of -0.017 which is significant at the 10% level. The result is consistent with the dilution hypothesis which expects that firms will repurchase more shares in order to enhance *EPS*. However, our other test of the dilution hypothesis, *ESO*, results in an unexpected negative coefficient of -0.058. This result suggests that firms with more *ESO*

⁸ If we remove the restriction for the dependent variable of truncation at the targeted level, the percentage of actual buy-back increases to 66 percent.

⁹ Testing of the residuals of the model indicates that heteroscedasticity is not a concern in this model.

intend to repurchase fewer shares at announcement. Although firms state that they are concerned with dilution due to ESO, the median level of ESO for our sample firms is only 1.8% of ordinary shares outstanding. Further, not all firms in the sample have employee stock options (28% of the sample firms do not issue options to employees). Thus, if firms are repurchasing to avoid dilution associated with employee stock options, the average number of shares a firm intends to repurchase would be much less than allowed by the 10/12 limit. When compared with the US sample used in Bens et. al. (2003) the median values of employee stock options outstanding fall around the bottom quartile of the US sample. Thus, on average, the dilutive effect of employee stock options in the Australian setting may be minimal.

Both control variables, size and growth, are statistically related to the dependent variable. It appears that smaller firms and firms with fewer growth options announce a greater proportion of shares to be repurchased. The finding on size is consistent with our arguments that smaller firms are more likely to be under-valued (due to adverse selection costs for outside investors), while the result on the growth variable is consistent with growth firms having alternative uses for cash flows.

Table 5 – about here

The second column of Table 5 provides the results of a model which includes only the reasons provided by management for the buy-back. Of these reasons, under-valuation (*UV_D*), dilution (*DIL_D*), capital restructuring (*LEV_D*) and liquidity (*LIQ_D*) are statistically associated with the level of shares the firm intends to repurchase. That is, firms that cite under-valuation, capital restructuring and liquidity as the reason for the buy-back intend to repurchase a greater proportion of shares than firms providing other reasons. However, firms that cite dilution as the reason for the buy-back, announce a smaller proportion of shares to be repurchased than other firms. This is consistent with the idea that firms which undertake buy-backs due to dilutive effects of options do not need to repurchase as many shares to offset the dilution.

Finally, the model is rerun with both firm characteristics and management reasons. In this version of the model, the *FCF* variable becomes statistically significant with a positive coefficient of 0.021. As predicted by hypothesis 2, this indicates that firms with higher levels of free cash flows have the intention of repurchasing a greater proportion of shares in the on-market buy-back. However, all of the variables that proxy for dilution in the model (*EPS*,

ESO and *DIL_D*), become statistically insignificant in this version of the model. Otherwise, the significance of the other variables in the model is unchanged.

We also undertake our analysis using alternative measures of under-valuation and free cash flows. Alternatives to the under-valuation measure used in this study are market-adjusted returns over a 3-month and 2-month window prior to the buy-back. Both these measures result in negative but statistically insignificant coefficients. We also measure under-valuation as price relative to a residual income valuation of the firm using a reduced sample. Again we do not find statistical significance for this alternate measure of undervaluation. Interestingly, in looking at the reasons provided by management in the Appendix 3C, many firms discuss under-valuation in terms of price to net asset backing. This measure is captured by our control variable for growth (market to book value) which is statistically significant in both versions of the model and which is consistent with both under-valuation and low growth expectations explanations.

With respect to the FCF variable, a variety of alternative measures are used in additional analysis but none are statistically significant. These alternate measures include: free cash flows measured using an indirect approach; measures of excess cash and liquidity as used by Mitchell and Dharmawan (2007); and excess cash determined by a residual from models developed by Dittmar and Mahrt-Smith (2007) and Opler et al. (1997).

In summary, there are a number of factors that are associated with the announced level of share repurchase activity. These factors are supported by direct disclosures from the firm and proxy variables. The next stage of the analysis is to examine the actual share repurchase activity.

6.2 Buy-back activity (Model 2)

The results for the model explaining actual buy-back activity (model 2) are presented in Table 6. Recall that this model uses the relative value of shares repurchased as the dependent variable.

The findings in Table 6 indicate that changes in the financial characteristics provide little explanation for actual buy-back activity. For instance, the model explains only 6.5% of the variation in the relative value of shares repurchased. Statistically significant results are found for only one of the change variables and for the control variable *TIME*. The coefficient on ΔEPS is 0.390 and statistically significant. That is, as EPS increases, a greater value of shares is repurchased over the buy-back period. This result is consistent with firms strategically using stock repurchases to favorably alter EPS (Hribar, et. al., 2006). To

elaborate, not all stock repurchases increase EPS. Hribar et. al. (2006) argue that stock repurchases have a direct, mechanical impact on reported EPS that is determined by three factors: (i) the timing of the repurchase; (ii) the proportion of shares bought back; and (iii) the financial return forfeited on the funds used to buy back shares. The first two factors increase EPS by reducing the number of shares outstanding, but the effect of the third factor is to decrease the EPS numerator as returns are forfeited on the value returned to shareholders. The net result is that some stock repurchases increase reported EPS while others decrease EPS. Taken together, the significant coefficients on the ΔEPS variable and *TIME* variable indicate that more profitable firms (or firms that need to appear more profitable) and longer buy-back programs result in a greater value of shares being repurchased.

The overall low explanatory power of the model is a finding in its own right. Earlier findings reveal that firms, on average, repurchase substantially less stock than originally announced. Thus, the question follows as to what factors lead firms to alter their repurchase plans? The results in Table 6 suggest that while the firms claim to undertake repurchases for various reasons, actual repurchase activity is not sensitive to changes in the underlying factors. That is, firms do not appear to systematically adjust their share repurchase activity. Rather, as noted above, the announcement of a buy-back effectively creates an option for firms as to their buy-back activity, and implicitly their payout policy. Apart from ΔEPS , the evidence in Table 6 does not shed much insight on what causes firms not to fully exercise this option. However, Table 6 does provide information as to what factors are not associated with the exercise of the implicit option. That is, changes in the variables capturing traditional theories as to why firms undertake buy-backs do not translate well to the setting of actual buy-back behaviour. This view has recently been argued by Dittmar and Dittmar (2008) who identify that patterns in repurchase activity reflect changes in the business cycle rather than changes in relative market value.

7. Conclusions

This study extends prior research in the area of share repurchases by considering the extent to which factors prior to the announcement of an on-market buy-back influence the intended repurchase activity, and how subsequent changes in these factors over the duration of the buy-back program influence actual buy-back activity. The study also contains an analysis of the reasons provided by management for the repurchase activity.

Due to the unique disclosure requirements for Australian companies, the study has the advantage of being able to utilize a source of information about on-market repurchases not available elsewhere. Specifically, prior research has relied on annual estimates of shares repurchased or dollars spent on repurchasing. However, given the disclosure environment in Australia, it is possible to analyse actual buy-back activity.

First, we find that the intended repurchase activity can be explained by the proportion of executive equity held in the form of dividends. That is, the findings provide consistent results for a dividend substitution effect in which the executive directors of a firm are concerned about the impact of dividends on the value of their options. This preference for distributing cash to shareholders through repurchases rather than dividends would suggest that directors' options may not be dividend protected. Further, more shares are intended to be repurchased by firms citing under-valuation, capital restructuring and liquidity as the reasons for the buy-back. The final results which consistently appear in our analysis are those of size and growth. Smaller firms intend to repurchase a greater proportion of their shares at the commencement of the buy-back while firms with fewer growth options intend to repurchase less.

When we analyse actual buy-back data, we document that firms generally repurchase substantially fewer shares (and less value) than originally announced. Hence, the study conducts an analysis of the change in factors that may be associated with the buy-back activity. The results from the analysis show that the model provides limited explanation. While we find that firms with increasing EPS over the buy-back period repurchase a greater relative value of shares, as do firms that have more extended buy-back periods, there is no systemic relation between changes in the other variables and actual repurchase activity. Rather, as noted above, the announcement of a buy-back effectively creates an implicit option for firms as to their payout policy. Apart from the result for EPS, our evidence is unable to shed insight as to what causes firms not to fully exercise this option and we conclude that traditional theories as to why firms announce buy-backs do not translate well to the setting of actual buy-back behaviour. Finally, our findings suggest that future research should further consider buyback activity in the context of repurchases as an earnings management device following Hibrar et. al. (2006). The timely disclosure of repurchases in Australia provides an ideal setting for investigating this motivation.

REFERENCES

- Allen, F., A. Bernardo and I. Welch, 2000, "A theory of dividends based on tax clientele", *Journal of Finance* 55, 2499-2536.
- Baker, H.K., G.E. Powell and E.T. Vei, 2003, "Why companies use open-market repurchases: a managerial perspective," *Quarterly Review of Economics and Finance* 43, 483-504.
- Bens, D., Nagar, V., Skinner, D. and M.H.F. Wong, 2003, "Employee stock options, EPS dilution, and stock repurchases," *Journal of Accounting and Economics* 36, 51-90.
- Boyd, J. and R. Jagannathan, 1994, "Ex-dividend price behaviour of common stocks," *Review of Financial Studies* 711-741.
- Brav, A., Graham, J.R., Harvey, C.R. and R. Michaely 2005, "Payout policy in the 21st century", *Journal of Financial Economics* 77 (3), 483-527.
- Christianto, C., Clarke, A. and J. Mitchell, 1997, "Short- and long-run performance of Australian share buy-backs," Working Paper, University of Western Australia.
- Comment, R. and G. Jarrell, 1991, "The relative signalling power of dutch-auction and fixed price self-tender offers and open market share repurchases," *Journal of Finance* 46, 1243-1271.
- Cook, D., Krigman, L. and J. Leach, 2003, "An analysis of SEC guidelines for executing open market repurchases," *Journal of Business* 76, 289-315.
- Cook, D., Krigman, L. and J. Leach, 2004, "On the timing and execution of open market repurchases", *Review of Financial Studies* 17 (2), 463-498
- Dharmawan, G. and J. Mitchell, 2001, "Australian share buy-back regulations: a cross country comparison," *Australian Journal of Corporate Law* 12, 246-281.
- Dittmar, A.K. 2000, "Why do firms repurchase stock?" *Journal of Business* 73 (3), 331-356.
- Dittmar, A.K. and R. F. Dittmar, 2008, "The timing of financing decisions: An examination of the correlation in financing waves" *Journal of Financial Economics* 90, 59-83
- Dittmar, A., and J. Mahrt-Smith, 2007, "Corporate governance and the value of cash holdings", *Journal of Financial Economics* 83, 299-634.
- Fama, E. and K. French, 2001, "The cross-section of expected returns", *Journal of Finance*, 47, 427-465.
- Fenn, G. and N. Liang, 2001, "Corporate payout policy and managerial stock incentives," *Journal of Financial Economics* 60, 45-72.
- Fried, J.M. 2001, "Open market repurchases: Signaling or managerial opportunism?", *Theoretical Inquiries in Law* 2 (2)
- Grullon, G. and R. Michaely, (2002), "Dividends, share repurchases and the substitution hypothesis", *Journal of Finance* 57, 1649-1684.
- Hribar, P., Jenkins, N.T. and W.B. Johnson, 2006, "Stock repurchases and earnings management device", *Journal of Accounting and Economics* 41, 3-27

- Ikenberry, D.L., Lakonishok, J. and T. Vermaelen, 1995, "Market underreaction to open market share repurchases" *Journal of Financial Economics* 39, 181-208
- Ikenberry, D.L., Lakonishok, J. and T. Vermaelen, 2000, "Stock repurchases in Canada: Performance and strategic trading," *Journal of Finance* 55, 2373-2397.
- Ikenberry, D.L. and T. Vermaelen, 1996, "The option to repurchase stock", *Financial Management* 25 (4), 9-24.
- Jagannathan, M., Stephens, C. and M. Weisbach, 2000, "Financial flexibility and the choice between dividends and stock repurchases," *Journal of Financial Economics* 57, 355-384.
- Kahle, K. 2002, "When a buy-back isn't a buy-back: open market repurchases and employee options," *Journal of Financial Economics* 63, 235-261.
- Kim, J., Schremper, R. and N. Varaiya, 2003, "Survey on open market repurchase regulations: Cross-country examination of the 10 largest stock markets," Working Paper, University of Oregon.
- Lamba, A. and I. Ramsay, 2000, "Share buy-backs: An empirical investigation," *Corporate Law and Securities Regulation* 1-34.
- Lee, B. and O.M. Rui, 2007, "Time-series behavior of share repurchases and dividends", *Journal of Financial and Quantitative Analysis* 42, 119-142.
- Lee, C.M.C., Myers, J. and B. Swaminathan 1999, "What is the intrinsic value of the Dow?" *Journal of Finance* 54 (5), 1693-1741.
- Lehn, K. and A. Poulsen, 1989, "Free cash flow and stockholder gains to going private transactions," *Journal of Finance* 44, 771-787.
- Lie, E., 2005, "Operating performance following open market share repurchase announcements", *Journal of Accounting and Economics* 39, 411-436.
- Masulis, R. W. 1980, "Stock repurchases by tender offer: An analysis of the causes of common stock price changes", *Journal of Finance* 35 (2), 305-319.
- Miller, M. and F. Modigliani, 1958, "The cost of capital, corporation finance and the theory of investment," *American Economic Review* 48, 261-297.
- Mitchell, J.D., and P. Robinson, 1999, "Motivations of Australian listed companies effecting share buy-backs", *Abacus* 35, 91-119.
- Mitchell, J.D., G.V. Dharmawan and A.W. Clarke, 2001, "Managements' view on share buy-backs: an Australian survey", *Accounting and Finance* 41, 93-129.
- Mitchell, J.D. and G.V. Dharmawan, 2007, "Incentives for on-market buy-backs: Evidence from a transparent buy-back regime", *Journal of Corporate Finance* 13, 146-169.
- Ohlson, J. A. 1995, "Earnings, book values and dividends in equity valuation", *Contemporary Accounting Research* 11, 661-687
- Opler, T., L. Pinkowitz, R. Stulz and R. Williamson, 1999, "The determinants and implications of corporate cash holdings", *Journal of Financial Economics* 52, 3-46.
- Opler, T. and S. Titman 1996, "The debt-equity choice: an analysis of issuing firms", Working paper, Columbus: Ohio State University.

- Stephens, C. and M. Weisbach, 1998, "Actual share reacquisitions in open-market repurchase programs," *Journal of Finance* 53, 313-333.
- Vermaelen, T. 1981, "Common stock repurchases and market signalling: An empirical study," *Journal of Financial Economics* 9, 139-183.

Figure 1
Frequency Histogram of Actual On-market Share Repurchases (n = 195)

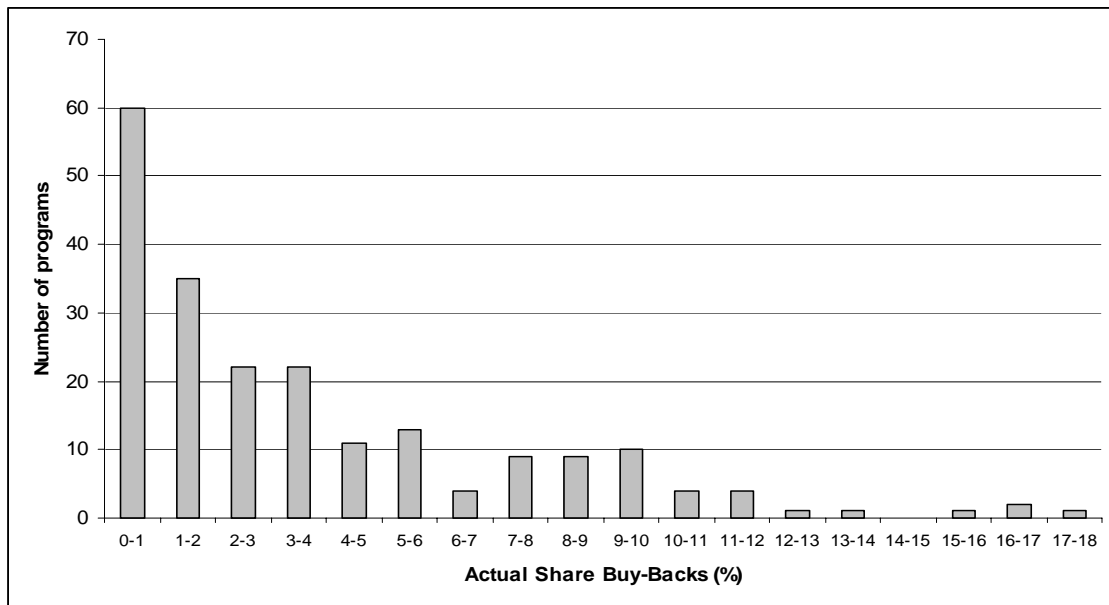


Table 1
Management Disclosures of Reasons for on-market share repurchases

Reasons for on-market repurchases disclosed in Appendix 3C notification have been categorised into seven explanations. A total of 195 buy-back programs are represented in this table. A firm may provide more than reason for a buy-back announcement and each reason is counted separately in the table.

Reason	Frequency of use	%
1. Capital management	92	47%
2. Under-valuation	54	28%
3. Dilution	46	24%
4. Capital restructuring	18	9%
5. Free Cash Flows	14	7%
6. Liquidity	8	4%
7. Other (volatility, stapled securities)	2	1%
8. No reason provided or missing data on database	22	11%

Table 2
On-market Share Repurchase Completion Rates

This table reports share repurchase activity (in percentages) by program for sample firms announcing on-market share repurchases over the period 1997 – 2003.

Completion rates (%) per program			
Portion of program completed	n	%	Cummulative %
0 to 5%	18	9%	9%
5 to 10%	11	6%	15%
10 to 25%	31	16%	31%
25 to 50%	36	18%	49%
50 to 75%	20	10%	59%
75 to 100%	40	21%	80%
100%+	39	20%	100%

Table 3
Summary statistics for intended and actual share repurchase models

<i>Panel A: Variables explaining Intended Repurchase Activity</i>					
n=195	Mean	Median	Minimum	Maximum	Std. Dev.
<i>ITD</i>	0.064	0.057	0.001	0.200	0.036
<i>UV</i>	-0.042	-0.098	-0.899	1.500	0.394
<i>FCF</i>	0.007	0.016	-0.903	1.220	0.233
<i>LEV</i>	0.172	0.137	0.000	0.800	0.176
<i>DIVD</i>	0.274	0.282	-10.000	8.333	1.065
<i>EXOP</i>	0.297	0.058	0.000	1.000	0.360
<i>EPS</i>	0.200	0.102	-0.915	1.700	0.329
<i>ESO</i>	0.047	0.018	0.000	0.576	0.089
<i>GR</i>	1.706	1.258	0.159	8.579	1.478
<i>SIZE</i>	19.102	18.508	14.323	26.106	2.504

<i>Panel B: Variables explaining Actual Repurchase Activity</i>					
N=195	Mean	Median	Minimum	Maximum	Std. Dev.
<i>SBB\$/ITD\$</i>	0.736	0.514	0.004	3.965	0.711
<i>RETURN</i>	0.059	0.010	-1.763	2.500	0.477
ΔFCF	0.027	0.004	-1.105	1.502	0.300
ΔLEV	0.005	0.000	-0.433	0.729	0.130
<i>SDIVD</i>	0.006	0.000	0.000	0.500	0.041
$\Delta DIVD$	0.010	0.000	-8.207	10.000	1.571
$\Delta EXOP$	0.048	0.000	-0.992	8.099	0.793
ΔEPS	-0.002	0.004	-1.407	1.400	0.278
ΔESO	0.006	0.000	-0.326	0.330	0.047
<i>TIME</i> (weeks)	31.810	25.000	2.143	135.571	26.379

Summary statistics for the variables used in equations 1 and 2. *ITD* measures the maximum number of shares the company announces it intends to buy-back divided by the total number of shares on issue prior to the commencement of the buy-back. *SBB\$/ITD\$*, is the market value of the shares repurchased over the market value of the maximum shares the firm intended to repurchase. *UV* is the market-adjusted return of firm *i* in the year prior to the buy-back announcement. *FCF* is the annualised pre-announcement operating cash flow plus cash flow from investing activities less preference dividends scaled by beginning total assets. *LEV* is measured as debt to assets for the financial year prior to the announcement. *DIVD* is the dividend payout ratio for the year prior to the announcement excluding special dividends. *EXEC* is the number of options paid to executive directors divided by total executive director options and shares outstanding for the financial year prior to the buy-back. *EPS* is the earnings per share in the financial year prior to the announcement measured as net profit after tax divided by the weighted average number of ordinary shares. *ESO* is the number of stock options paid to other employees outstanding before the announcement, scaled by shares on issue at the end year t-1. *GR* is the market to book ratio and *SIZE* is the natural log of market capitalisation both measured prior to the announcement date. ΔFCF is measured as the annualised percentage change in FCF. $\Delta DIVD$ is the change in dividend payout ratio. *SDIV* is the annualised average special dividends per share. $\Delta EXOP$ is the change in *EXOP*. ΔEPS is the change in EPS over the buy-back period. ΔESO is the change in *ESO*. *TIME* is the number of weeks between announcement and completion.

Table 4
Correlation matrix for the independent variables used in Models 1 and 2

Panel A: Pearson (above) and Spearman (below) correlations for the independent variables used in Model 1

n=195	<i>UV</i>	<i>FCF</i>	<i>LEV</i>	<i>DIVD</i>	<i>EXOP</i>	<i>EPS</i>	<i>ESO</i>	<i>GR</i>	<i>SIZE</i>	<i>UV D</i>	<i>CM D</i>	<i>DIL D</i>	<i>FCF D</i>	<i>LEV D</i>	<i>LIQ D</i>
<i>UV</i>	1	0.153	0.043	-0.038	0.068	<i>0.126</i>	<i>0.131</i>	0.251	0.058	0.079	-0.101	0.000	0.031	-0.032	-0.101
<i>FCF</i>	0.206	1	-0.129	0.002	-0.026	0.063	-0.125	0.021	0.047	-0.166	0.037	-0.005	-0.064	-0.055	-0.144
<i>LEV</i>	0.078	-0.055	1	0.087	0.198	0.219	-0.089	0.061	0.303	-0.049	-0.007	0.031	0.061	0.096	0.005
<i>DIVD</i>	0.157	0.027	0.286	1	-0.053	0.076	-0.050	0.045	0.110	0.026	-0.069	0.050	0.003	0.008	-0.031
<i>EXOP</i>	0.119	-0.043	0.108	-0.012	1	0.202	0.119	0.024	0.399	-0.088	0.174	-0.004	-0.012	0.093	-0.098
<i>EPS</i>	0.193	0.149	0.269	0.482	0.183	1	-0.148	0.289	0.648	-0.184	0.081	0.235	-0.115	0.039	-0.186
<i>ESO</i>	0.141	-0.062	-0.115	-0.191	0.545	-0.176	1	-0.066	-0.271	<i>0.123</i>	-0.102	-0.018	0.150	0.010	-0.048
<i>GR</i>	0.215	0.028	0.110	0.283	0.171	0.455	0.046	1	<i>0.138</i>	-0.042	-0.071	0.219	-0.103	-0.097	0.007
<i>SIZE</i>	<i>0.132</i>	0.001	0.362	0.434	0.224	0.724	-0.285	0.277	1	-0.219	0.283	0.083	-0.091	0.000	-0.158
<i>UV_D</i>	0.033	-0.099	-0.050	-0.119	-0.031	-0.150	0.171	-0.082	-0.200	1	-0.378	-0.128	0.005	-0.118	-0.012
<i>CM_D</i>	-0.069	-0.042	-0.039	0.089	0.172	<i>0.138</i>	0.005	0.034	0.258	-0.378	1	-0.259	-0.064	0.302	0.012
<i>DIL_D</i>	0.041	0.018	0.073	0.194	-0.002	0.244	-0.121	0.230	0.109	-0.128	-0.259	1	0.079	0.031	-0.115
<i>FCF_D</i>	0.013	-0.083	0.058	-0.009	0.021	-0.160	<i>0.128</i>	-0.090	-0.108	0.005	-0.064	0.079	1	-0.020	-0.058
<i>LEV_D</i>	0.025	-0.059	<i>0.125</i>	0.054	0.094	0.009	0.028	-0.065	0.025	-0.118	0.302	0.031	-0.020	1	-0.066
<i>LIQ_D</i>	-0.119	-0.106	-0.017	-0.133	-0.108	-0.191	-0.052	-0.027	-0.170	-0.012	0.012	-0.115	-0.058	-0.066	1

Panel B: Pearson correlations for the independent variables used in Model 2

N=195	ΔFCF	ΔLEV	<i>SDIVD</i>	ΔDPS	$\Delta EXOP$	ΔEPS	ΔESO	<i>TIME</i>
ΔFCF	1	-0.186	-0.027	0.041	-0.010	0.013	-0.094	0.070
ΔLEV		1	-0.037	0.014	0.051	0.165	-0.050	0.168
<i>SDIVD</i>			1	-0.009	-0.062	0.173	0.032	0.103
ΔDPS				1	0.009	0.042	-0.026	-0.095
$\Delta EXOP$					1	0.071	0.179	0.000
ΔEPS						1	0.030	0.333
ΔESO							1	0.077
<i>TIME</i>								1

UV is the market-adjusted return of firm *i* in the year prior to the buy-back announcement. *FCF* is the annualised pre-announcement operating cash flow plus cash flow from investing activities less preference dividends scaled by beginning total assets. *LEV* is measured as debt to assets for the financial year prior to the announcement. *DIVD* is the dividend payout ratio for the year prior to the announcement excluding special dividends. *EXEC* is the number of options paid to executive directors divided by total executive director options and shares outstanding for the financial year prior to the buy-back. *EPS* is the earnings per share in the financial year prior to the announcement measured as net profit after tax divided by the weighted average number of ordinary shares. *ESO* is the number of stock options paid to other employees outstanding before the announcement, scaled by shares on issue at the end year t-1. *GR* is the market to book ratio and *SIZE* is the natural log of market capitalisation both measured prior to the announcement date. Six dummy variables are used to capture the most common categories of reasons provided by management for the buy-back in the Appendix 3C lodged with the ASX. These dummy variables take a value of 1 when management cites the following reasons, respectively, for the buy-back: *UV_D*, under-valuation; *CM_D* capital management; *DIL_D*, dilution; *FCF_D*, free cash flows; *LEV_D*, capital structure management; *LIQ_D* improving liquidity. Otherwise these dummy variables take a value of 0. ΔFCF is measured as the annualised percentage change in FCF. $\Delta DIVD$ is the change in dividend payout ratio. *SDIV* is the annualised average special dividends per share. $\Delta EXOP$ is the change in *EXOP*. ΔEPS is the change in EPS over the buy-back period. ΔESO is the change in *ESO*. *TIME* is the number of weeks between announcement and completion. Correlations that are significant at $p < 0.05$ are depicted in bold while correlations significant at $p < 0.10$ are in italics.

Table 5
Regression Analysis of the Determinants of Intended Repurchase Activity

$$ITD_{it} = \alpha_0 + \alpha_1 UV_{it} + \alpha_2 FCF_{it} + \alpha_3 LEV_{it} + \alpha_4 DIVD_{it} + \alpha_5 EXOP_{it} + \alpha_6 EPS_{it} + \alpha_7 ESO_{it} + \alpha_8 GR_{it} + \alpha_9 SIZE_{it} + \varepsilon_{it} \quad (1)$$

Independent variables	Pred.	Firms characteristics	Management reasons	Both
		Coefficient <i>t-stat</i>	Coefficient <i>t-stat</i>	Coefficient <i>t-stat</i>
Intercept		0.179 7.263**	0.059 11.488**	0.163 6.615**
<i>UV</i>		-0.002 -0.382		-0.002 -0.375
<i>FCF</i>		0.012 1.177		0.021 2.085**
<i>LEV</i>		0.011 0.817		0.009 0.689
<i>DIVD</i>		0.001 0.378		-0.001 -0.250
<i>EXOP</i>		0.015 2.117**		0.014 1.958*
<i>EPS</i>		-0.017 -1.827*		-0.011 -1.187
<i>ESO</i>		-0.058 -2.048**		-0.046 -1.650
<i>GR</i>		-0.006 -3.389**		-0.005 -3.129**
<i>SIZE</i>		-0.006 -4.098**		-0.005 -3.853**
Reasons provided by management in Appendix 3C				
<i>UV_D</i>			0.014 2.314**	0.013 2.375**
<i>CM_D</i>			0.000 0.039	0.007 1.347
<i>DIL_D</i>			-0.016 -2.553**	-0.005 -0.922
<i>FCF_D</i>			0.006 0.663	-0.001 -0.083
<i>LEV_D</i>			0.024 2.712**	0.016 1.961*
<i>LIQ_D</i>			0.045 3.669**	0.037 3.232**
n		195	195	195
Adj R²		0.248	0.136	0.314
F stat		8.123**	6.092**	6.919**

ITD, is the maximum number of shares a firm intends to buy-back on the announcement divided by the shares outstanding at announcement date. Under-valuation, *UV*, is the market-adjusted return of firm *i* in the year prior to the buy-back announcement. *FCF* is annualised pre-announcement operating cash flow plus cash flow from investing activities less preference dividends scaled by beginning total assets. *LEV* is measured as debt to assets for the financial year prior to the announcement. *DIVD* is the dividend payout ratio for the year prior to the announcement excluding special dividends. *EXEC* is the number of options paid to executive directors divided by total executive director options and shares outstanding for the financial year prior to the buy-back. *EPS* is the earnings per share in the financial year prior to the announcement measured as net profit after tax divided by the weighted average number of ordinary shares. *ESO* is the number of stock options paid to other employees outstanding before the announcement, scaled by shares on issue at the end year t-1. *GR* is the market to book ratio and *SIZE* is the natural log of market capitalisation both measured prior to the announcement date. The dummy variables used in Models 2 and 3 capture the six main reasons we identified from the Appendix 3C document for the buy-back. These dummy variables take a value of 1 when management cites the following reasons, respectively, for the buy-back: *UV_D*, under-valuation; *CM_D* capital management; *DIL_D*, dilution; *FCF_D*, free cash flows; *LEV_D*, capital structure management; *LIQ_D* improving liquidity. Otherwise these dummy variables take a value of 0. Significance levels are indicated as: * significant at p< 0.10 and ** significant at p<0.05.

Table 6
Regression Analysis of On-market Share Repurchase Program Activity

$$SBBS/ITDS_{it} = \beta_0 + \beta_1\Delta FCF_{it} + \beta_2\Delta LEV_{it} + \beta_3SDIV_{it} + \beta_4\Delta DPS_{it} + \beta_5\Delta EXOP_{it} + \beta_6\Delta EPS_{it} + \beta_7\Delta ESO_{it} + \beta_8TIME_{it} + \varepsilon_{2it} \quad (2) \quad (2)$$

Firm characteristics	Pred.	Excl. return
Intercept		0.558
		7.546**
ΔFCF		0.177
		1.126
ΔLEV		-0.677
		-1.477
$SDIV$		-1.723
		-1.571
$\Delta DIVD$		0.006
		0.161
$\Delta EXOP$		0.003
		0.073
ΔEPS		0.390
		2.546**
ΔESO		0.080
		0.102
$TIME$		0.006
		2.431**
n		195
Adj R2		0.065
F stat		2.700**

The dependent variable $SBBS/ITDS_{it}$ is the market value of the shares repurchased over the market value of the maximum shares the firm intended to repurchase. Change variables summarise key changes in the firm's position throughout the life of the buy-back. These are the change in free cash flows (ΔFCF), the change in leverage (ΔLEV) over the buy-back period, special dividends per share paid during the buy-back program ($SDIV$), the change in the dividend payout ratio over the financial year/s relating to the buy-back period ($\Delta DIVD$), the change in the number of executive options as a proportion of total number of shares and options held at the start of the buy-back ($\Delta EXOP$), the change in the value of earnings per share (ΔEPS) over the year/s relating to the buy-back period and the change in the change in the employee stock options outstanding at the end of the financial year following completion of the buy-back, from the beginning of the buy-back period, divided by the number of shares outstanding at the start of the buy-back program (ΔESO). A control for length of the buy-back program ($TIME$). White's (1980) corrected standard errors are used to control for the impact of heteroscedasticity. Significance levels are indicated as: * significant at $p < 0.10$ and ** significant at $p < 0.05$.