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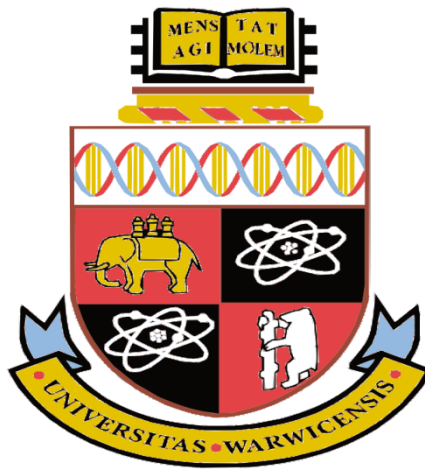http://wrap.warwick.ac.uk/79562

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Agency Issues in Share Repurchase Programmes

by

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Declaration

I declare that this thesis is my own work and any material from this thesis has not been submitted for the award of any other degree to any University. I have presented Chapter two of this thesis titled "Executive compensation and open market share repurchases" in different national and international conferences and received many helpful comments. The paper has particularly benefitted from insightful comments from Dr. Steve Young (Lancaster University, UK) and Dr. Timothy Burch (University of Miami, USA). Professor Richard Taffler has spent countless hours with me to polish the work presented in this thesis. List of conferences where I presented my research from this thesis is provided below

- 2015 FMA Annual Meeting, Orlando, USA (Oct. 2015)
- IFABS 2015 Oxford Conference, Said Business School, UK (Sep. 2015)
- 4th Annual Corporate Finance Conference, Manchester, UK (Sep. 2015)
- PhD Conference in Monetary and Financial Economics, Bristol, UK (Jun. 2015)
- Young Finance Scholars' Conference, University of Sussex, UK (Jun. 2015)
- PG Conference in applied linguistics, University of Warwick, UK (Jun. 2015)
- June 10-12, 2015. FMA European doctoral consortium, Venice, Italy (Jun. 2015)
- Annual British Accounting and Finance Association (BAFA) Conference, Manchester, UK (Mar. 2015)
- XI NIPE Summer School, Universidade do Minho, Braga, Portugal (Jul. 2014)
- Young Finance Scholars' Conference, University of Sussex, Brighton, UK (May. 2014)

Waqar Ahmed

Abstract

The corporate finance literature generally views open market share repurchase announcements as a signal of equity undervaluation. Managers also frequently cite undervaluation as a rationale for their decision to repurchase firm equity. However, such an announcement cannot necessarily be viewed as a strong signal of firm undervaluation as it lacks characteristics of a credible signal. Firstly, managers are increasingly relying on share repurchases as a mechanism for distributing cash to shareholders. Secondly, open market buyback announcements are not binding obligation on the part of firm management to complete. In addition, such programmes have a positive effect on executive compensation, so managers can also employ these opportunistically to accumulate personal wealth at the expense of shareholders. Thus, buyback announcements can be either value signalling or agency driven. Since these two theories (agency vs signalling) are not mutually exclusive and a pure *ex ante* measure of managerial intent does not exist, the challenge is to distinguish value signalling announcements from "cosmetic" ones.

My thesis consists of three papers (chapters 2-4). In my first paper, I test whether the market distinguishes between agency driven and value signalling open market share buybacks by observing the underlying managerial wealth and repurchase incentives. In theory, better convergence between the executive and shareholder wealth interests and risk preferences should lower agency costs thus increasing the "perceived" credibility of managements' buyback announcements (signals). My results suggest that executive compensation arrangements play an important role in explaining the market reaction to, and actual share repurchase decisions of, firms that announce buyback programmes. This study makes an original contribution to the literature by demonstrating that investors approximate the value signalling effect of a buyback announcement by observing the underlying managerial repurchase incentives and respond accordingly.

My second paper addresses the open market buyback announcement credibility issue directly by capitalising on the soft information conveyed in such announcements. This is novel to the literature on share buybacks. Recent studies show that news disclosure tone affects investor reaction to an information event. In my study, I demonstrate that the disclosure tone of buyback press releases contains value relevant information and has significant explanatory power for short term announcement returns. The hand collected data I use in this chapter also allows me to explore other aspects of buyback announcements where the extant literature is limited.

In my third paper, I analyse insider trading behaviour around buyback announcements. The key insight of this paper is to infer insiders' private information about firm value by observing their trading behaviour around the repurchase announcement event. Insiders add credibility to the (repurchase) undervaluation signal by trading parallel to their signal (i.e., purchasing more or selling fewer shares in advance of the repurchase announcement). However, insiders seeking to time the market (cash out at a higher price) will sell more shares post-announcement. My analysis shows that, consistent with the undervaluation signalling argument, investors respond more positively to buyback announcements where insiders buy more or sell less equity before the announcement event. However, I also document that insiders sell more shares (time the market) in the first 3-months post-announcement. This is especially true for firms that are less (more) likely to be undervalued (overvalued) and for smaller firms that present the greatest potential for gain through insider trading. My results suggest that net insider sales are significantly positively related to repurchase announcement returns. Finally, I show that higher post-announcement net insider sales are slightly negatively related to longer-term returns suggesting such firms do not out perform in the long-run.

My research adds significantly to the literature on share buybacks by addressing the agency issues associated with share repurchase programmes. It

finds that the market is conscious of the managerial incentives attached to repurchase programmes and the potential for their opportunistic use. Investor reaction to repurchase programme announcements is sensitive to executive compensation arrangements, the information content and disclosure tone of buyback announcement press releases and insider trading behaviour. This study seeks to add to our understanding of share buybacks and how the market treats and reacts to these announcements. The market realises that managements' promises to spend billions of dollars on share repurchases may not necessarily add to shareholders' wealth. Repurchase announcements cannot be uniformly viewed as a signal of equity undervaluation; insiders also use such programmes for personal gains. In summary, my research highlights novel factors that explain investor reaction to share buyback announcements.

Abbreviations

AR	Abnormal Return
B/M	Book-to-Market ratio
BHAAR	Buy and Hold Annual Abnormal Return
BHAR	Buy and Hold Abnormal Return
CA	Current Assets
CAPEX	Capital Expenditures
CAR	Cumulative Abnormal Return
CEO	Chief Executive Officer
CF	Cash Flows
Coeff.	Coefficient
CRSP	Center for Research in Stock Prices
DA	Discretionary Accruals
DIV	Dividends
DJNS	Dow Jones News Service
EPS	Earnings Per Share
FLS	Forward Looking Statement
HML	High Minus Low
KZ	Kaplan and Zingales financial constraints index
Lev	Leverage
M&A	Mergers and Acquisitions
MD&A	Management Discussion and Analysis
MV	Market Value
NDA	Non Discretionary Accruals
OMSR	Open Market Share Repurchase
OMSRs	Open Market Share Repurchase programmes
$\mathbf{R_{mt} - R_{ft}}$	Market return minus Risk free rate
ROA	Return on Assets
S&P	Standard and Poor's

S.D	Standard deviation
SDC	Security Data Company
SEC	Security and Exchange Commission
SMB	Small Minus Big
TA	Total Assets
Tobin's Q	Market value to book value ratio
UMD	Up Minus Down
WSJ	The Wall Street Journal

Chapter 1

Introduction

1.1 Background and introduction

An ideal market provides resource allocation signals and investors can choose among securities that represent ownership of firms' activities. Thus capital markets have the key role of resource allocation and distribution of firms' ownership rights in an economy (Fama (1970)). So an efficient capital market, in which prices reflect fundamental values, will by implication result in efficient resource allocation in an economy (Ahmed (2010)). However, information asymmetry among market participants can cause stock prices to deviate from fundamental value. Managers are particularly sensitive to stock undervaluation and often try to correct it by sending "credible" signals to the market.

The last couple of decades have witnessed a remarkable increase in stock repurchase programmes. Managers are increasingly relying on share repurchase announcements which are generally viewed as a signal of equity undervaluation and/or managerial optimism about firm prospects. According to Ikenberry et al. (1995) corporations now distribute a greater portion of their earnings to shareholders by repurchasing their own stock (see also Grullon and Michaely (2002)).[1] As a result of increasing popularity of repurchase programmes and the amount of money involved in these, the topic has attracted enormous attention from academic researchers and business analysts alike.

Let us begin with the definition of share repurchases and share repurchase announcements followed by a discussion of what these actually represent.

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[1] "Corporate buybacks have been surging since the financial crisis, with S&P 500 companies spending nearly $2.3 trillion on them since 2009, according to a new report from Aranca Investment Research" by (Farrell (2015, Aug. 18)) in The Wall Street Journal

Stock buyback or share repurchase is an act of a company to purchase its own shares from the market either by tender offer, Dutch auction or by open market operation.

Share repurchases result in reduction of outstanding share capital by distributing cash to selling equity holders. Thus, share repurchases can be seen as the reverse of (secondary) equity issues – where companies issue shares and raise capital. Out of the three repurchase methods, open market share buybacks is the most common method of repurchasing shares (Grullon and Ikenberry (2000)). Such repurchase programmes provide managers with the greatest flexibility and hence are preferred by executives.[2] As a result I focus on open market repurchase programmes.

Share repurchase (buyback) announcements represent simple authorizations by the company's board to its management to repurchase a certain amount of the firm's outstanding equity from the market over a given time period.[3]

Thus repurchase announcements represent managerial intention to repurchase shares and not actual repurchases. Generally, the market reacts positively to such repurchase announcements and announcing firms experience significant positive abnormal returns around the announcement date. In the academic literature as well as in actual share repurchase announcements several reasons are mentioned as to why firms may engage in share repurchase activity. Most of the academic research on buybacks has focused on identifying

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[2] More than ninety percent of all repurchase programmes rely on open market operations for their implementation.

[3] For example, Applied Material, on April 26, 2015, issued the following press release about its share repurchase intentions.

"Applied Materials, Inc. (NASDAQ: AMAT) today announced that its Board of Directors has approved a new share repurchase program authorizing up to $3 billion in repurchases over the next three years beginning in the third quarter of fiscal 2015.

"We are pleased to announce this new share repurchase program," said Gary Dickerson, president and chief executive officer of Applied Materials. "This program reflects our confidence in our performance and opportunities as well as our strong commitment to shareholder returns."........". Web link: http://www.appliedmaterials.com/company/news/press-releases/2015/04/applied-materials-announces-3-billion-share-repurchase-authorization

the source(s) of gain in firm value as a result of share repurchase announcements.

The corporate finance literature regards repurchase announcements as a managerial signal of equity undervaluation assuming managers will only repurchase shares when they believe their stock to be trading below its fair value. Brav et al. (2005) document that the primary reason cited by US corporate executives for their decision to repurchase shares is, in fact, stock undervaluation.[4] Vermaelen (1981) and Comment and Jarrell (1991) explain positive abnormal returns associated with share repurchase announcement as a market response to executives' undervaluation signals. Ikenberry et al. (1995), Ikenberry et al. (2000) and Peyer and Vermaelen (2009) further show that undervalued firms that announce a repurchase programme earn significant abnormal returns on announcement and also outperform in the long-run.

However, recent data shows that managers may not necessarily use repurchases to take advantage of low stock prices. Waggoner (2015) claims that companies are not particularly good at timing the market. He highlights that firms repurchased the highest number of shares in 2007 when the market was at its peak, and the least number of shares were purchased in 2009 when the market was bearish. Thus, undervaluation is not the sole reason behind managements' decision to initiate a repurchase programme. Repurchases can be initiated for several other reasons. For example, as an alternative to dividends and a tax efficient way of distributing cash to shareholder (Allen et al. (2000); Fatemi and Bildik (2012); Grullon and Michaely (2002)), to alter capital structure (Masulis (1980); Skinner (2008)), to manage earnings (Hribar et al. (2006); Gong et al. (2008); Young and Yang (2011)), to prevent dilution

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[4] *"Time Warner may favor a share repurchase rather than an increase of its dividend because the stock is "a bargain".....*"by Rabil (2009, Feb. 3) in Bloomberg*
"Charlie [Warren Buffet's partner] and I favour repurchases when two conditions are met; first, a company has ample funds to take care of the operational and liquidity needs of its business; second, its stock is selling at a material discount to the company's intrinsic business value, conservatively calculated."- by Rotblut (2012, Feb. 3) in Forbes

and/or fund employee stock grants and options (Jolls (1998); Kahle (2002); Bens et al. (2003)).

More recent studies have focused on the credibility of open market repurchase announcements as a managerial signal of stock undervaluation. Open market repurchase announcements are simple authorizations and not binding obligations on firms' management and hence do not send a strong signal of equity undervaluation. Stephens and Weisbach (1998) show that not all firms complete their announced repurchase programmes. In fact, some firms do not repurchase a single share post-announcement. Chan et al. (2010) argue that minimum regulatory and disclosure requirements in the US around actual buybacks also facilitate mimicking behaviour from other firms. US presidential candidate Hillary Clinton has also recently called for more timely disclosure on share repurchases (Whitehouse (2015, Oct. 16)). Vermaelen (1981) compares the relative signalling power of repurchase tender offers, Dutch auctions and open market repurchases and concludes that the latter is considered to be the least effective tool to signal undervaluation.

Fried (2001) theoretically argues that open market repurchase announcements serve managerial interests and presents his alternative hypothesis of "managerial opportunism". He argues that managers use repurchase programmes to maximise their personal wealth instead of signaling value to investors. Executive compensation is often linked to firms' earnings per share and stock price performance, which are positively affected by share buybacks.[5] Fenn and Liang (2001), Massa et al. (2007), Louis and White (2007) and Chan et al. (2010) provide evidence that repurchase programmes are used opportunistically or at least "cosmetically" by managers to mislead investors. Thus buyback announcements can be value signalling or agency

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[5] *"Executives are compensated [based] on EPS, the primary reason they do buybacks."* by Murphy and Kester (2014, Oct. 29) in The Wall Street Journal
Earnings per share is positively affected when managers actually repurchase shares and stock prices generally increase on the repurchase announcement.

driven. So, how credibly a share buyback announcement signals firm undervaluation represents an empirical question.

Open market share repurchase announcements thus represent a special case that can either be viewed as value signalling or misleading (agency driven). This thesis studies open market repurchase announcements in the context of agency issues associated with such announcements. It is important to note that in this thesis I refer to agency issues as in the traditional agency theory where a conflict of interest results from separation of ownership and control. By agency driven repurchases I mean repurchase programmes initiated by firm management in their self-interests rather than creating value for shareholders. This differs from agency theory of free cash flows where a repurchase programme announcement is, in fact, a positive news for shareholders. Shareholders of cash rich firms with poor investment opportunities benefit from repurchase activity as it reduces the amount of cash available to managers for empire building and other unproductive uses.

Specifically, in chapter 2 and 3, I explore factors that can influence investors' perception about the strength of repurchase announcement as a value signalling mechanism and more importantly if these factors can explain differences in market reaction to the share buyback "signal". In chapter 4, by analyzing insider trades around the repurchase announcement event, I empirically explore the possibility of managers timing the market by exploiting share repurchase announcements. My final chapter, chapter 5 concludes the thesis and highlights areas of further research/work.

Each of my empirical chapter employs US data and is compiled from different data sources. Chapter 2 covers repurchase announcements of S&P 1500 firms between 1992 and 2008. Executive compensation data is available from 1992 onwards. The data period ends in 2008 to allow calculation of long-term returns up to 4 years post-announcement. In chapter 3, I work with sample data of 351 repurchase announcements made between 2000 and 2004. This

study requires hand collected data and is run on a relatively small data sample due to the nature of data collection process and the time constraints of WBS doctoral programme. I will significantly increase the sample size to make it consistent with existing literature when revising chapter 3 for publication. Chapter 4 is my final empirical chapter of this thesis and thus includes more recent data on repurchase announcement as well. This chapter includes repurchase programmes announced between 1990 and 2012. The next subsections summarise each chapter of this thesis.

1.2 Executive compensation and repurchases

In chapter 2, I investigate the relationship between executive compensation arrangements and stock market reaction to repurchase announcements and also their impact on actual repurchases post-announcement. In theory, an efficient market should be able to differentiate between value signalling and "cosmetic" repurchase announcements. However, since an ex-ante measure of managerial intent does not exist, investors have to rely on noisy proxies to approximate the credibility of a buyback announcement as value signalling. In this chapter, I explore how investors view and react to an open market share repurchase announcement given executive compensation arrangements. Specifically, I test whether the market distinguishes between value signalling and agency driven or "cosmetic" repurchase announcements by observing the underlying managerial wealth and repurchase incentives. I expect that differences in degree of agency issues (incentive alignment between the executive and shareholders) among repurchasing firms can explain variations in stock price reaction to firms' repurchase announcements and also actual repurchase decisions post-announcement.

I conjecture that if the executive compensation package is structured in a way that reduces agency issues then a repurchase announcement from such managers' should be regarded as a relatively more credible signal of equity undervaluation by the market. In cases where shareholders' and executives'

interests diverge, such firm announcements may provide less value relevant information and outside investors may become increasingly suspicious of these. Thus, the market reaction to repurchase announcements will be stronger for firms with better incentive alignment between executives and shareholders.

My study focuses on share-based compensation component of the CEO's remuneration package as this is argued to be highly effective in reducing agency issues (e.g., Jensen and Meckling (1976)). To estimate managerial wealth incentives and risk preferences, I use delta and vega measures following Core and Guay (2001) and Coles et al. (2006). Delta represents sensitivity of CEO wealth to share price. Chava and Purnanandam (2010) argue that in equilibrium an optimal level of delta aligns executive wealth incentives with those of shareholders as managers share gains and losses with shareholders. So, higher delta values should reduce agency costs and any signal by such a manager should be considered as value signalling in relative terms. Percentage of CEO firm equity ownership is also used to capture the immediate effect of repurchase announcement on CEO wealth.[6]

Vega measures sensitivity of CEO wealth to stock return volatility. Executives with higher vega have an incentive to increase firm risk, whereas shareholders are regarded as risk neutral in theory. Although shareholders may not necessarily dislike risk as long as firm value increases, excessive risk can result in lower firm value due to the higher discount rate used in evaluating expected cash flows. On the other hand, in theory, managers have nothing to lose, and in fact all to gain, as the value of their stock options increases with higher stock return volatility. So, the market should respond more circumspectly to an announcement made by an executive with higher vega.

Nonetheless, endogeneity of compensation schemes can be of some concern. If compensation contracts were perfectly designed then delta and vega measures might be of little use in estimating the severity of agency problems. If

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[6] Percentage of CEO equity ownership represents the proportional stake of the executive in the firm.

this were the case then the coefficients on these variables would be insignificantly different from zero in empirical tests. However, my empirical tests show that this is not the case. Literature on executive compensation arrangements also suggests that compensation contracts are less than perfectly designed (see e.g. Morck et al. (1988); Crystal (1991) and Jensen (1993)).[7] Lastly, to alleviate some of the endogeneity concerns I use lagged values of compensation arrangement variables in all of my regression model specifications.

I test my predictions using a sample of 2,296 unique share repurchase announcements made by Standard and Poor's (S&P) 1500 firms between 1992 and 2008. My results show that a novel relationship exists between executive compensation arrangements and the "perceived" credibility of share buyback announcements as value signalling. The market approximates the credibility of a buyback announcement (as value signalling) by observing the underlying managerial wealth and repurchase incentives. In particular, I find that the executive compensation arrangements can explain both the market reaction to, and actual repurchase decisions of, firms after the repurchase announcement. Short-term repurchase announcement returns are significantly positively (negatively) related to percentage of CEO equity holdings (vega). Longer-term annual buy-and-hold returns are also significantly positively (negatively) related to sensitivity of CEO wealth to stock price (volatility).

Mean three day return (-1, 1) around the share buyback announcement is 2.14% for firms in the lowest vega quintile (1) compared with only 0.86% for firms in the highest vega quintile (5). Similarly, average annual buy-and-hold abnormal return for firms in quintile 1 is 5.47% as compared with only 2.82% for firms in quintile 5. This univariate result suggests that the market does respond more circumspectly to buyback announcements where CEO

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[7] Core et al. (2003) provide an excellent review of the executive compensation literature. Jensen (2005) also shows that executives with high wealth sensitivity to their firm's equity may end up destroying the core value of the business in defending the overvaluation of its stock.

wealth increases with increase in firm risk. However, a parallel return pattern is not so obvious in delta sorted quintiles.

Multivariate regression results also indicate that short-term announcement returns are significantly negatively (positively) related to CEO wealth sensitivity to stock return volatility (percentage of CEO equity ownership). In further tests, I show that short-term returns are positively related to a compensation dummy variable that represents better incentive alignment and/or lower agency concerns.[8] The relationship between compensation dummy variable and short-term announcement returns is positive and highly significant suggesting that the market reacts more favourably to repurchase announcements where executive wealth incentives are better aligned with those of shareholders. The coefficients on the separate interactions of compensation dummy with proxies of information asymmetry and undervaluation are more positive and highly significant. This indicates that investors react more strongly to buyback announcements from CEOs with better incentive alignment when the firm is more likely to be undervalued or when firms suffer from higher information asymmetry

Consistent with Ikenberry et al. (1995) and Peyer and Vermaelen (2009) I find that the market under reacts to the repurchase signal and such firms earn abnormal returns over the next three years. Longer-term returns of repurchase announcing firms are also positively (negatively) related to CEO wealth sensitivity to stock price (volatility). However, incentive alignment variables have opposite signs when regressed against actual repurchases as a dependant variable. Firms that initiate repurchase programmes for undervaluation reasons will have a lower incentive to repurchase shares when post-announcement returns are high and mispricing is eliminated. Higher post-announcement returns also make actual repurchases more costly and thus can justify the positive (negative) relationship between repurchase rates and CEO

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[8] The compensation dummy represents a combination of three incentive alignment variables, delta, vega and percentage CEO share ownership. Compensation dummy is 1 when delta is high, vega is low and percentage CEO share ownership is high and 0 otherwise.

wealth sensitivity to volatility (stock price). Executives with higher wealth sensitivity to volatility are also more likely to repurchase a greater number of shares due to the fact that actual repurchases increase firm risk.

As a further test, I explore the relationship between executive compensation arrangements and firm investment behaviour and operating performance. Coles et al. (2006) show that managerial compensation arrangements affect firms' investment policy. Higher CEO wealth sensitivity to volatility encourages managers to cut capital expenditure and invest in more risky projects resulting in lower operating returns. CEOs with higher equity ownership tend to invest more in capital expenditure and deliver better operating performance. Consistent with this, I find that higher sensitivity of CEO wealth to stock volatility is negatively related to average annual capital expenditure and post-announcement operating performance. However, percentage of CEO share ownership is positively related to investment decisions and operating returns. These findings are also in line with prior literature on executive compensation and firm policy and provide further evidence on why firms with higher CEO wealth sensitivity to stock price (volatility) should earn higher (lower) abnormal returns and repurchase fewer (more) shares post-announcement.

The chapter contributes to the growing literature addressing the credibility of open market share repurchase announcements as a signal of firm undervaluation. For example, Chan et al. (2010) use earnings quality as a measure of managerial propensity to mislead investors using share repurchase announcements. Chang et al. (2010) and Bonaimé (2012) show that investors draw upon their prior experience of firm repurchases while reacting to their subsequent share repurchase announcements. Chen and Wang (2012) show that the market reacts more sceptically to repurchase announcements of financially constrained firms as they are more likely to under invest and become less competitive in future.

The empirical research study described in this chapter makes an original contribution to the literature on share buybacks and executive compensation. It establishes a link between executive compensation arrangements and the "perceived" credibility of share buyback announcement as a signal of equity undervaluation. My analysis suggests that not all buyback announcements are regarded "as equal". Executive compensation arrangements play an important role in determining how the market perceives and reacts to a share buyback announcement. Thus, executive compensation arrangements is value relevant information and can explain short-term and longer-term returns as well as actual repurchase rates of firms that announce a repurchase programme. Executives make investment and operating choices based on their compensation/incentives which affect firm risk and performance. The market appears to understand underlying managerial wealth and repurchase incentives and acts accordingly.

1.3 Language of buyback announcements

Corporations disclose material information to investors through a variety of methods including corporate announcements. One such announcement is about the firm's intention to repurchase shares through open market operations. In chapter 3, I analyse actual repurchase announcements to explore if the narrative disclosure tone of repurchase announcement press releases can help in explaining investor reaction to the repurchase announcement.

A number of recent studies highlight the importance of qualitative data in enhancing our understanding of financial markets. For example, Tetlock et al. (2008) suggest that linguistic media content captures otherwise hard-to-quantify aspects of firm fundamentals. They show that simple quantitative measures of language derived from firm-specific news can predict firms' earnings and stock returns. The objective here is to lever qualitative disclosures of share repurchase announcements to analyse if these are value relevant information and of some importance to investors.

Here, I conjuncture that managers with real good news may use more optimistic (positive) language to distinguish themselves from others.[9] By resorting to more positive disclosure tone managers expose themselves to higher litigation risk (see for example, Francis et al. (1994); Rogers et al. (2011)). The additional litigation risk may add credibility to their repurchase announcement as value signaling. Using a content analysis approach, I investigate if the language of share repurchase announcement news is value relevant information for investors. More specifically, I examine the effect of share repurchase announcement disclosure tone on short-term announcement returns, longer-term returns and actual repurchase decisions of firms that announce a repurchase programme.

The data for the study is hand collected and allows me to investigate several interesting aspects of share repurchase programmes. Peyer and Vermaelen (2009) and Bonaimé (2012) show that the stated motive of repurchase programmes is value relevant information for investors. Thus I classify repurchase announcements according to their stated motive(s). In addition, I collect information on any other material information that may accompany a repurchase announcement such as earnings, mergers and acquisitions or recent stock performance news etc. I broadly classify these either as good news or bad news.

This chapter contributes to the existing literature in several ways. First, it introduces a qualitative perspective into the literature on share repurchases. It is the first research study to the best of my knowledge that analyses disclosure tone of repurchase announcements. My results suggest that the narrative disclosure tone of repurchase announcements is significantly positively related to short-term announcement returns. Thus, the market reacts more favourably to repurchase announcements with more optimistic disclosure tone. Mean three day (-1, 1) difference in returns of firms in the highest and the lowest ranked

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[9] In the paper I use the term optimistic and positive interchangeably.

groups by disclosure tone is 1.71% and is highly significant at the 1% level. This suggests that investors regard positive repurchase announcement disclosure tone as a proxy for managerial optimism about their firm's prospects and react more strongly.

New information (signals) might be more value relevant for firms suffering a higher degree of information asymmetry. Following Bonaimé (2012), I measure degree of information asymmetry by firm size and find that the impact of positive tone is more pronounced for small firms. Initial market reaction to positive tone is also stronger for firms with more growth opportunities (low Book-to-Market ratio) as compared to value firms. Mercer (2004) shows that the presence of numeric terms and numeric precision increases the credibility of management disclosure. The impact of positive tone of buyback announcement news is further enhanced by the presence of a higher number of numeric terms in the repurchase announcement. However, I observe no link between narrative disclosure tone and actual repurchases post-announcement and the longer-term abnormal returns of firms that announce a share repurchase programme.

Second, chapter 3 contributes to the existing literature by allowing a better understanding of the stated objectives of repurchase programmes, their relative frequency, the market reaction to such repurchase announcements and also in terms of their actual completion rates and long-run performance. As expected, the initial announcement return is highest for firms that announce repurchase programmes citing stock undervaluation as the motive. Mean 3-day cumulative abnormal return around the repurchase announcement event is 1.11% significant at the 5% level. However, the announcement return is negative for firms that repurchase for legal reasons. More interestingly, firms that do not state any reason in their repurchase announcement earn positive abnormal returns both in the short term and long term which are significant at conventional levels as compared to firms that repurchase for reasons other than undervaluation. An important research question for further exploration here is:

why do these latter firms state a reason for their repurchase programme when this is associated with under-performance compared to those who simply announce a repurchase programme without mentioning any reason for their intention to repurchase stock? This study highlights the importance of discretionary disclosure options for managers in relation to share repurchases and their impact on firm valuation.

Finally, my hand collected data allows me to analyse other aspects of share repurchase announcements. For example, I analyse the relative frequency of other news mentioned in share repurchase announcements, its nature and impact on the market reaction to the buyback announcement event. Descriptive statistical analysis is provided in the chapter.

1.4 Insider trading and repurchase announcements

Chapter 4 tests if insiders employ repurchase programmes for their own personal benefit by looking at insider trades taking place around repurchase announcements. Specifically, I test the relationship between pre- and post-announcement insider trades and returns of firms that announce a repurchase programme. Open market share repurchase announcements do not send a very strong signal of firm under-pricing for reasons mentioned earlier in this chapter. Investors may also discount the open market repurchase announcement "signal" as managers' personal wealth incentives may lead them to announce such programmes. In fact, in this context, Fried (2001; 2005) also claims that open market repurchase announcements reflect opportunistic managerial behaviour rather than serving as a signal of equity undervaluation. Consistent with this, Edmans et al. (2014) show that managers strategically time the disclosure of positive news (in months in which their equity vests), so that they can cash out at a higher stock price.

In this chapter I analyse insider trades around open market repurchase announcements to infer insiders' private information about firm value. The objectives of this investigation are twofold. First, I argue that a repurchase

announcement will be a more credible signal of undervaluation when it is supported by insiders actions. Insiders who buy more (or sell less) stock in their firm, in advance of the repurchase announcement, signal that they believe their stock to be under-priced. Holding additional own firm equity is costly and exposes already undiversified insiders to considerable risk. This is particularly true if the stock is overpriced. So, investors should take into account pre-announcement insider trades in evaluating repurchase announcements and respond accordingly. Second, there is also a possibility that insiders announce a repurchase programme to cash out at a higher price rather than to signal equity undervaluation (Fried (2005)).[10] Such insiders are more likely to sell after the repurchase announcement is made. Post-announcement sales will be particularly beneficial for insiders when announcement returns are high. So, post-announcement insider sales will be higher when repurchase announcement returns are high.

Seyhun (1998) and Lakonishok and Lee (2001) show that insiders can predict long-run price performance in the case of small firms for up to two years. They show that smaller firms are more likely to be mispriced and insiders can profitably trade in smaller firms as these present the greatest potential of gains from insider trading. Finally, insiders will sell more of the stock they own in their firm when they believe it to be either over-priced or at least not significantly under-priced. Thus such post-announcement insider sales also signal insiders private information about the firm's true value. So, firms where insiders sell more shares post-announcement should not outperform or underperform in the long-run as compared to other repurchase announcing firms. Therefore, I expect post-announcement net insider sales to be either unrelated or negatively related to long-term firm performance.

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[10] Fried (2001) suggests that repurchase announcements can be used as a false signalling device as these are not binding obligations on the part of firm management. Massa et al. (2007) and Chan et al. (2010) provide evidence that managers use repurchase programmes to fool the market.

I test these predictions using a sample of 8,945 open market repurchase programmes announced between 1990 and 2012. I find that the market reacts more positively to repurchase announcements where insiders' net sales are lower (buy more or sell less) in the pre-announcement period. Firms with lower net insider sales earn an average 3-day buy-and-hold abnormal return of 2.4 percent, 0.80 percent greater than firms where insider net sales are higher before the repurchase announcement, with difference highly significant at conventional levels. However, pre-announcement trades affect only short-term announcement returns; I find that the difference in longer-term returns of the two groups is not statistically significant.

In line with the insider signalling argument, regression results suggest that short-term repurchase announcement returns are significantly positively (negatively) related to insider purchases (sales). Similar to earlier studies (such as Ikenberry et al. (1995) and Peyer and Vermaelen (2009)), I find announcement returns are higher for undervalued and smaller firms that suffer from higher information asymmetry and are thus more likely to be mispriced. Similar to the empirical evidence on the value relevance of insider trading (see for example, Lakonishok and Lee (2001), Ofek and Yermack (2000) and Jin (2002)), I find that insider purchases have a stronger positive effect on announcement returns while insider sales are only weakly negatively related. I also find that 3-month pre-announcement insider trading has a stronger effect on announcement returns as compared to insider trades 6-months before the announcement.[11]

Next, I investigate the relationship between post-announcement insider trades and repurchase announcement returns. Consistent with Fried's (2005) theoretical argument that managers may announce repurchase programmes to sell their shares at a higher price, I find that insiders sell more shares in the 3-month window post-announcement than in the pre-announcement 3-month

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[11] Regression coefficients on 3-month insider trade variables (purchases, sales, net sales) are higher than those of 6-month insider trades.

window. However there is no significant difference in insider purchases during the two periods. Similar to Huddart et al. (2007) and Agrawal and Nasser (2012), I find that insiders trade more cautiously in the 6-month (-3, 3) window centred on the repurchase announcement date as compared to the 12-month (-6, 6) window.

My analysis suggests that insiders sell (purchase) more (less) shares when their firm's stock is less likely to be undervalued such as firms with lower book-to-market value ratios, firms with more negative runup returns and firms with higher net insider sales (lower purchases) in the pre-announcement period. In line with Fried (2005), I also document that insiders sell more shares post-announcement, especially when announcement returns are high, allowing them to cash out at higher stock prices. My analysis further indicates that controlling for announcement returns, insiders sell more when a firm is less likely to be under-priced (low book-to-market value) and more likely to be mispriced with potential gains to exploiting insider trades (small firms).

Finally, I explore the relationship between post-announcement insider trades and repurchase announcement returns; and the signalling effect of post-announcement insider trades on the longer-term returns of firms that announce a repurchase programme. I find that insider sales (purchases) are significantly positively (negatively) related to short-term announcement returns suggesting that insiders sell a greater number of shares when repurchase announcement returns are high. This is consistent with Fried (2001; 2005) who posits that insiders announce repurchase programmes to sell their equity at higher post-announcement stock prices. This is the first paper (to the best of my knowledge) that empirically documents that insiders sell more equity post-announcement especially when announcement returns are high. However, I find mixed results for the signalling argument in the case of the association between post-announcement insider sales and the longer-term returns of repurchase announcing firms. Higher post-announcement insider sales signal that insiders either believe their stock to be overvalued or fairly valued but not

significantly undervalued. Consistent with this, regression results of 1-month net insider sales on longer-term returns show that insider sales are not related to first year buy-and-hold abnormal returns (BHAR) and only weakly negatively related to second year BHAR. However, regression results of 3-month net insider sales post-announcement show that this is positively related to first year BHAR but weakly related to second year BHAR of share repurchasing firms.[12]

This chapter of my thesis, in particular, contributes to the growing literature addressing the credibility of the share repurchase programme announcement as a signal of equity undervaluation and also to the corporate payout policy literature, more generally. Vermaelen (1981) and Comment and Jarrell (1991) evaluate the relative market reaction to repurchase tender offers, Dutch auctions and open market share repurchases and find that the latter is considered to be the least effective signalling tool with lowest announcement returns as compared to other methods. Fried (2001; 2005) theoretically and Chan et al. (2010) empirically show that repurchase announcements are used by managers in their self-interest rather than to convey value relevant information to the market. Fenn and Liang (2001) show that managers with a higher number of stock options use repurchase announcements to artificially increase stock prices. I add to the literature by showing that insiders, in fact, take advantage of higher post-announcement stock prices and sell more shares. Post-announcement insider sales also signal insiders' private information to investors regarding firm value.

The paper also adds to literature on insider trading. Seyhun (1998), Lakonishok and Lee (2001) and Agrawal and Nasser (2012) show that insider trading contains value relevant information for market participants. My research also sheds light on the trading behaviour of insiders around buyback announcements and their investment horizon. I contribute to the literature on

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[12] The unexpected positive relationship of 3-month net insider sales with first year BHAR might be due to higher demand for the firm's shares due to its repurchase activity resulting in higher returns for the year.

insider trading by demonstrating that insider trades both before and after the repurchase announcement provide value relevant information to investors in evaluating share buyback signal.

My final chapter in this thesis, chapter 5, summarises my findings and the overall contribution of my study to the share buyback literature. I also suggest future research avenues and opportunities in this area.

Chapter 2

Executive Compensation and Open Market Share Repurchases

2.1 Introduction and motivation

The last couple of decades have witnessed a tremendous surge in the use of share repurchase programmes. The corporate finance literature regards these repurchase announcements as managerial signal of firm undervaluation. Brav et al. (2005) document that stock undervaluation is in fact the most cited reason by managers for their decision to repurchase shares.[13] Vermaelen (1981) and Comment and Jarrell (1991) explain the positive abnormal returns associated with share repurchase announcement as a market response to executive's undervaluation signal in the form of share repurchase announcement. Ikenberry et al. (1995); Ikenberry et al. (2000) and Peyer and Vermaelen (2009) further show that undervalued firms that make a repurchase announcement significantly outperform in the long-run.

However undervaluation is not the sole reason for managements' decision to initiate a repurchase programme. Corporate America is increasingly relying on share repurchases to distribute cash to shareholders.[14] Though distribution of excess cash should increase firm value by reducing agency costs of free cash flows for firms suffering from overinvestment problem, excessive repurchase activity can also result in underinvestment problems for firms with good investment opportunities. In addition, open market repurchase

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[13] *"Time Warner may favor a share repurchase rather than an increase of its dividend because the stock is "a bargain"….."* by Rabil (2009, Feb. 3)
"Charlie [Warren Buffet's partner] and I favour repurchases when two conditions are met; first, a company has ample funds to take care of the operational and liquidity needs of its business; second, its stock is selling at a material discount to the company's intrinsic business value, conservatively calculated." - Rotblut (2012, Feb. 3)
[14] See for example "S&P may hit another record for buybacks this year" by Farrell (Aug. 18, 2015) in The Wall Street Journal.

announcements are simple authorizations and not binding obligations on the firm management and hence do not send a strong signal of equity undervaluation. Vermaelen (1981) compares the relative signalling power of repurchase tender offers and open market share repurchases and finds that the latter is considered to be less effective tool as a signal firm undervaluation.

More recent studies have focused on the credibility of open market repurchase announcement and have challenged the traditional view that repurchase announcements represent managerial signal of stock undervaluation. Fried (2001) theoretically argues that open market repurchase announcements serve managerial interests and presents his alternative hypothesis of "managerial opportunism". He suggests that buybacks positively affect executive wealth as executive compensation is often linked to the firm's earnings per share and stock price performance which are positively affected by share buybacks.[15] Fenn and Liang (2001), Massa et al. (2007), Louis and White (2007) and Chan et al. (2010) provide evidence that repurchase programmes are used opportunistically or at least "cosmetically" by managers to mislead investors. Thus buyback announcements can be value signalling or agency driven. So, how credibly a share buyback announcement signals firm undervaluation represents an empirical question.

In theory, the market should be able to differentiate between value signalling repurchase announcements from "cosmetic" ones. However, since an ex-ante measure of managerial intent does not exist, investors have to rely on noisy proxies to approximate the credibility of a buyback announcement as value signalling. This chapter addresses how investors view an open market share repurchase announcement by drawing upon executive compensation literature. Specifically, I test whether the market distinguishes between the two motives (value signalling vs agency driven) by observing the underlying

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[15] *"Executives are compensated [based] on EPS, the primary reason they do buybacks."* by *Murphy and Kester (2014, Oct. 29) in The Wall Street Journal.*
Earnings per share is positively affected when managers actually repurchase share and stock price increases on average when repurchase programme is announced.

managerial wealth and repurchase incentives. I expect that differences in degree of agency issues among repurchasing firms can explain the variation in stock price reaction to firms' repurchase announcements.

I conjecture that if executive compensation package is structured in a way that reduces agency issues then managers' repurchase announcement should reflect "inside" information on firm value and hence be regarded as a more credible signal of equity undervaluation by the market. In cases where shareholders' and executives' interests diverge, such firm announcements may provide less value relevant information and outside investors may become increasingly suspicious of these. Thus, the market reaction to repurchase announcements will be stronger for firms with better incentive alignment between the executive and shareholders.

Ikenberry et al. (1995) and Peyer and Vermaelen (2009) show that undervalued firms earn higher abnormal returns on repurchase announcement. Thus, I expect a stronger and more positive market reaction to firm's repurchase announcements where agency issues are lower (better incentive alignment) and firm is more likely to be undervalued. Similarly, for firms that suffer from higher degree of information asymmetry, any signal (new information) to market is more important though also more difficult to verify. So, investors' reaction to repurchase announcement signal will be stronger for firms that have higher degree of information asymmetry and where better incentive alignment between the executive and shareholders adds credibility to their buyback signal.

This study, in particular, focuses on the share-based compensation component of the CEO's remuneration package as this is argued to be highly effective in reducing agency issues (e.g., Jensen and Meckling (1976)). To measure managerial wealth incentives and risk preferences, I use delta and vega measures following Core and Guay (2001) and Coles et al. (2006). Delta represents the sensitivity of CEO wealth to share price. Chava and

Purnanandam (2010) argue that in equilibrium an optimal level of delta aligns executive wealth incentives with those of shareholders as managers share gains and losses with shareholders. So, higher delta values should reduce agency costs and any signal by such a manager should be considered as value signalling in relative terms. Percentage of CEO firm equity ownership is also used to capture the immediate effect of repurchase announcement on CEO wealth. Percentage of CEO equity ownership represents the proportional stake of the executive in firm value. A signal from an executive that owns a larger portion of firm value is more likely to be regarded as value signalling by the market.

Vega measures managerial wealth sensitivity to stock return volatility. Managers with higher vega have an incentive to increase firm risk, whereas shareholders are regarded as risk neutral in theory. Although shareholders may not necessarily dislike risk as long as firm value increases, excessive risk can result in lower firm value due to higher discount rate used in evaluating expected cash flows. On the other hand, in theory, managers have nothing to lose, and in fact all to gain, as their stock options become more valuable with increase in stock volatility. So, the market should respond more circumspectly to an announcement made by an executive with higher vega.

Here, endogeneity of compensation schemes can be of some concern. If compensation contracts were perfectly designed then measures of delta and vega might be of little use in measuring the severity of agency problems. However, if this were the case then the coefficient on these variables would have been insignificantly different from zero in empirical tests. However, my empirical results suggest that this is not the case. Literature on executive compensation arrangements also suggests that compensation contracts are less than perfectly designed (see e.g., Morck et al. (1988); Crystal (1991) and

Jensen (1993)).[16] Lastly to alleviate some of the endogeneity concerns I use lagged values of compensation arrangement variables in all of my regression models.

I test the above mentioned hypotheses using a sample of 2,296 unique share repurchase announcements made by Standard and Poor's (S&P) 1500 firms between 1992 and 2008. My results show that a novel relationship exists between executive compensation arrangements and the stock market reaction to share buyback announcements. The market approximates the credibility of a buyback announcement (as value signalling) by observing the underlying managerial wealth and repurchase incentives. In particular, my analysis indicates that executive compensation arrangements can explain both the market reaction to, and actual repurchase decisions of, firms after the repurchase announcement. Mean 3-day return (-1, 1) around the share buyback announcement is 2.14% for firms in the lowest vega quintile (1) compared with only 0.86% for firms in the highest vega quintile (5). Similarly, average annual buy-and-hold abnormal return for firms in quintile 1 is 5.47% as compared with only 2.82% for firms in quintile 5. This shows that the market does respond more circumspectly to buyback announcements where CEO wealth is more sensitive to changes in risk. However, a parallel return pattern is not so obvious in delta sorted quintiles.

Multivariate regression results show that short term announcement returns are significantly negatively (positively) related to sensitivity of CEO wealth to stock return volatility (percentage of CEO equity ownership). In further tests, I show that short term returns are positively related to a compensation dummy variable that represents better incentive alignment and/or lower agency concerns.[17] The relationship between compensation dummy

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[16] Core et al. (2003) provide an excellent review of the executive compensation literature. Jensen (2005) also shows that executives with high wealth sensitivity to their firm's equity may end up destroying the core value of the business in defending overvaluation of its stock.

[17] The compensation dummy represents a combination of three incentive alignment variable, delta, vega and percentage CEO share ownership. Compensation dummy is 1 when delta is high, vega is low and percentage CEO share ownership is high and 0 otherwise.

variable and short term announcement returns is positive and highly significant suggesting that the market reacts more favourably to repurchase announcements where executive wealth incentives are better aligned with those of shareholders. The coefficients on the separate interactions of compensation dummy with proxies of information asymmetry and undervaluation are more positive and highly significant. This indicates that investors react more strongly to buyback announcements from CEOs with better incentive alignment when the firm is more likely to be undervalued or firms suffering from higher information asymmetry.

The literature suggests that the market under reacts to share repurchase announcements (e-g, Ikenberry et al. (1995), Peyer and Vermaelen (2009)). Also share repurchase announcements represent managerial intention to repurchases shares rather than a promise. Thus, I also test the role of CEO compensation arrangements in explaining firm's longer-term returns and actual share repurchases post-announcement. My analysis suggests that higher CEO wealth sensitivity to stock price (volatility) is positively (negatively) related to longer-term buy-and-hold returns post-announcement. The finding indicates that the market under reacts to the news and firms with better incentive alignment between the executive and shareholders earn higher returns over the next 3-year period post-announcement.

However, incentive alignment variables have opposite signs when regressed against actual repurchases as a dependant variable instead of returns. Higher post-announcement returns make actual share repurchases more costly and thus can justify the positive (negative) relationship between repurchase rates and CEO wealth sensitivity to volatility (stock price). Also, firms that initiate repurchase programmes for undervaluation reasons will have a lower incentive to repurchase shares if the post-announcement returns are high and mispricing is eliminated. Executives with higher wealth sensitivity to volatility are also more likely to repurchase higher number of shares due to the fact that actual repurchases increase firm risk.

As a further test, I explore the relationship between executive compensation and firm's investments and operating performance for my sample firms. Coles et al. (2006) show that managerial compensation arrangements affect firm's investment policy. Higher CEO wealth sensitivity to stock return volatility encourages managers to cut capital expenditure and invest in more risky projects. Such firms tend to repurchase more shares at the expense of capital expenditure and have lower operating returns. Firms with higher CEO share ownership tend to invest more in capital expenditure and earn higher operating returns post-announcement.

My results demonstrate that higher sensitivity of CEO wealth to stock volatility is negatively related to capital expenditure and operating performance in the three year period post-announcement. However, percentage of CEO share ownership is positively related to investments and operating returns. These findings are consistent with prior literature on executive compensation and firm policy and provide further evidence that why firms with higher CEO wealth sensitivity to stock price (volatility) should earn higher (lower) abnormal returns and repurchase fewer (more) shares post-announcement.

The paper contributes to the growing literature on the credibility of open market share repurchase announcement as a signal of firm undervaluation. Chan et al. (2010) use earnings quality as a measure of managerial propensity to mislead investors using share repurchase announcements. Chang et al. (2010) and Bonaimé (2012) show that investors draw upon their prior experience of firm repurchases while reacting to their subsequent repurchase announcements. Chen and Wang (2012) show that the market reacts more sceptically to repurchase announcements of financially constraint firms as they are more likely to under invest and become less competitive in future. Fried (2005) even argues that managers, in fact, opportunistically employ share repurchase programmes for their own good rather than signalling firm undervaluation.

This research makes an original contribution to the literature on buybacks and executive compensation arrangements. The paper establishes a link between executive compensation arrangements and the perceived credibility of share buyback announcements as a signal of equity undervaluation. The results presented in the paper are robust even after controlling for a host of factors that may affect repurchase announcement returns and completion rates.

In conclusion, the analysis in this study suggests that not all buyback announcements are regarded "as equal". Executive compensation design plays an important role in determining how the market perceives and reacts to a share buyback announcement. Executive compensation design is value relevant information and can explain short term and longer-term returns as well as actual share repurchases after the repurchase announcement. Executives make investment and operating choices based on their compensation/incentives which affect firm risk and performance. The market appears to understand underlying managerial repurchase incentives and acts accordingly.

The remainder of the paper is organised as follows. Section 2.2 provides a brief review of relevant literature and lists hypotheses. In section 2.3, I discuss data sources, research methodology and sample selection. The results are discussed in section 2.4 and finally I conclude in section 2.5.

2.2 Background and hypotheses

The last few decades have witnessed a tremendous increase in stock repurchase activity. Skinner (2008) shows that corporations now distribute a greater portion of their earnings by repurchasing their firms' stock and only dividend paying firms are largely extinct. In 2013, the S&P 500 index companies alone have spent around $500 billion on share repurchases (Thurm (2013)). Given the growth rate and amount of money involved in share repurchases, it remains a hot topic in the area of corporate finance.

The academic literature as well as managers in their repurchase announcements provides several reasons as to why firms engage in repurchase activity. One of the earliest explanations is a taxation motive. Stock buybacks serve as a tax efficient way of returning cash to shareholders compared to dividends (see e.g., John and Williams (1985) and Allen et al. (2000)). Repurchases are treated as capital gains which are taxed at a lower rate than dividend income (see e.g., Litzenberger and Ramaswamy (1979) and Lie and Lie (1999) for empirical evidence). Several papers also document the rise in use of buyback programmes as a substitute for dividends (see e.g., Fama and French (2001); DeAngelo et al. (2004) and Fatemi and Bildik (2012)). Stock buybacks are also used to make capital structure adjustments (Dittmar (2000) and Dixon et al. (2008)), to distribute excess cash to shareholders especially in firms with low investment opportunities (Oswald and Young (2008)), to manage earnings (Gong et al. (2008) and Hribar et al. (2006)), to fund outstanding option awards (Kahle (2002)) and as a takeover deterrent (Bagnoli et al. (1989); Billett and Xue (2007) and Lin et al. (2012)).

Finance academics have mainly focused on signalling theory to explain abnormal returns experienced by firms that announce a share repurchase programme. The signalling hypothesis regards stock buyback announcement as a managerial signal of stock undervaluation. I discuss this explanation in some detail below.

2.2.1   Buyback announcements as a market signal

Information asymmetry in the market place can lead stock prices to deviate from their fundamental value. Managers are particularly sensitive to stock undervaluation and often take action to correct it by signalling their private information to the market. Grullon and Ikenberry (2000) point out that a stock can be undervalued either due to market's failure to correctly process available information or its inability to take into account firm's growth prospects. Grullon and Michaely (2004) show that undervaluation can also result from the

market's failure to adjust for expected risk reduction after repurchase programme announcement.

Ikenberry et al. (1995) conduct the most important empirical study in this regard. They use share repurchase announcement data from the Wall Street Journal between 1980 and 1990 and show that repurchase announcing firms, on average, earn an abnormal return of more than 12% over the next 4 years. They show that these results are driven by undervalued firms as value firms (high B/M) earn an abnormal return of over 45% in the 4-year period post-repurchase announcement as compared to growth firms (low B/M) that do not show any abnormal performance.

To render further support for their findings, Ikenberry et al. (2000) conduct a similar study using 1,060 buyback announcements from the Canadian market and find evidence similar to their earlier study. Undervalued (value) firms significantly outperform growth firms, though growth firms also earn abnormal returns post-announcement in the Canadian market. Chan et al. (2004) also find evidence consistent with this mispricing (undervaluation) hypothesis in the US stock market.

Managers acting in the interest of their long-term shareholders try to correct under-pricing by sending "credible" signals to the market. There is a well-established costly signalling literature in finance beginning with Spence (1973). Signalling costs are important as they provide credibility to what managers say. In the absence of signalling costs, all managers, not just the ones with good news, will have an incentive to mimic any signal issued by good firms. It results in a "pooling equilibrium" where the market fails to distinguish between good and bad firms and assigns an average value to all firms.

Share repurchase announcements, however, represent firm's authorization to repurchase shares (costless) and not the actual transaction

(costly).[18] In addition, such authorizations are not firm commitments and a large number of firms do not complete their announced repurchase programmes (see e.g., Stephens and Weisbach (1998) and Bhattacharya and Dittmar (2008)).[19] Massa et al. (2007) and Chan et al. (2010) raise concerns that lack of firm commitment and the inherent flexibility of stock buyback programmes can induce other managers to engage in mimicking behaviour. In addition, Chan et al. (2010) argue that minimal regulatory and disclosure requirements around actual repurchase transactions and absence of any significant reputational penalty for executives who fail to honour their buyback commitments also facilitates such mimicking behaviour.

2.2.2   Executive compensation and buyback announcements

In addition to the financial flexibility offered by share repurchase programmes, managers' personal wealth incentives can also induce them to announce such repurchase programmes. Share repurchases benefit managers both in terms of their personal gains as well as in terms of their performance evaluation. At a firm level, share repurchases help to stabilise price and improve liquidity in the short run (Cook et al. (2004)) and paint a fairer picture of managerial performance by improving earnings per share when actual repurchases take place.[20]

   "In a world in which corporate performance and executive compensation are linked to earnings per share (EPS) and the firm's share

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[18] The evidence on share buyback announcement signalling costs are mixed. Bonaimé, A. A. (2012) finds that firms repurchase reputation has an impact on the market reaction to their subsequent repurchase announcements. However, Chan et al. (2010) argue that there are no significant reputational penalties for managers who fail to honour their repurchase commitments.

[19] *"When it comes to stock-buyback, public traded companies show a lot of bark than bite. It's oh-so-easy for a company to announce a buyback program. And it's gratifying, no doubt, for a company to watch its shares jump as a result of announcements. But the open secret on Wall Street is that few companies actually buy anywhere near the amount of stock that they indicate they might." – The Wall Street Journal (Mar. 27, 1995)*

[20] In an article in The Wall Street Journal Murphy and Kester (2014, Oct. 29) claim that the primary reason managers repurchase shares is to improve firm's EPS number – a performance evaluation measure to which executive compensation is often tied.

price, share buybacks are an easy way out." – Denning (2014, Sep. 19) in Forbes

On a personal level, managers benefit directly by observing an increase in the value of their options and stocks, given the fact that the market reacts positively to these announcements.

"In general, buyback programs are more attractive to management than dividends, because their stock options do not get the benefit of dividends, which lower the stock price by the amount of the dividend when they are paid."- Hutchinson (2012, Sep. 21) in Money Morning

Fried (2005) even terms open market repurchase announcements as a "false signalling device". He argues that such announcements are mainly driven by managerial incentives. A considerable body of literature documents the fact that managers engage in informed trading. For example, Gosnell et al. (1992) find that corporate insiders get rid of most of their stake in the company in the five months preceding a bankruptcy announcement. Kim and Varaiya (2003) find that managers sell more heavily in quarters where their firms are repurchasing shares. In a recent paper, Edmans et al. (2014) show that managers strategically time the disclosure of discretionary news to coincide with months in which their equity vests. They show that managers disclose significantly greater number of positive news in months in which their equity vests, thus allowing them to sell their stock and exercise their options at a higher price.

Open market share repurchase announcement, thus, represents a special case that simultaneously exposes the market with agency and signalling theory and it has to weigh the two and act accordingly.[21] Repurchase programmes can

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[21] It is important to note that agency theory here refers to the traditional agency conflict between the shareholders and managers and not the agency cost of free cash flows. The former represents the possibility that repurchase programmes can be used opportunistically against the interests of shareholders. In the later case the repurchase announcement is, in fact, viewed as good news by shareholders as it reduces the agency costs of free cash flows by limiting the amount of cash available to managers for empire building.

signal firm undervaluation or these can be exploited opportunistically or at least cosmetically by firm management. Given the flexibility, lack of firm commitment and managerial incentives attached to open market repurchase programmes, such announcements lack characteristics of a strong market signal. In an efficient market one would expect market participants to be able to differentiate value signalling announcements from agency driven or cosmetic ones. However, managerial intentions of repurchase announcement are unobservable. Chan et al. (2010) acknowledge the fact that no true, ex-ante measure of managerial intent exists. Any measure used to proxy this will at best be indirect and noisy.

I use executive compensation design to proxy the "perceived" strength of open market share repurchase announcements by the market as a signal of equity undervaluation, which in turn determines the market reaction to the news. Executive compensation arrangements are designed to reduce agency costs and to align the interests of the executive with those of shareholders. A perfect compensation package should, in theory, eliminate all agency costs. However, unfortunately, such a compensation package does not exist. So, in relative terms, a better compensation package is one that reduces agency costs and at the same time sufficiently compensates managers to attract and retain better managerial talent (Coles et al. (2006)).

If executive compensation packages are structured in a way that reduces agency problems then managerial announcements should be regarded as more credible and lead to reduction in information asymmetry. On the other hand in cases where shareholders and executives interests diverge, one should expect outside investors to view their buyback signal more sceptically. I particularly focus on share-based component of executive compensation package as it is argued to be highly effective in resolving agency issues between the executive and shareholders as compared to fixed cash compensation (Jensen and Meckling (1976)).

I follow prior literature on share-based executive compensation and measure managerial wealth alignment and risk preferences by calculating delta and vega for the executive's portfolio of stocks and options held in the firm (see e.g., Core and Guay (2001), Coles et al. (2006) and Low (2009)). Delta measures the change in managerial wealth for one percentage point change in share price. So delta measures the change in executive wealth as the stock price changes. Jensen and Murphy (1990) argue that higher pay performance sensitivity is important to incentivise executives to act in the interests of shareholders. More recent studies also suggest that CEOs may indulge in unethical behaviours, such as earning management, income smoothing and gaming the market, when their compensation is more closely tied to firms' operating and stock performance (see Beneish and Vargus (2002); Bergstresser and Philippon (2006) and Bergstresser et al. (2006)). Jensen – who initially proposed pay for performance compensation in 1990s – also acknowledges the fact in his (2005) study that a higher portion of stock based compensation in an overvalued market is akin to adding fuel to fire.

In an agency context however as initially proposed a compensation contract that closely ties executive compensation with firm performance reduces agency conflict between the executive and shareholders (Jensen and Murphy (1990)). Lower agency concerns through better incentive alignment encourage managers to take actions/decisions that increase firm value. Thus, a signal is more likely to be perceived as credible when agency issues between the executive and shareholders are lower. Chava and Purnanandam (2010) argue that in equilibrium an optimally chosen delta level aligns executives' incentives with those of shareholders. So, a higher delta value should reduce agency costs and any signal from such a manager should be considered as a stronger (more credible) signal in relative terms. Formally, I formulate the following hypothesis:

Hypothesis 1: There is a positive relationship between CEO wealth sensitivity to stock price (delta) and the market reaction to share buyback announcement.

The above relationship is particularly important for the longer-term returns as restricted stock grants and stock options normally have a vesting period. So, delta associated with stock grants and options aligns incentives over medium to long-term period. Similarly, a higher percentage of CEO firm ownership also reduces agency issues. However, unlike delta, CEO share holdings capture immediate effect on CEO wealth. So,

Hypothesis 2: There is a positive relationship between CEO share ownership and the market reaction to a buyback announcement.

Vega estimates the dollar change in managerial wealth for one percentage point change in stock return volatility. Amihud and Lev (1981) and Smith and Stulz (1985) argue that managers hold an undiversified portfolio as compared to diversified shareholders due to their heavy investment in firm-specific wealth. Managers' concerns over job security and under diversification may lead them to forgo risk increasing but positive net present value (NPV) projects against the interests of shareholders – an effect that is similar to the underinvestment problem explained by Myers (1977). Coles et al. (2006) show that higher sensitivity of executives' pay to stock return volatility (vega) is, in fact, related with riskier policy choices, such as investment in more risky projects, concentrated business lines and higher debt to equity ratios. Although a higher vega can help reduce risk-related agency issues, it can also increase other types of agency issues. Ju et al. (2014) study the effect of stock options in executive compensation and find that depending upon executive risk aversion and investment technology, a call option contract can induce either too little or too much risk taking. Since stock options are like call options on the firm's stock and have a convex payoff shape, managers are protected on the downside as they cannot lose more than the value of their share options. This downward protection encourages them to take on risky projects and increase overall firm risk. Thus, managers with higher vega definitely have an incentive to increase firm risk.

Shareholders on the other hand are considered risk neutral in the traditional finance literature. They may not necessarily dislike risk as long as firm value increases. However, if firm value declines due to excessive risk, shareholders will bear the cost (reduction in stock price due to higher discount rates associated with higher risk in evaluating future cash flows), while managers are still better off as the value of their stock options increases with risk. On this basis, the market should respond more circumspectly to an announcement made by an executive with high vega. Formally, I set up hypothesis 3;

Hypothesis 3: There is a negative relationship between CEO wealth sensitivity to stock return volatility (vega), and the market reaction to buyback announcement.

To further test the role of executive compensation arrangements as a proxy for the perceived credibility of repurchase announcement as a signal of firm undervaluation, I define a compensation dummy variable that represents a combination of three incentive alignment variables i.e., delta, vega and percentage CEO share ownership. It also eliminates concerns of any outliers in the data. Compensation dummy variable takes value of 1 when delta is high, vega is low and percentage CEO share ownership is high and 0 otherwise. The value of 1 represents better incentive alignment between the executive and shareholders. Therefore, I expect a positive relationship between this dummy variable and share repurchase announcement returns.

Hypothesis 4a: There is positive relationship between executive compensation dummy variable and share buyback announcement returns.

The above setting also allows me to further test the role of CEO compensation arrangements on the market reaction to repurchase announcement for different types of firms. Agency issues are of more serious concern to investors when a firm suffers from a higher degree of information asymmetry. Any new information in such a case reduces information

asymmetry between investors and firm management. Thus the role of CEO compensation design will be more pronounced for firms that suffer from higher information asymmetry as better incentive alignment also adds credibility to the new information as value signaling. So, firms with better CEO compensation design (lowers agency concerns) and higher information asymmetry should experience stronger market reaction to the share repurchase announcement.

Hypothesis 4b: The market reaction to repurchase announcements is stronger for firms that suffer from higher information asymmetry and have lower agency concerns.

Similarly, firms that are more likely to be undervalued and where CEO compensation arrangements also alleviate agency concerns, the market reaction will be stronger as investors may view such announcements as a more credible signal of stock undervaluation. Thus, firms that are both undervalued and have better compensation arrangements that reduce agency concerns should experience a stronger market reaction to the repurchase announcement.

Hypothesis 4c: The market reaction to repurchase announcements is stronger for firms that are undervalued and have lower agency concerns.

2.2.3   Longer-term returns and actual repurchases

The presence of longer term abnormal returns after share repurchase announcement points toward market under reaction to the news. An obvious explanation of any potential under reaction might be due the credibility issues associated with share buyback announcements. Ikenberry and Vermaelen (1996) borrow from the real options literature and regard the share buyback announcement as an option to exchange the market value of the firm for its true value. Through share repurchase announcements the company effectively creates an option that may be exercised in the future.

Peyer and Vermaelen (2009) using recent data confirm their earlier finding of market under reaction to repurchase announcements, and claim that unlike many other market anomalies that disappeared over time, this one persists and repurchase announcing firms earn superior longer-term returns. They explain these abnormal returns post-repurchase announcement as a market correction to a prior over-reaction to bad news. I argue that CEOs with better incentive alignment with those of shareholder make investment and operating choices that result in better performance of these firms. Coles et al. (2006) empirically demonstrate that executive compensation arrangements influence managers' operating and investment choices. Since the firm's operating performance is linked to its stock price performance, repurchase announcing firms with better incentive alignment tend to outperform in the long-run and earn higher stock returns on average. Thus CEO compensation arrangements can also explain the longer-term returns of firms that announce a share repurchase programme. To test this explanation I establish hypothesis 5 as follows

Hypothesis 5: There is a positive relationship between CEO wealth sensitivity to price (Delta and CEO share ownership) and longer-term returns of repurchase announcing firms and, there is a negative relationship between CEO wealth sensitivity to volatility (Vega) and longer-term returns of repurchase announcing firms.

As repurchase authorizations are not firm commitments, many firms fail to complete their announced repurchase programmes. Bhattacharya and Dittmar (2008) analyse repurchase announcements between 1985 and 1995 and estimated that nearly 46% of their sample firms do not repurchase any shares post-announcement. See also Stephens and Weisbach (1998). However, it is important to understand that noncompliance with the announced repurchase programme does not necessarily represent opportunistic management behavior. There is an endogeneity issue with management's decision to announce the repurchase programme and actual share repurchases. For example, repurchase

programmes initiated due to stock undervaluation should not be completed if the market corrects for any mispricing post-repurchase programme announcement. In this case, one should expect a negative relationship between post-announcement returns and actual repurchase rates. Therefore, I expect opposite signs on CEO wealth sensitivity measures in relation to actual share repurchases as compared to their sign with returns. Hypothesis 6 tests this idea formally;

Hypothesis 6: There is a positive (negative) relationship between vega (delta and percentage of CEO share ownership) and actual share repurchases.

Lastly, I explore the relationship between executive compensation arrangements and firm's investment decisions and operating performance. The tests will provide further evidence in relation to above mentioned hypotheses. Here, I draw upon executive compensation and firm policy literature to formulate my hypothesis. For example, Coles et al. (2006) show that executives with higher wealth sensitivity to changes in risk invest more in risky projects and cut capital expenditure. Therefore, I would expect a negative relationship between vega and capital expenditure, as such executives are more likely to substitute investment in capital expenditure with investment in repurchasing shares and other risky investments such as research and development (R&D). The expectation of negative relationship between operating returns and vega is consistent with expectation of lower market returns for such firms. Contrary to this, higher CEO wealth sensitivity to changes in stock price is expected to be positively related to capital expenditure and average operating returns as such managers are more likely to focus on long-term firm value maximization given their wealth incentives.

Hypothesis 7: There is a negative (positive) relationship between CEO wealth sensitivity to volatility (price) and firm's capital expenditure (operating performance).

2.3   Data and methodology

Share repurchase announcement data are from Thomson Financial Security Data Company (SDC) US Mergers and Acquisitions database. The sample data includes all open market share repurchase programmes announced between 1992 and 2008. I start with year 1992 as data on executive compensation is only available from the year 1992. Executive compensation arrangements data are taken from the Compustat's Execucomp database. Other financial statements data are taken from the annual and quarterly COMPUSTAT files. Stock return data are from the CRSP. Since I calculate longer-term returns for a period of three to four years post repurchase announcement, CRSP data covers period between 1991 and 2011.

In order to be included in the final dataset, I require event firms to have executive compensation data available in the Execucomp database. Since the Execucomp database covers Standard & Poor's 1500 (S&P 500, S&P Midcap 400 and S&P Smallcap 600) firms, so my sample data is reduced to repurchase programmes announced by S&P 1500 firms during the sample period. I further require these firms to be listed in the CRSP and the COMPUSTAT files in order to ensure availability of returns and accounting data. Following Chen and Wang (2012), I delete all observations with price lower than three dollars at the time of announcement to avoid skewing longer-term returns. I also delete observations that appear more than once within a two year period. An announcement may appear more than once in the same year because of the way SDC collects and reports data. SDC may report an announcement more than once if it appears in different news source on different dates (Banyi et al. (2008)).

Table 2.1 presents details of my data sampling procedure. SDC search provides me with an initial total of 12,795 share repurchase announcements over the sample period. I keep the first observation if a firm appears more than once during the next two year period. This also deletes duplicate

announcements that appear in the SDC data. Then I delete repurchase announcements made by firms trading at price below \$3 at the time of repurchase announcement, leaving only 7,879 repurchase announcements in the dataset. CRSP and COMPUSTAT data availability criteria further reduces the number of observations to 6,034. Requiring repurchasing firms to be covered by Execucomp reduces the number of observations to 2,395 of which 2,296 are open market share repurchase announcements. This large reduction in repurchase announcement is due to the fact that the Execucomp covers only S&P 1,500 firms.

Short term announcement returns are calculated using event study methodology. I calculate 3-day (-1, 1) Cumulative Abnormal Return (CAR) around the share repurchase announcement (event) date (day 0). Abnormal returns are excess returns due to the announcement over unconditional (without announcement) expected returns

$$e_{it} = R_{it} - R_{mt} \tag{1.1}$$

Where e_{it} is the abnormal return on security i at time t. R_{it} is the conditional return and R_{mt} is the expected return on the market portfolio. Both equal weighted and value weighted market portfolio are used to calculate abnormal returns. The CAR approach accumulates daily abnormal return (AR) over a time horizon of t_1 and t_2 (estimation window).

$$CAR(t_1, t_2) = \sum_{t=t_1}^{t_2} e_{it} \tag{1.2}$$

and the mean CAR is calculated as,

$$\frac{1}{n} \sum_{i=1}^{n} CAR(t_1, t_2) \tag{1.3}$$

where n is the number of firms in the sample.

Methodology becomes more crucial for longer-term performance measurement because of issues addressed by Franks et al. (1991). They show that the use of different benchmarks leads to different conclusions. The results become highly sensitive to model choice and benchmark selection. Following Ikenberry et al. (1995), the Buy-and-Hold Abnormal Return (BHAR) approach is used for longer-term performance analysis. Taffler et al. (2004) while discussing the pros and cons of BHAR approach favor it as it captures actual investor experience. The BHAR approach is simple and intuitive. It simply compares the multi-year returns from a buy-and-hold strategy of event firms against that of the market portfolio. Thus the abnormal return of stock repurchase firms is simply the difference between their return and the return on benchmark portfolio.

$$BHAR_i(t,T) = \prod_{t=1 \; toT} \left(1 + R_{i,t}\right) - \prod_{t=1 \; toT} \left(1 + R_{B,t}\right) \qquad (1.4)$$

The returns are calculated for time T for security i. R_B is the return on the benchmark. Just as in short term return calculations, I use both equal weighted and value weighted market portfolios as benchmarks. Average buy and hold abnormal returns for the event firms and the market portfolio are calculated using monthly returns data. BHAR is calculated over a period of three years post announcement (i-e. from the month of the announcement to 36th month after the announcement or up to the end of the period for which data is available).[22] Average annual abnormal return is the difference between the average annual buy-and-hold return of the event firms and that of the benchmark portfolio.

2.3.1 Measuring managerial incentives

Managerial incentives are measured by mainly focussing on the stock-based part of executive compensation package rather than fixed cash compensation as

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[22] If the firm is delisted during the BHAR calculation period, I adjust for delisting returns.

this explains the changes in managerial wealth in relation to stock price returns and volatility. In line with extant literature, I use delta and vega as measures of executive's wealth sensitivity to changes in stock price and risk respectively. The variables are derived from the executive's portfolio of stock based compensation. Following Core and Guay (2002) and Coles et al. (2006), delta is defined as the change in dollar value of executive's wealth for a one percentage point change in stock price.[23] Similarly, vega is defined as the change in dollar value of executive's wealth for a one percentage point change in annualized stock return volatility. In fact delta and vega are the first derivatives of Merton's modified version of Black and Scholes (1973) option valuation model with respect to price and volatility respectively. The details of the estimation procedure are presented in appendix I. CEO ownership is simply the percentage of firm shares owned by the CEO.

For further tests of my hypotheses, I define a compensation dummy variable that proxy's the "perceived" credibility of open market share repurchase announcement as a signal of undervaluation. Compensation dummy variable combines my three variables of interest – delta, vega and percentage of CEO firm ownership – into one variable. I define compensation dummy equal to 1 when delta is high, vega is low and CEO firm ownership is high. More specifically, compensation dummy assumes value of 1 when firm's delta is in the highest three delta quintiles, vega is in the lowest three vega quintiles and percentage CEO firm ownership is above the median value, else compensation dummy assumes value of 0. Thus, it represents a combination of these three variables based on CEO compensation arrangements and proxy incentive alignment between the executive and shareholders.

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[23] I thank the authors for providing detailed description of their methodology and data. http://www.lebow.drexel.edu/academics/disciplines/finance/faculty/naveendaniel.

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2.3.2   Variables definitions

In multivariate analysis, I use the following general equation to estimate the impact of delta, vega and CEO ownership on returns of firms that announce a share buyback programme.

$$
\begin{aligned}
R_{i,t} = \propto\ & + \beta_1\left(delta_{i,t-1}\right) + \beta_2\left(vega_{i,t-1}\right) \\
& + \beta_1\left(CEO\ ownership_{i,t-1}\right) \\
& + \sum_{i=3}^{n} \beta_i\left(control\ variables_{i,t-1}\right) + \epsilon_i
\end{aligned}
\tag{1.5}
$$

where R_{it} is the announcement return (short term or longer term) during time t and delta, vega and CEO ownership are as defined above. Based on prior literature, I control for other variables that might affect dependant variables. Chen and Wang (2012) show that financially constrained firms experience lower share repurchase announcement returns on average as compared to unconstrained firms. Financial constraints are measured by Kaplan and Zingales (1997) (KZ) index following Chen and Wang (2012) who calculate it as follows;

$$
\begin{aligned}
KZ =\ & -1.002\ (CF_t/TA_{t-1}) - 39.368(DIV_t/TA_{t-1}) \\
& - 1.315(CA_t/TA_{t-1}) + 3.139(LEV_t) \\
& + 0.283(Q_t)
\end{aligned}
\tag{1.6}
$$

where CF_t is the cash flow for the year t, DIV_t and CA_t represent the dividend and current assets of the company for the year t. All these variables are scaled by lagged total assets of the firm, i.e. total assets of the firm in year t-1. LEV_t is the ratio of total debt and book value of assets in the year t and Q_t is the ratio of market-to-book (M/B) value of firm's assets in year t.

Gong et al. (2008), Peyer and Vermaelen (2009), Chan et al. (2010), and Chen and Wang (2012) suggest a number of other control variables in their multivariate regression models. Following prior literature, in equation 5, I control for a number of variables that can affect announcement returns and

actual repurchases of firms that announce a repurchase programme. Firm size is the market value of the firm at the beginning of the fiscal year prior to the announcement. Book-to-market (B/M) is the ratio of book value of firm's assets to its market value. Chan et al. (2010) use quality of accruals as a proxy of managerial intent and show that discretionary accruals (DA) play an important role in explaining announcement returns of repurchase announcing firms. Discretionary accruals also serves as a control for the opportunistic use of repurchase announcements where CEO total compensation is highly sensitive to stock performance. I estimate earnings quality using Sloan (1996) model, and decompose it into discretionary and non-discretionary accrual using Jones (1991) model. The details of the estimation procedure are explained in appendix II.

In addition, I also control for firm's cash flows, 30-days buy-and-hold return prior to the announcement and percentage of outstanding shares that the firm intends to buyback (percent sought). Estimating firm's actual repurchase rate requires an accurate measure of actual repurchase activity. However, Stephens and Weisbach (1998) highlight problems in estimating actual share repurchases as these can neither be observed at the time of announcement nor can be estimated with accuracy afterwards. An SEC rule change in December 2003 now requires firms to report the number of shares repurchased in each quarter.[24]

Banyi et al. (2008) show that although no proxy of actual repurchases is without error, however, they find Compustat's data items purchase of common and preferred stock minus any decrease in redeemable preferred stock to be least problematic, especially for firms with high levels of equity offerings or option exercises. To calculate the number of shares repurchased, I divide this

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[24] On Dec. 17, 2003, the Securities and Exchange Commission (SEC) began requiring all repurchasing firms to report the total number of shares repurchased, the average price paid per share, the number of shares that were purchased as part of a publicly announced repurchase plan, and the maximum number (or approximate dollar value) of shares remaining under other plans. This regulation applies to all quarterly and annual filings for periods ending on or after Mar. 15, 2004.

number by the quarterly closing price of the firm. This yields the number of shares repurchased which are then scaled to by the total number of shares outstanding to estimate the percentage of shares repurchased. These quarterly number are summed over a period of one year (4 quarters) following Chan et al. (2010). Finally, to determine the number of shares actually repurchased in relation to the announced repurchase programme, the above number is divided by the intended repurchase percentage of the firm at the time of repurchase announcement.

Firm investments are measured by its capital expenditures scaled by total firm assets. I follow prior literature and measure firm operating performance by return on assets (ROA) which is defined as the ratio of earnings before interest, tax, depreciation and amortization (EBITDA) to total assets. I define capital expenditures as the ratio of firm investment in capital expenditures (CAPEX) to its total firm assets (TA). I use 3-year average of investments and ROA post-announcement in my regression models.

2.4 Results

This section presents descriptive statistics of my sample data followed by univariate and multivariate analysis.

2.4.1 Descriptive statistics

Table 2.2 presents the frequency distribution of open market share repurchase announcements by fiscal year along with average size, book-to-market ratio, and their intended repurchase percentage. My sample data consists of 2,296 unique repurchase announcements. The highest number of buyback announcements is made in the year 2006 representing 11.5 percent of the sample. On average, sample firms intend to repurchase around 8.26 percent of their outstanding shares. The average book-to-market ratio for the whole sample is 41.1% and the average size of repurchasing firms as measured by their market value is around $8,500 million. Descriptive statistics presented in table 2.2 are in line with those reported in earlier studies.

Table 2.3 presents summary statistics of announcement returns, CEO compensation variables and other firm characteristics. Mean 3-day return (-1, 1) around the repurchase announcement is 1.36% using either value weighted or equal weighted market return as the benchmark. Repurchase announcing firms earn an average buy-and-hold abnormal return of 12.03% in the three years period following the repurchase announcement. In line with findings reported in earlier studies, my descriptive return statistics show that repurchasing firms earn significant abnormal returns after the repurchase programme announcement, signalling market under reaction to the news (Ikenberry et al. (1995), Peyer and Vermaelen (2009)).

The median delta and vega values (in thousands) of repurchase announcing firms are $304.42 and $52.32 respectively. Minimum values are zero as managers cannot lose more than the value of their share options and the lower bound on options is always zero. Figure 2.1 and 2.2 show distribution of mean and median values for delta and vega respectively by year for sample firms.

The mean and median percentage of CEO firm ownership is 2.51 and 0.32 respectively. Event firms lose around 5% of their value in the 30-day period prior to the repurchase announcement. Average cash balance and cash flow of these firms as a fraction of total assets are 0.12 and 0.13 respectively. Event firms each year invest 5% of total assets value in capital expenditures, on average, and earn average annual return of 15% on firm assets in the 3-year period after the repurchase announcement.

2.4.2 Univariate results

Table 2.4 shows the correlation matrix of abnormal returns with my main explanatory variables. Vega is significantly negatively related to short-term announcement returns. This shows that the market reacts less favorably to firm repurchase announcements where the executive has a higher incentive to increase firm risk. The longer-term abnormal returns are also negatively related

to vega with correlation coefficient significant at the 10% level. In contrast to vega, longer-term returns are significantly positively related to delta. This suggests that the higher the CEO wealth sensitivity to stock price the higher the abnormal returns following share repurchase announcement. However, the relationship between delta and short term announcement returns is not significant at conventional significance levels.

CEO ownership percentage represents the direct claim of the CEO on firm's assets. Higher CEO ownership should lower agency costs and is a more direct measure of managerial short-term incentive alignment than the indirect stock-based wealth alignment measure represented by delta, which better aligns incentives over the medium to the long term period. In fact table 2.4 shows that correlation for both initial and longer-term returns is significant and positively related to the percentage of firm equity owned by the executive.

Cumulative buy-and-hold return for 30 days prior to the announcement to 2 days before the announcement (-30,-2) is also significantly negatively related to both short term and longer-term abnormal returns of firms that announced a share repurchase programme. This finding is also consistent with prior research. The higher the negative returns observed by the firm prior to the announcement, the greater will be the potential undervaluation, and thus the stronger will be the market reaction to the buyback announcement.

Table 2.5 present univariate analysis of mean returns with respect to CEO wealth sensitivity measures (delta and vega). For each year of data, I sort all firms in Execucomp into quintiles based on delta and vega values respectively. Quintile 1 contains firms with lowest delta and vega values, and quintile 5 has firms with highest delta and vega values. I then assign my sample firms to these quintiles based on their delta and vega values prior to the repurchase announcement.

Panel A of Table 2.5 shows mean 3-day (-1, 1) announcement return for vega sorted quintile firms along with other descriptive statistics. Broadly

speaking, there appears a downward trend in mean announcement returns from low to high vega firms. Firms in the lowest vega quintile (quintile 1) earn an average abnormal return of 2.14% whereas firms in the highest vega quintile (quintile 5) earn an abnormal return of only 0.86%. This is in line with hypothesis 3 that there is a negative relationship between vega and initial share repurchase announcement returns. Firms with higher vega earn a lower return on average as compared to firms with lower vega. Although not reported, mean difference in returns of quintile 1 and quintile 5 firms is statistically significant. Panel B of table 2.5 shows mean CAR for delta sorted quintile firms. Mean abnormal return for each quintile is statistically different from zero, however, there is no clear trend as was the case with vega sorted quintile returns.

Panels C and D of the table show mean annual buy-and-hold abnormal return (BHAAR) for vega- and delta-sorted quintile firms respectively. BHAAR is the 3-year (36-month) buy-and-hold abnormal return post-announcement starting from the announcement month divided by 3. Here again higher vega firms earn lower returns as compared to firms with lower vega values. Mean BHAAR for vega sorted quintile 1 is 5.47% compared with mean return of 2.82% for quintile 5 firms. Delta sorted quintiles in panel D show that mean BHAAR of quintile 1 is 3.4% and is significant only at the 10% significance level, as compared to mean return of 5.45% for quintile 5 firms which is highly significant at the 1% significance level.

2.4.3   Multivariate results

Tables 2.6 and 2.7 present regression results of short-term and longer-term repurchase announcement returns on executive wealth sensitivity measures respectively. Table 2.6 regresses short term (-1, 1) announcement returns on CEO wealth sensitivity measures (delta and vega). Following Coles et al. (2006), I regress both delta and vega together to isolate the effect of each of these incentive measures and also to control for their effect on each other as these variables tend to vary substantially across firms. I use Petersen (2009)

two-way clustering for robust standard errors. I cluster on year and industry to control for their effects on regression parameter estimates and standard errors.

The relationship between my dependent variables (returns and actual repurchases) and independent variables (delta, vega and CEO ownership) might suffer from potential endogeneity. In order to alleviate some of the endogeneity related concerns, I use lagged values of independent variables in all of my regression model specifications. Model I of table 2.6 regresses buyback announcement returns on delta and vega without any control variables. Sign on delta and vega coefficient are positive and negative, as predicted in hypothesis 1 and 3 respectively. The delta and vega coefficients are significant at the 5% and 1% significance level respectively. In model II, I regress short-term announcement returns on CEO ownership, and find a highly significant positive relationship which is in line with hypothesis 2. In model III, announcement returns are regressed on delta, vega and CEO ownership variables together. The delta loses its significance although vega is still significantly negatively and CEO ownership positively related to short term announcement returns. As per the predictions in hypothesis 3, higher vega results in lower announcement returns consistent with shareholders taking into account managerial incentives to increase firm risk.

In model IV, I include all the control variables. Both vega and CEO ownership retain significant negative and positive relationship respectively with short-term announcement returns. Prior buy-and-hold return (-30,-2), which proxy for undervaluation, and financial constraints are also significantly negatively related to buyback announcement returns. These results indicate that short-term buyback announcement returns are sensitive to the degree of undervaluation, financial constraints, CEO wealth sensitivity to changes in stock return volatility, and percentage equity stake of the executive in firm value. Similar to Peyer and Vermaelen (2009) I find that undervaluation has the greatest economic impact on short term buyback announcement returns. However, I add to the literature by showing that CEO incentive measures also

have incremental explanatory power for share buyback announcement returns. After undervaluation, vega has the highest economic impact on returns followed by financial constraints (as shown by Chen and Wang (2012)), and CEO ownership.

The insignificance of delta can also be justified as it aligns incentives over the medium to long-term because stock options have a vesting period of typically three years. Compared to delta, executive wealth increase associated with a buyback announcement is directly related to CEO stock ownership. So in the short-run, it is reasonable for the market to pay more attention to CEO share ownership as opposed to delta.[25]

Table 2.7 presents results from regressing longer-term returns (BHAAR) on CEO wealth sensitivity variables in different model specifications. Model I shows that both delta and vega are highly significant and can explain long-run stock performance of share repurchasing firms. Model II shows that CEO ownership is also important in explaining longer-term returns of share repurchasing firms. Model III and IV confirm that all the CEO wealth alignment variables are important and can explain longer-term returns of share repurchasing firms. The findings support the assertions in hypothesis 5.

As discussed earlier, delta measures wealth incentive alignment over the medium to long term and consistent with this, I find delta to be empirically significant and positively related to longer-term returns in model III. Although the coefficient on vega is higher as compared to delta coefficient but in economic terms delta is slightly more important. A one standard deviation change in delta results in 1.43 percent change in BHAAR as compared to 1.08 percent change in BHAAR for one standard deviation change in vega. In

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[25] One interpretation of these results also comes from behavioural finance theory. Kahneman and Tversky (1979) prospect theory shows that people put more weight on negative outcomes (losses) than on good ones (gains). The market appears to under-weight information contained in delta measure and over-weight information in vega measure in its initial reaction to stock repurchase news.

addition, in model IV I find that size is negatively related to announcement returns showing that small firm earn higher abnormal returns. However, unlike Chen and Wang (2012), I do not find a significant negative relationship between financial constraints and long-run stock performance. The only control variable that has some statistical significance for longer-term post-announcement returns is prior buy-and-hold return although only significant at the 10% level. This result is consistent with papers that suggest undervalued firms earn higher returns post-repurchase programme announcement.

2.4.4 Further tests

To test the robustness of my results, I define a compensation dummy variable that reflects better incentive alignment between the executive and shareholders. Compensation dummy variable combines the three incentive alignment variables i-e, delta, vega and percentage CEO share ownership and it takes the value of 1 when delta is high, vega is low and percentage CEO share ownership is high and 0 otherwise. This specification also allows me to test the impact of compensation design across different types of firm. A value of 1 on compensation dummy variable represents better incentive alignment or lower agency issues. Therefore, I expect a positive relationship between compensation dummy and short-term repurchase announcement returns.

Model I in table 2.8 provides clear support to proposition that executive compensation design has value relevant information for investors in relation to share repurchase announcements. The coefficient on the compensation dummy variable is positive and significant providing evidence on my hypothesis 4a. The market appears to understand executives' underlying wealth incentives and responds to repurchase announcement accordingly. The market reaction is stronger for repurchase announcements that are "perceived" as value signalling by the market based on executive compensation arrangements.

The credibility of the repurchase announcement as value signalling will be a more important issue for the market when information asymmetry is high.

Following Bonaimé (2012), I proxy information asymmetry by firm size. Smaller firms have lower analyst following and media coverage, they are more likely to suffer from higher information asymmetry and less efficiently priced (Lakonishok and Lee (2001)). Model II of table 2.8 interacts compensation dummy with firm size dummy. The size dummy takes the value of 1 for (small) firms with size below the sample median and 0 other wise. As can be seen, the interaction term coefficient is statistically significant at the 1% level and is much higher than the one on compensation dummy alone. The finding supports hypothesis 4b that the market reaction to share buyback announcement is stronger where information asymmetry is higher and executive wealth incentives are well aligned with those of shareholders.

The negative coefficient on the compensation dummy variable in model II suggests that larger firms do not experience higher announcement returns as compared to small firms. The coefficient however is much smaller and may reflect a managerial entrenchment effect. As managers are more likely to be entrenched in large firms, any signal from such managers is more likely to be discounted by the market leading to lower announcement returns.

Similarly, model III shows that the market reaction is stronger for firms that are more likely to be undervalued and executive's wealth incentives are well aligned with those of shareholders. Undervaluation is measured by the firm's buy-and-hold returns prior to the repurchase announcement. Firms that lose more during this period are more likely to be undervalued (Peyer and Vermaelen (2009)). Undervaluation dummy variable is 1 for firm whose buy-and-hold return prior to the announcement are below the median for my sample firms and 0 otherwise. The coefficient on interaction between compensation dummy and undervaluation dummy is 1.64 and significant at the 5% level. The result is consistent with hypothesis 4c that the market reaction to share buyback announcement is stronger for firms that are more likely to be undervalued and where executive wealth incentives are well aligned with those of shareholders.

To test the robustness of longer-term regression results, I use the Carhart (1997) four factor model to calculate longer-term abnormal returns post-repurchase programme announcement. Following Fama (1998), and Mitchell and Stafford (2000), I use the calendar-time regression approach to calculate event firms monthly abnormal performance. Specifically, I run the following regression model

$$R_{it} - R_{ft} = \alpha_i + \beta_{1i}(R_{mt} - R_{ft}) + \beta_{2i}(SMB_t) + \beta_{3i}(HML_t) \qquad (1.7)$$
$$+ \beta_{3i}(UMD_t) + \epsilon_{it}$$

where R_{it} is the return of firm i in month t; R_{ft} is the risk free rate as measured by the return on the US one-month Treasury bills in month t; R_{mt} is the return on the value weighted market index in month t; SMB_t is the return difference between a portfolio of small firms and that of large firms in month t; HML_t is the difference in returns of a portfolio of value stocks (high book-to-market) and glamour (low book-to-market) stocks in month t; UMD_t is the difference in returns between previous years' winner (high return) and loser (low return) stocks in month t; and ϵ_{it} is the unexplained error term of the regression model for firm i in month t. The intercept term (α) estimates the monthly average abnormal performance of firm i over the following 4-year period post-buyback announcement. I regress the estimated intercept term against my independent variables (delta, vega and CEO ownership). Results of the regression analysis are reported in table 2.9.

Table 2.9 shows that both delta and vega variables have signs as expected and are significant. Vega loses some of its significance but the coefficient is still significant at the 10% level when I include all of the control variables. CEO percentage of share ownership loses its significance in this regression although delta remains significant. So, delta plays an important role in explaining longer-term abnormal returns following firm's share repurchase announcement. These findings are consistent with my hypothesis 1 and 3. The table provides evidence that both delta and vega are important and are able to explain post-announcement returns of share repurchasing firms.

To further test the robustness of my results I delete all buyback announcements made by firms operating in, or associated with, financial services sector. Results are unaffected by elimination of such firms; in fact they become stronger. Thus the findings reported in the paper are empirically robust.

2.4.5 Actual repurchases

Ikenberry et al. (1995) and Peyer and Vermaelen (2009) argue that share repurchase announcements signal firm undervaluation and firms will want to take advantage of this mispricing by repurchasing their shares. However, if the market corrects the mispricing post-announcement then there will be no incentive for managers to actually repurchase any shares. Also for those firms that experience higher post-announcement returns, actual repurchases become more costly. So CEO wealth sensitivity variables that have a positive (negative) relationship with returns should have a negative (positive) relationship with actual repurchases (see hypothesis 6). I test this in table 2.10 where dependent variable is actual repurchases post-announcement.

Models I and II are linear regression models and model III is a tobit regression model where actual repurchases are truncated at 100% of the intended share repurchases (percent sought). Regression results of model II show that vega (delta) is in fact positively (negatively) related to actual repurchase rate significant at the 1% and 10% levels respectively. Tobit regression results in model III confirm that vega is positively related to actual repurchases. Delta in this model is not significant; however, CEO ownership is significant and positively related. The findings are in line with hypothesis 6. CEOs with higher wealth sensitivity to change in risk, in fact, repurchase more shares and where CEO wealth is more sensitive to changes in price such executive repurchase fewer shares post-announcement. The findings suggest the managerial decision of actual repurchase is also influenced by their wealth incentives and hence compensation arrangements.

2.4.6   Investment decisions and operating performance

In table 2.11 I show that firms with better CEO compensation design earn higher returns after open market share repurchase announcement as they make better investment and operating decisions. Regression results in table 2.11 show that CEOs with higher equity ownership of their firm invest more in capital expenditure and deliver better operating performance. Whereas CEOs with greater wealth sensitive to stock return volatility tend to cut capital expenditure investments and have lower operating returns. The findings are consistent with executive compensation and firm policy literature that shows that executives with higher incentives to increase firm risk under invest and take on more risky projects.

The table provide evidence on hypothesis 7. The results show that executives make investment and operating decisions taking into account their compensation incentives. The higher CEO wealth sensitivity to changes in risk (price) is negatively (positively) related to average annual capital expenditure investments in the 3-year period post-announcement. The table also shows that higher CEO wealth sensitivity to changes in risk (price) is negatively (positively) related to average annual return on assets in the 3-year period post-announcement. I conjecture that better investment and operating performance feeds back in to better stock return performance and lower repurchase rate for firms with better CEO compensation design.

2.5 Conclusion

The past couple of decades have witnessed a tremendous increase in the use of share buyback programmes (Grullon and Michaely (2002)). The market views buyback programme announcements as a good news based on signalling theory, and responds favourably to these on average. However, among all the possible ways of share repurchases, open market share repurchases seem to be the preferred way of executives. Such programmes provide the greatest flexibility to managers, lack characteristics of a strong signal and have fewer

reporting and regulatory requirements around actual buyback transactions (Chan et al. (2010)). With the increasing use of stock based compensation schemes, executives wealth incentives are also related to share repurchases which creates potential for their opportunistic use.

In this paper, I argue that open market share repurchase programmes can be either value signalling or cosmetic and even opportunistic. I show that the market seems to proxy the credibility of repurchase programme announcement as value signalling by observing the underlying repurchase incentives of the executive, on the basis of his/her compensation arrangements. In particular, I focus on executives' wealth sensitivity to changes in stock price (delta and CEO ownership) and volatility (vega). My results suggest that the market reaction is stronger to a firm's share repurchase announcement where CEO incentives are better aligned with those of shareholders. In fact, the effect of executive compensation arrangements - that better align the wealth incentives of executives with those of shareholders - on repurchase announcement returns are particularly stronger for firms where the repurchase announcing firm is either undervalued or suffers from higher information asymmetry. Longer-term returns of repurchase announcing firms are also in line with the incentive alignment story. Specifically, higher sensitivity of CEO wealth to changes in stock price (volatility) is positively (negatively) related to longer-term returns of event firms. However, actual repurchases are positively (negatively) related to sensitivity of CEO wealth to changes in volatility (stock price) as these become more costly for firms that experience higher returns post-announcement.

I further show that higher CEO sensitivity to changes in stock price (volatility) encourages managers to invest more (less) in capital expenditure in the 3-year period post-repurchase programme announcement. These findings are in line with the literature on executive compensation and firms' investment policy (see for example, Coles et al. (2006)). The operating performance of share repurchasing firms is also related to executive compensation

arrangements. Average return on assets is positively (negatively) related to sensitivity of CEO wealth to changes in stock price (volatility).

This paper contributes to literature on share repurchases – with particular focus on how the market views an announcement given executive compensation arrangements. The study explores the relationship between executive compensation arrangements and the perceived credibility of buyback announcements as value signalling. The analysis in the paper shows that executive compensation design has value relevant information in relation to news events such as open market share repurchase announcements. My results show that the market appears to understand the underlying managerial wealth incentives associated with share repurchases, and responds accordingly. Executive compensation arrangements appear to be able explain the market reaction to, and actual repurchase decisions of, firms that announce share repurchase programme.

Although compensation arrangements represent a corporate governance mechanism, it will also be interesting to analyse the effect of other corporate governance measures in reducing agency concerns and their effect on the perceived credibility of repurchase announcements. As a next step I aim to test the effect of compensation arrangements on credibility of repurchase announcements after controlling for other corporate governance measures.

Table 2.1: Sample selection

Data source	N
SDC data	12795
Deleting observation within 2 years	8345
Deleting observation with price lower than 3	7879
CRSP data	7875
COMPUSTAT data	6034
Execucomp data	2395
Open market share repurchases	2296

Table 2.2: Descriptive statistics of share repurchasing firms

The table reports the distribution of repurchase announcements by year. Year represents the year of the announcement. N shows the number of announcements made in the year for my sample. Frequency is the percentage to total announcements in the given year. B/M is the ratio of book value of firm assets to its market value at the beginning of the year. Size is measured by the market value of the firm and is shown in millions of dollars. Intended buyback ratio is the percentage of outstanding shares that management states it intends to buyback at the time of announcement.

Year	N	Frequency (%)	B/M (%)	Size ($M)	Intended ratio (%)
1992	22	1.0	35.0	5423.8	4.0
1993	104	4.5	41.3	4667.7	7.5
1994	132	5.8	44.9	3203.5	8.2
1995	183	8.0	45.2	5428.0	6.8
1996	142	6.2	42.1	3751.6	8.9
1997	239	10.4	42.0	4380.9	9.8
1998	151	6.6	42.5	5262.5	8.4
1999	95	4.1	37.8	12223.8	8.0
2000	89	3.9	32.4	15802.5	7.2
2001	108	4.7	36.6	10582.5	8.3
2002	108	4.7	41.2	6053.9	7.5
2003	177	7.7	39.7	14125.5	10.9
2004	176	7.7	43.0	11920.5	7.7
2005	201	8.8	42.0	12913.3	9.1
2006	264	11.5	39.5	9948.3	8.0
2007	105	4.6	41.2	9103.2	7.1
All	2296	100.00	41.1	8508.6	8.3

Table 2.3: Descriptive statistics of returns, CEO wealth sensitivity measures and firm characteristic

CAR is the 3 day (-1 to +1) cumulative abnormal return around the announcement date (day 0) using value weighted market return as benchmark. BHAR is the mean buy-and-hold abnormal return of event firms over the value weighted market portfolio return. Delta is the dollar change in the executive wealth for 1 percentage point change in stock price. Vega is the dollar change in the executive wealth for 1 percentage point change in annual volatility. CEO ownership is the CEO's stock ownership of the firm expressed as a fraction of total shares outstanding. Size is the market value of the firm. B/M is the ratio of book value of firm to its market value. Prior BHR is the cumulative buy-and-hold return of the firm for 30 days prior to the announcement to 2 days before the announcement (-30 to -2). Leverage is the ratio of total debt to total assets of the firm. Cash is cash level of the firm scaled by total assets. Cash Flow is the operating cash flow of the company scaled by total assets. Financial constraints are measured by KZ index (discussed in methodology section). DA is the discretionary accruals of the firm. All variables are in the fiscal year prior to the announcement except actual buyback dummy. Actual repurchases is the percentage of shares repurchased as a fraction of intended repurchase programme size (percent sought). Actual repurchase are untruncated but windorised at the 1st and 99th percentile. Sales growth is the increase in revenues over previous year revenues. Average CAPEX and Average ROA is the average annual capital expenditure and return on asset over the next three year post OMSR announcement respectively.

| Variable | N | Mean | Std Dev | Percentiles | | |
				25th	Median	75th
CAR	2296	1.36	6.72	-1.32	1.15	3.98
BHAR	2296	12.03	28.61	-12.27	0.20	14.63
Delta ($000)	2296	1355.72	7930.75	118.72	304.45	811.36
Vega ($000)	2296	161.38	378.22	17.16	52.32	159.14
CEO ownership (%)	2296	2.51	5.58	0.09	0.32	1.61
Size	2296	8508.65	23279.18	715.69	1995.99	6450.17
Book-to-market	2296	41.10	32.49	23.64	37.52	54.48
Prior BHR	2296	-0.05	0.16	-0.13	-0.03	0.05
Leverage	2296	0.52	0.22	0.36	0.52	0.66
Cash	2296	0.12	0.19	0.02	0.06	0.15
Cash Flow	2296	0.13	0.11	0.07	0.12	0.18
Financial Constraints(KZ)	2296	1.80	2.31	1.14	1.76	2.42
Discretionary Accruals	2049	-0.01	0.33	-0.06	0.00	0.06
Actual Repurchases[a]	2211	0.78	0.80	0.27	0.59	1.03
Sales growth	2102	1.18	0.63	1.04	1.11	1.22
Average CAPEX	1970	0.05	0.04	0.02	0.04	0.07
Average ROA	1979	0.15	0.10	0.09	0.14	0.19

Figure 2.1: Distribution of mean and median delta values by year
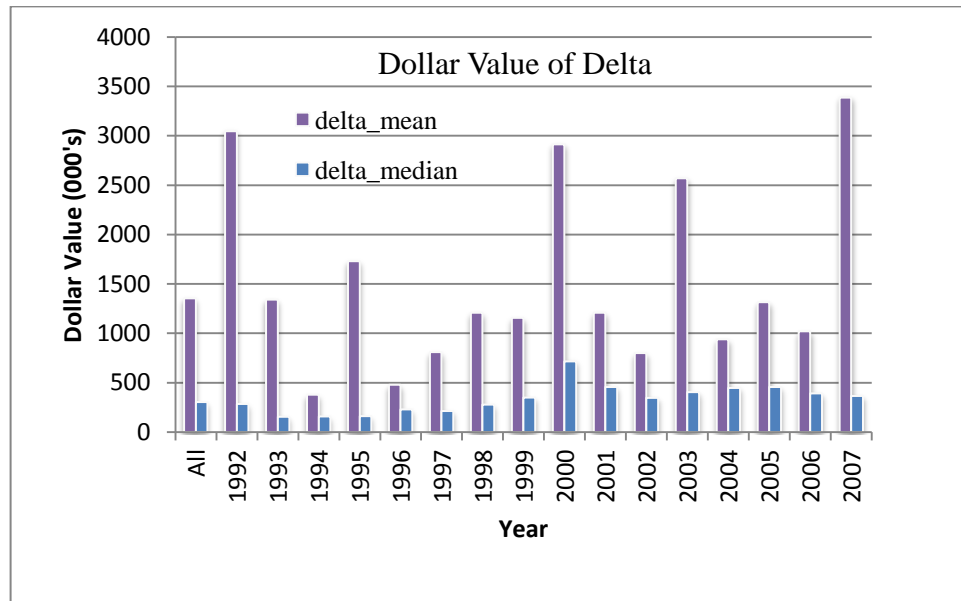
Figure 2.2: Distribution of mean and median vega values by year
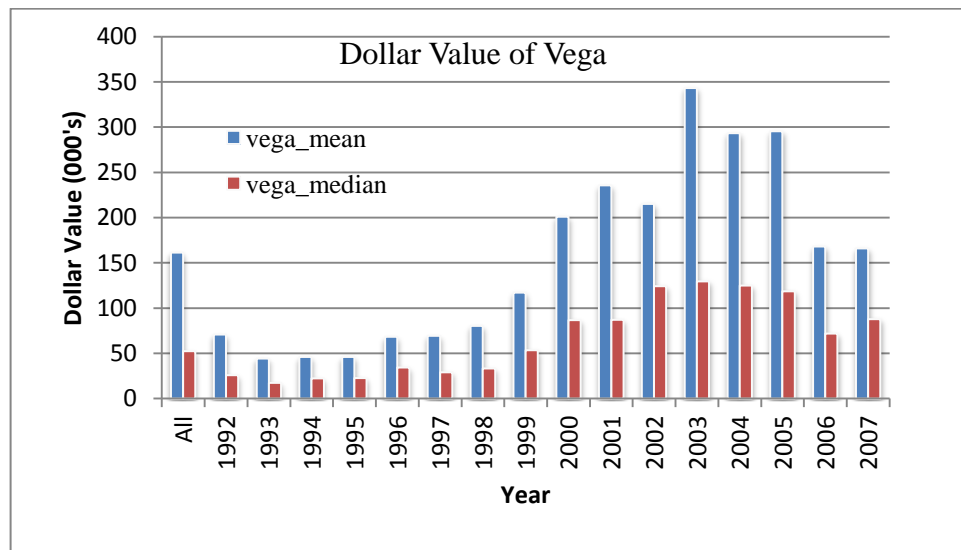
Table 2.4: Correlation Analysis of announcement returns and the executive compensation sensitivity measures.

The table report the correlation coefficients. CAR represents three day (-1 to +1) cumulative abnormal return around the event date (day 0). Vega is the dollar change in manager wealth for 1 percentage point change in firm annual volatility. Delta is the dollar change in manager wealth for 1 percentage point change in firm share price. Prior BHR is the cumulative buy and hold return of the firm for 30 days prior to the announcement to 2 days before the announcement date (-30 to -2). BHAAR is the buy and hold average annual abnormal return calculated as the cumulative buy and hold abnormal return over the 36 months from the event month (0) divided by 3. Ownership represents the executive percentage share ownership of the firm. N shows the number of observations.

Variable	1	2	3	4	5	6
1.CAR	1					
2.Vega	-0.045**	1				
3.Delta	-0.001	0.316***	1			
4.Prior BHR	-0.096***	0.032	0.034	1		
5.BHAAR	-0.0199	-0.040*	0.067***	-0.076***	1	
6.Ownership	0.067***	-0.039*	0.267***	-0.092***	0.075***	1
N	2296	2296	2296	2296	2296	2296

* ,**,*** represent significance at 10%, 5% and 1% significance level respectively.

Table 2.5: Mean short-term and longer-term returns by vega and delta quintiles

The table reports the mean, median, standard deviation, minimum and maximum values of CAR and BHAAR by delta and vega quintiles. CAR represents three day (-1 to +1) cumulative abnormal return around the repurchase announcement event (day 0). Vega is the dollar change in manager wealth for 1 percentage point change in firm annual volatility. Delta is the dollar change in manager wealth for 1 percentage point change in firm stock price. BHAAR is the buy and hold average annual abnormal return calculated as the cumulative buy and hold abnormal return over the 36 months from the event month (0) divided by 3. In order to sort firms into quintiles, for each year of data in Execucomp I sort all the firms into quintiles based on their delta and vega values. I then assign my repurchase sample firms to these groups based on their delta and vega values for the fiscal year prior to the repurchase announcement. Quintile 1 contains firms with lowest delta and vega values and quintile 5 has firms with highest delta and vega values. N shows the number of firms in each quintile.

Quintiles	N	MEAN	MEDIAN	STD	MIN	MAX
Panel A: Mean short term return (CAR) by vega quintiles						
1	333	2.14***	1.64	7.73	-27.92	57.34
2	412	1.52***	1.34	6.97	-35.78	38.17
3	461	1.54***	1.03	7.52	-45.59	44.40
4	501	1.15***	1.21	5.90	-28.29	28.29
5	586	0.86***	0.92	5.84	-48.63	35.00
Panel B: Mean short term return (CAR) by delta quintiles						
1	261	1.67***	1.55	8.03	-35.78	57.34
2	445	0.96***	1.03	7.02	-31.98	44.40
3	451	1.89***	1.40	6.35	-28.29	38.17
4	552	1.27***	1.00	5.89	-30.33	27.12
5	587	1.20***	1.16	6.84	-48.63	35.00
Panel C: Mean long term return (BHAAR) by vega quintiles						
1	333	5.47***	0.10	32.30	-58.25	250.39
2	412	4.10***	-1.03	30.88	-57.46	156.48
3	461	3.79***	0.85	27.43	-60.21	238.30
4	501	4.52***	0.96	29.07	-47.99	223.99
5	586	2.82***	0.53	25.06	-49.40	221.09
Panel D: Mean long term return (BHAAR) by delta quintiles						
1	261	3.40*	-0.87	28.63	-45.83	122.53
2	445	4.43***	0.93	30.29	-60.21	250.39
3	451	3.81***	0.47	25.70	-58.25	130.24
4	552	2.57**	0.57	24.34	-57.46	156.44
5	587	5.45***	0.36	32.83	-49.40	238.30

* ,**,*** represent significance at 10%, 5% and 1% significance level respectively.

Table 2.6: Effect of executive compensation on short-term returns

The table presents the results of regressing initial buyback announcement abnormal returns (CAR) on executive compensation variables, CEO share ownership and control variables in different models. CAR represents 3- day (-1 to 1) cumulative abnormal return around the repurchase announcement date (day 0). Vega is the dollar change in manager wealth for 1 percentage point change in firm annual volatility. Delta is the dollar change in manager wealth for 1 percentage point change in firm stock price. Delta and vega values are in $000's. CEO ownership is the CEO's stock ownership of the firm expressed as a fraction of total shares outstanding. Percent sought is the percentage of outstanding shares that the management states that it intends to buyback. Prior BHR is the buy and hold return of the firm for 30 days prior to the announcement to 2 days before the announcement (-30 to -2). Financial constraints are measured by KZ index (discussed in methodology section). Size is the market value of the firm. B/M is the ratio of book value of firm to its market value. Cash Flow is the operating cash flow of the company scaled by total assets. Actual buyback dummy is a dummy variable equal to 1 if actual repurchase is higher than the sample median and zero otherwise. DA is the discretionary accruals of the firm. All variables are in the fiscal year prior to the announcement except actual buyback dummy.

Label	Parameter Estimate			
	Model I	Model II	Model III	Model IV
Intercept	1.49***	1.16***	1.28***	1.46***
	(8.83)	(7.63)	(11.00)	(4.85)
Delta	0.0126**		-0.005	0.0046
	(2.09)		(0.13)	(0.51)
Vega	-0.88***		-0.72***	-0.476***
	(5.17)		(3.86)	(3.09)
CEO ownership		0.08***	0.08***	0.0795***
		(4.70)	(3.92)	(4.38)
Percent sought				0.173
				(0.73)
Prior BHR				-4.12***
				(3.63)
Financial constraint				-0.146***
				(3.35)
Size				-0.000
				(0.09)
B/M				0.0002
				(0.06)
Cash Flow				-1.34
				(0.66)
Actual buyback dummy				-0.146
				(0.11)
DA				0.015
				(0.47)
Year cluster	Yes	Yes	Yes	Yes
Industry cluster	Yes	Yes	Yes	Yes
R-square	0.0022	0.0045	0.006	0.018
F-value	5.22***	9.89***	6.08***	3.6***

* ,**,*** represent significance at 10%, 5% and 1% significance level respectively.

Table 2.7: Effect of executive compensation on long-term returns

The table presents the results of regressing long term buyback announcement abnormal returns (BHAAR) on executive compensation variables, CEO share ownership and control variables in different models. BHAAR is the buy and hold average annual abnormal return calculated as the cumulative buy and hold abnormal return over the 36 months from the event month (0) divided by 3. Vega is the dollar change in manager wealth for 1 percentage point change in firm annual volatility. Delta is the dollar change in manager wealth for 1 percentage point change in firm stock price. Delta and vega values are in $000's. CEO ownership is the CEO's stock ownership of the firm expressed as a fraction of total shares outstanding. % sought is the percentage of outstanding shares that the management states that it intends to buyback on the announcement date. Prior BHR is the buy and hold return of the firm for 30 days prior to the announcement to 2 days before the announcement (-30 to -2). Financial constraints are measured by KZ index (discussed in methodology section). Size is the market value of the firm. B/M is the ratio of book value of firm to its market value. Cash Flow is the operating cash flow of the company scaled by total assets. Actual buyback dummy is a dummy variable equal to 1 if actual repurchase is higher than the sample median and zero otherwise. DA is the discretionary accruals of the firm. All variables are in the fiscal year prior to the announcement except actual buyback dummy.

Label	Parameter Estimate			
	Model I	Model II	Model III	Model IV
Intercept	4.41*	3.04	3.71	2.58
	(2.30)	(1.50)	(1.64)	(0.75)
Delta	0.318***		0.26***	0.18***
	(3.26)		(2.65)	(3.33)
Vega	-5.16***		-4.61***	-2.87**
	(4.23)		(3.23)	(2.03)
CEO ownership		0.38***	0.27***	0.22***
		(3.28)	(3.05)	(2.68)
Percent sought				0.0300
				(0.28)
Prior BHR				-12.3*
				(1.73)
Financial constraint				0.380
				(1.25)
Size				-0.000
				(1.22)
B/M				-0.014
				(0.45)
Cash Flow				9.17
				(0.82)
Actual buyback dummy				-0.78
				(0.56)
DA				-0.42
				(0.44)
Year cluster	Yes	Yes	Yes	Yes
Industry cluster	Yes	Yes	Yes	Yes
R-square	0.009	0.0056	0.0112	0.0157
F-value	4.66**	4.40**	3.53**	2.98***

*,**,*** represent significance at 10%, 5% and 1% significance level respectively.

Table 2.8: Effect of executive compensation arrangements on short-term returns

The table presents the results of regressing initial buyback announcement abnormal returns (CAR) on compensation dummy and control variables in different models. CAR represents three day (-1 to +1) cumulative abnormal return around the repurchase announcement date (day 0). Compensation dummy proxy's for the wealth alignment between the executive and shareholder. It takes the value of 1 when delta is high (in bottom 3 quintile), vega is low (in top 3 quintiles) and CEO ownership is above median and 0 otherwise. Percent sought is the percentage of outstanding shares that the management intends to buyback on announcement date. Prior BHR is the buy and hold return of the firm for 30 days prior to the announcement to 2 days before the announcement (-30 to -2). Financial constraints are measured by KZ index (discussed in methodology section). Size is the market value of the firm. B/M is the ratio of book value of firm to its market value. Cash Flow is the operating cash flow of the company scaled by total assets. Actual buyback dummy is a dummy variable equal to 1 if actual repurchase is higher than the sample median and zero otherwise. DA is the discretionary accruals of the firm. All variables are in the fiscal year prior to the announcement except actual buyback dummy. Size and value dummy is 1 for small and value firms respectively and 0 otherwise.

	Parameter Estimates					
	Model I		Model II		Model III	
Variables	Coeff.	t-stat	Coeff.	t-stat	Coeff.	t-stat
Intercept	**1.46**	**4.56**	**1.42**	**4.54**	**1.56**	**4.11**
Compensation dummy	**0.70****	**2.59**	**-0.40****	**-2.02**	-0.20	-0.50
Percent sought	0.02	0.66	0.02	0.57	0.01	0.27
Prior BHR	**-4.19*****	**-3.62**	**-4.15*****	**-3.41**		
Financial constraint	**-0.15*****	**-3.35**	**-0.15*****	**3.05**	**-0.14*****	**-3.66**
Size (x10^{-5})	-0.32	-0.60			-0.38	-0.74
B/M (x10^{-2})	0.10	0.28	0.10	0.85	0.10	0.31
Cash Flow	-1.21	-0.62	-1.13	0.42	-1.26	-0.62
Actual buyback dummy	**-0.20*****	**-3.74**	-0.20	0.52	-0.28	
DA	0.04	0.08	0.06	0.94	0.04	0.07
Size dummy			-0.04	-0.08		
Compensation x size dummy			**1.55*****	**3.65**		
Value dummy					0.37	0.98
Compensation x value dummy					**1.64****	**1.97**
R-squared	0.0151		0.0169		0.0106	

* ,**,*** represent significance at 10%, 5% and 1% significance level respectively.

Table 2.9: The effect of executive compensation on longer-term returns calculated using Carhart's 4-factor model

The table shows results of regressing Carhart's (1997) four factor model abnormal return (intercept) on executive compensation variables, CEO share ownership and control variables in different models. Vega is the dollar change in manager's wealth for a 1 percent change in firm's annual volatility. Delta is the dollar change in manager's wealth for a 1 percent change in firm's share price. Delta and vega values are in $000's. CEO ownership is the CEO's stock ownership of the firm expressed as a fraction of total shares outstanding. % sought is the percentage of outstanding shares that the management intends to buyback. Prior BHR is the buy and hold return of the firm for 30 days prior to the announcement to 2 days before the announcement. Financial constraints are measured by KZ index (discussed in methodology section). Size is the market value of the firm. B/M is the ratio of book value of firm to its market value. Cash Flow is the operating cash flow of the company scaled by total assets. Actual buyback dummy is a dummy variable equal to 1 if actual repurchase is higher than the sample median and zero otherwise. DA is the discretionary accruals of the firm. All variables are in the fiscal year prior to the announcement except actual buyback dummy.

Label	Parameter Estimate		
	Model I	Model II	Model III
Intercept	0.55***	0.55***	0.87***
	(4.80)	(6.05)	(4.40)
Delta	0.0069***	0.006**	0.009**
	(3.81)	(2.14)	(2.11)
Vega	-0.348***	-0.34**	-0.296*
	(2.71)	(2.63)	(1.98)
CEO ownership		0.003	0.006
		(0.19)	(0.45)
Percent sought			0.005
			(0.36)
Prior BHR			0.28
			(0.55)
Financial constraint			0.013
			(1.17)
Size			-0.000*
			(1.86)
B/M			-0.003
			(1.19)
Cash Flow			-0.64
			(1.01)
Actual buyback dummy			-0.27***
			(3.51)
DA			0.16**
			(2.03)
Year cluster	Yes	Yes	Yes
Industry cluster	Yes	Yes	Yes
R-square	0.0021	0.0021	0.0079
F-value	3.83**	2.62*	2.89***

* ,**,*** represent significance at 10%, 5% and 1% significance level respectively.

Table 2.10: Effect of executive compensation on actual share repurchases.

The table regresses actual repurchases on CEO compensation sensitivity measures and other control variables. Model I and II are linear regression models and Model III is a tobit regression model where actual repurchases are truncated at 100% of intended number of share repurchases. Actual repurchases are firms' actual share re-acquisitions in the first four quarters from the quarter of OMSR announcement. Delta is the dollar change in manager's wealth for a 1 percent change in firm's share price. Vega is the dollar change in manager's wealth for a 1 percent change in firm's annual volatility. Delta and vega values are in $000's. CEO ownership is the CEO's stock ownership of the firm expressed as a fraction of total shares outstanding. ln Size is the natural log of the market value of the firm. B/M is the ratio of book value of firm to its market value. Leverage is the ratio of total debt to total assets of the firm. Cash is cash level of the firm scaled by total assets. Cash Flow is the operating cash flow of the company scaled by total assets. Prior return is the buy-and-hold return of the firm for 30 days prior to the announcement to 2 days before the announcement (-30 to -2). Annual return is the average annual abnormal return over the 3 year period post announcement. Financial constraints are measured by KZ index (discussed in methodology section). Percent sought is the percentage of outstanding shares that the management states that it intends to buyback. DA is the discretionary accruals of the firm.

	Parameter Estimates					
	Model I		Model II		Model III	
Variables	Coeff.	t-stat	Coeff.	t-stat	Coeff.	t-stat
Intercept/sigma	0.745	19.5	0.906	10.1	0.448	
Delta	-0.002	-1.52	**-0.002***	**-1.79**	-0.001	-0.70
Vega	**0.278***	**4.51**	**0.275***	**3.90**	**0.086**	**2.36**
CEO ownership	-0.002	-0.44	-0.002	-0.41	**-0.004**	**-2.10**
ln Size			-0.003	-0.24	0.008	0.89
B/M			**0.001**	**2.00**	0.000	0.64
Leverage			0.046	1.11	-0.016	-0.27
Cash			-0.019	-0.33	-0.028	-0.48
Cash flow			**0.363***	**8.55**	**0.188***	**1.78**
Prior return			**0.248**	**2.15**	**0.191***	**2.86**
Annual return			**-0.001***	**-1.75**	-0.001	-1.43
Financial constraint			0.002	0.27	0.002	0.40
Percent sought			**-0.031***	**-6.93**	**-0.015***	**-7.75**
DA			**-0.150***	**-3.09**	**-0.068**	**-2.17**
pseudo/R-squared	0.0166		0.0699		0.0338	

*,**,*** represent significance at 10%, 5% and 1% significance level respectively.

Table 2.11: Effect of executive compensation on post-announcement investments and operating performance

CAPEX is the average annual investment in capital expenditure over the next three years post OMSR announcement scaled by total assets in each year. ROA is the average annual return on asset over the next three years post OMSR announcement. ROA is the ratio of EBITDA and total assets. Delta is the dollar change in manager's wealth for a 1 percent change in firm's share price. Vega is the dollar change in manager's wealth for a 1 percent change in firm's annual volatility. Delta and vega values are in $000's. CEO ownership is the CEO's stock ownership of the firm expressed as a fraction of total shares outstanding. ln Size is the natural log of the market value of the firm. B/M is the ratio of book value of firm to its market value. Leverage is the ratio of total debt to total assets of the firm. Cash is cash level of the firm scaled by total assets. Cash Flow is the operating cash flow of the company scaled by total assets. Prior return is the buy-and-hold return of the firm for 30 days prior to the announcement to 2 days before the announcement (-30 to -2). Annual return is the average annual abnormal return over the 3 year period post announcement. Financial constraints are measured by KZ index (discussed in methodology section). Percent sought is the percentage of outstanding shares that the management states that it intends to buyback. DA is the discretionary accruals of the firm.

Parameter Estimates						
	CAPEX		CAPEX		ROA	
Variables	Coeff.	t-stat	Coeff.	t-stat	Coeff.	t-stat
Intercept	**0.045**	**2.64**	**0.042**	**2.43**	**0.122**	**3.15**
Delta(x10^{-3})	-0.086	-0.75	-0.167	-1.51	0.214	0.86
Vega	**-0.007*** **	**-3.14**	**-0.007*** **	**-2.97**	**-0.009***	**-1.69**
CEO ownership	**0.001*** **	**3.33**	**0.000** **	**2.78**	**0.001***	**1.85**
ln Size			-0.001	-0.99	**0.003** **	**2.26**
B/M (x10^{-2})			-0.041	-1.49	**-0.462*** **	**-7.48**
Leverage			-0.001	-0.15	**0.057*** **	**5.58**
Cash			**-0.029*** **	**-5.96**	**-0.061*** **	**-5.61**
Cash flow			**0.116*** **	**13.76**	**0.344*** **	**18.15**
Annual return			0.000	0.03	**0.001*** **	**9.67**
Financial constraint			**-0.001** **	**-2.47**	**-0.007*** **	**-8.14**
Sales growth			**0.004*** **	**3.23**	0.000	0.12
Industry FE	Yes		Yes		Yes	
Adj. R-squared	0.14		0.23		0.28	
N	1970		1968		1977	

* ,**,*** represent significance at 10%, 5% and 1% significance level respectively.

Chapter 3

How Informative is the Language of Buyback Announcements?

3.1 Introduction

Corporations disclose material information to investors through a variety of methods including corporate announcements. One such announcement is about firm's intention to repurchase its shares from the market through open market operations generally known as open market share repurchase announcements. Firms may opt to repurchase their own shares for a variety of reasons; however, the corporate finance literature considers such announcements as a signal of firm undervaluation and the market responds favourably to these, on average. However, Chan et al. (2010) view Open Market Share Repurchase programmes (OMSRs) as a dubious signal due to their inherent flexibility and absence of firm commitment. They argue that such repurchase announcements can be opportunistically used by the management to mislead the market. Hence, share repurchase announcements can either disclose valuable information about the firm and its prospects or these can be used to deceive the market. Thus, an interesting research question is; if the market can distinguish between value signalling repurchase announcements from those of cosmetic ones.

Given the dubious nature of open market buyback signal, in this chapter I analyse the qualitative information that accompanies a share buyback announcement to explore how the market perceives the buyback announcement given this narrative disclosure. It is reasonable to assume that the market reaction will be stronger for repurchase announcements that it regards as value signalling. Solving the credibility puzzle of OMSR programmes at the time of announcement is extremely difficult, if not impossible. The objective here is to

lever the qualitative disclosure of share repurchase announcements to analyse if it is value relevant information and is of some importance to investors.

Chan et al. (2010) suggest that managers may announce repurchase programmes to mislead the market. Massa et al. (2007) show that competing firms may also mimic repurchases to counter the negative effect of peer repurchases on their valuation, especially in concentrated industries. In addition, repurchase announcements are not binding obligations. Traditionally, academics in financial economics have relied on quantitative data for stock valuation and to explain the observed variations in stock price performance. A number of recent studies however highlight the importance of qualitative data in enhancing our understanding of financial markets. For example, Tetlock et al. (2008) and Xuan et al. (2014) suggest that linguistic media content captures otherwise hard-to-quantify aspects of firm fundamentals. They show that simple quantitative measure of language derived from firm-specific news can predict firm's earnings and stock returns.

Here, I conjuncture that managers with real good news may use more optimistic (positive) language (disclosure tone) to distinguish themselves from others.[26] By resorting to more positive disclosure tone managers expose themselves to higher litigation risk. For example, Francis et al. (1994) and Rogers et al. (2011) show that a positive disclosure tone is related to higher litigation risk. Thus the additional cost of higher litigation risk may add credibility to management's share repurchase announcement as value signalling. Using a content analysis approach, I investigate if the language of share repurchase announcement news is value relevant information for investors. More specifically, I examine the effect of narrative disclosure tone of share repurchase announcement news on short-term announcement returns and actual repurchase decisions of firms that announce a repurchase programme.

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[26] In this chapter I use the terms optimistic and positive interchangeably.

The data for the paper is hand collected and allows me to investigate several interesting aspects of share repurchase programmes. Peyer and Vermaelen (2009) and Bonaimé (2012) show that the stated motive of repurchase programme is value relevant information for investors. Thus I classify repurchase announcements according to the stated motive(s) of the repurchase programme. In addition, I collect information on any other material information that may accompany a repurchase programme announcement such as earnings, mergers and acquisitions or recent stock price performance etc. I broadly classify these either as good news or bad news.

This chapter contributes to the existing literature in several ways. First, it introduces qualitative perspective into the literature on share repurchases. This is the first study to the best of my knowledge that analyses the disclosure tone of share repurchase programme announcements. My results suggest that the narrative tone of repurchase announcement is significantly positively related to short-term announcement returns. Thus, the market views OMSR announcement as a stronger signal when the disclosure tone of repurchase announcement news is more optimistic. Three day (-1, 1) return difference around share buyback announcement between firms in the highest and the lowest rank group of disclosure tone is 1.71% and is highly significant at the 1% level. This suggests that the market regards positive repurchase announcement disclosure tone as a proxy for managerial optimism about firm's prospects.

For short-term repurchase announcement returns, the regression coefficient on positive tone variable is 1.59 and is highly significant at the 1% level indicating a positive relationship between the two variables. New information (signals) might be more value relevant for firms suffering from a higher degree of information asymmetry. Following Bonaimé (2012), I measure degree of information asymmetry by firm size and find that the impact of positive tone is more pronounced for small firms that have higher

information asymmetry. Initial market reaction to positive tone is also stronger for firms with more growth opportunities (low Book-to-Market ratio) as compared to value firms (high Book-to-Market ratio). Mercer (2004) shows that the presence of numeric terms and numeric precision increases the credibility of management disclosure. The impact of positive tone of buyback announcement news is further enhanced by the presence of higher number of numeric terms in the buyback announcement press release. However, I observe no link between narrative disclosure tone and actual repurchase rates post-announcement and the longer-term abnormal returns of firms that announce a repurchase programme.

Second, this chapter contributes to the existing literature by allowing a better understanding of the stated objectives of repurchase programmes, their relative frequency, the market reaction to such repurchase announcements and also in terms of their actual completion rates and relative long-run performance. As expected, the initial announcement return is highest for firms that announce repurchase programmes citing stock undervaluation as the motive. Mean 3-day cumulative abnormal return around the repurchase announcement event is 1.11% significant at the 5% level. However, the announcement return is negative for firms that repurchase for legal reasons. These firms lose around 2.61% of their market value in the 3-day period around the repurchase announcement. However, most of these repurchase announcements were made around the September 11, 2001 terrorist attacks when the market was down and investor confidence was at its lowest. More interestingly, firms that do not state any reason for their repurchase programme announcement earn abnormal returns both in the short term and longer-term which are significant at the conventional levels as compared to firms that repurchase for reasons other than undervaluation. An important research question for further exploration here is: why do these latter firms state a reason for their repurchase programme when this is associated with underperformance compared to those who simply announce a repurchase programme without

mentioning any reason for their intention to repurchase stock? This study highlights the importance of discretionary disclosure options for managers in relation to share repurchases and their impact on firm valuation.

Finally, my hand collected data allows me to analyse other aspects of share repurchase announcements about which literature is limited. For example, I look for any other news information contained in share repurchase announcements and broadly classify it by the nature of news in terms of good versus bad news. I analyse the relative frequency of additional news content in share repurchase announcements as well as its impact on the market reaction to such repurchase announcements. Descriptive statistics of such analysis is also discussed in the paper.

The rest of the paper is organised as follows. The next section presents a review of the relevant literature with emphasis on the importance and role of qualitative information in better understanding the market we operate in. Research hypothesises are developed in the light of relevant literature and presented in the same section. The next section after that describes data, data sources and research design. In section 3.4, I present results of my statistical analysis. And finally section 3.5 concludes the study.

3.2 Related literature

Efficient pricing is the outcome of incorporating all available information in firm valuation. The corporate world and financial press provide us with a wealth of information in both quantitative and qualitative forms. Researchers in accounting and financial economics have predominantly relied on quantitative data and have utilised the available economic models and statistical tools to examine its value relevance and information content in stock valuation (Feldman et al. (2010)). Until recently, only a few studies had examined the role of qualitative information in firm valuation and its impact on stock prices. It is reasonable to assume that researchers in accounting and finance preferred

to work with quantitative data in determining firm value and to analyse stock price movements as such archival data is easily downloadable, objective in nature and definitely less ambiguous than qualitative data. Jegadeesh and Wu (2013) attribute such lack of qualitative research in the finance literature to difficulty in objectively quantifying qualitative information. However, following such *extant* work would have meant ignoring valuable qualitative information from our analysis.

Although these quantitative studies have significantly improved our understanding of financial markets, there is also a growing realization that quantitative data alone is inadequate in explaining stock price movements. See for example, Shiller (1981), and Roll (1988) and Pike et al. (1993), as early acknowledgers of the fact in the areas of finance and accounting. Corporations and even government regulatory bodies frequently provide a wealth of information to market players in different forms and through diverse forums and media (Feldman et al. (2010)). Certainly market participants are expected to analyse and process this information in their firm valuations and decision making. The need to incorporate qualitative information in firm valuation process has also gained considerable importance following recent financial scandals and corporate frauds like Enron, Worldcom etc. and an increased emphasis on transparency and corporate governance.

Li (2010a) highlights at least three reasons for the use of qualitative analysis in enhancing our understanding of financial markets and its players. First, textual analysis can provide useful insights and context in understanding financial data and testing important economic hypotheses. For example, Li (2008), using Fog index from computational linguistic literature shows that firms with annual reports that are longer and harder to read have lower earnings whereas firms with easy to read annual reports show persistent positive earnings.

Second, the rise of behavioural economics (see e.g., Barberis and Thaler (2003) and Nofsinger (2011)) in recent years has highlighted several cognitive biases that preclude human judgement from rational decision making. Since pure quantitative measures of investors' or managers' behavioural biases are hard to find, a qualitative approach can provide useful insights. A textual analysis of managerial communications can highlight certain managerial traits that might have significant bearing on decisions they take. For example, Chen and Wang (2012) show that managers of already financially constrained firms spend more cash to repurchase their stock than other firms due to their overconfidence. Similarly, Malmendier and Tate (2008) show that overconfident managers over estimate their ability to generate positive abnormal returns. They are more likely to engage in value destroying mergers and acquisitions by overpaying for target firms.

Third, managerial communications can also provide useful insights about managerial incentives and their private information set that may allow better understanding of their actions and firm behaviour. In other words, managerial communications provide outsiders an opportunity to see the world from their eyes and hence appropriately evaluate their decisions and performance in a given environment.

Besides, the growing realisation of the inadequacy of quantitative data to fully explain stock prices, Li (2010a) argues that the use of qualitative data in financial economic research is further facilitated by the availability and accessibility of large amount of unstructured descriptive data in an electronic form and significant developments in the area of computational linguistics, machine learning and text mining. Jegadeesh and Wu (2013) argue that the recent advances in statistical processing of textual information have enabled researchers to effectively measure descriptive disclosures tone and analyse its impact on market prices.

Both of these factors, the electronic availability and the ability to process textual data have led to a growing literature in financial economics that analyses descriptive disclosures. Accounting researchers were among the early adopters of descriptive data analysis tools and techniques. They mainly focused on descriptive disclosures in financial statements, president's letter, chairman's statement, Management Discussion and Analysis (MD&A) and other forms of managerial communications and corporate filings.

The fundamental question about narrative disclosures relates to whether it provides value relevant information or is just another marketing technique? This is an empirical question. For example, McConnell et al. (1986) regard accounting narratives in annual reports as "carefully crafted public relations documents with little substantive content", if any. However, several papers show that this is not the case. For example, Abrahamson and Amir (1996) using a computerised content analysis approach find that the number of negative words in the president's letter to shareholders is associated with firm fundamentals. Tavcar (1998) expresses his concerns over the usefulness of the MD&A section of financial statements for investors.

However, Pava and Epstein (1993) show that information provided in the MD&A section though accurately describes historical events but has limited ability to predict future firm performance. Specifically, they find that information provided in the MD&A section has a strong bias towards predicting positive news, but bad news is either ignored or not fully reported. Bryan (1997) however finds that the information contained in the MD&A has a strong association with firms' future financial variables such as changes in sales, operating cash flows, earnings per share and especially capital expenditures over 3-years into the future. Similarly, Smith and Taffler (2000) show that discretionary descriptive disclosure in annual reports encompasses information that can estimate firms' bankruptcy risk. Specifically, they find

that the chairman's statement alone contains value relevant information that is highly related to the event of firm failure.

In order to highlight the importance of descriptive disclosures Sun (2010) examines the explanation(s) provided for the increase in inventory levels in the MD&A for manufacturing firms. Generally, the rise in inventory level is seen as a bad sign and is negatively associated with firms' current and future stock and earnings performance (Lev and Thiagarajan (1993)). However, he finds that favourable explanation for inventrory increases is associated with firms' future profitability and sales growth. He argues that presence and nature of inventory disclosures in the MD&A helps users to better interpret disproportionate changes in inventory and predict firm performance.

Feldman et al. (2010) explore the effect of changes in tone of the MD&A in a large sample of 10Q and 10K filings. They find that short term returns around SEC filing date are significantly associated with tone changes in the MD&A section even after controlling for other factors such as accruals and earnings surprises. Similarly, Li (2010b) using a Naïve Bayesian machine learning algorithm, finds that the average tone of forward-looking statements (FLS) in MD&A is positively associated with firms' future earnings. Kothari et al. (2009) using the General Inquirer classification show the effect of the MD&A disclosure tone on the firm's cost of capital and risk. They analyse more than 100,000 documents and find that an aggregate positive (negative) disclosure expressed in the reports is related to a decrease (increase) in firm's cost of capital and risk (return volatility). Further analysis of disclosure by source reveals that disclosure in business press stories (both positive and negative) is deemed more credible by the market and has an impact on firm risk measures whereas only negative disclosure by corporations have an impact on its risk. The study highlights the fact that such narrative disclosure not only reports on past performance but also contains valuable information about firms' future.

Tetlock (2007) is one of the earliest papers that analysed the role of business press disclosure on financial markets. My work is similar in its approach but different in scope to Tetlock (2007) paper. He analyses the popular *Wall Street Journal* column titled "Abreast of the Market" and finds that the sentiment expressed in the column is related to short term market returns and volatility. Specifically, he shows that a more pessimistic tone in the article puts downward pressure on the market prices as measured by Dow Jones stock index. In contrast to the general belief that higher pessimism leads to higher returns or lower volatility (risk), he shows that higher pessimism, in fact results in higher volatility of stocks. This suggests that pessimism factor as estimated by the number of negative words in the article may be distinct from risk (Feldman et al. (2010)).

As a step further to examine the role of media in financial markets, Tetlock et al. (2008) study the information content of real time media news stories about S&P 500 companies. Using Dow Jones News Service and daily stories published in The Wall Street Journal between 1984 and 2004, they show that the proportion of negative words in such stories can predict firm's future earnings and returns. Their results are robust to controlling for a host of other factors such as historic accounting data, past returns and analyst forecasts.

These studies highlight the impact of narrative disclosures in the business press on financial markets and suggest that such qualitative information is value relevant and conveys incremental information to that captured by traditional quantitative factors. Kothari et al. (2009) also regards information from business press as more credible due to lower agency issues as compared to information contained in analyst forecasts and disclosures by corporation itself.

Open market repurchase announcements are not regarded as a strong signal of equity undervaluation or better future prospects as these are not

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binding obligations and also a growing number of firms use repurchase programmes as a tax efficient way of distributing cash to shareholders (see e.g., Comment and Jarrell (1991); Grullon and Michaely (2002); Gaspar et al. (2013)). Fried (2005) suggests that open market repurchase programmes in fact represent opportunistic management behaviour and are used to deceive investors rather than as a disclosure about firm fundamentals.

In this chapter, I analyse the information content of business press releases of share repurchase announcements.[27] To the best of my knowledge, this is the first study that uses a content analysis approach to examine the effect of repurchase announcement disclosure tone on the market reaction to share buyback signal. Francis et al. (1994) and Rogers et al. (2011) suggest that a more positive disclosure tone is positively related to litigation risk.[28] Litigation is costly for the firm and its management both in economic and reputational terms. Managers by opting for a more optimistic disclosure tone add some cost to their share buyback signal by exposing themselves to a higher litigation risk. Thus, in line with Tetlock (2007), Tetlock et al. (2008) and Kothari et al. (2009), I argue that the narrative tone of the repurchase announcement discloses valuable information about the company and its prospects. Managers with real good news may use a more positive disclosure tone to distinguish themselves from mimicking firms and the market reaction to such announcements will thus be stronger. So formally,

Hypothesis 1 (*H1*): A more positive disclosure tone positively affects investor's reaction to repurchase programme announcement.

The value of new information will be more important for firms that suffer from higher degree of information asymmetry. Bhattacharya and Jacobsen (2015) suggest that only repurchase announcement (signal) is

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[27] Business press releases are firm-generated press releases for media articles.
[28] Although particular allegations vary from case to case, a common recurring theme is that investors often allege that managements' disclosures about firm value were overly optimistic and that led them to form unduly optimistic expectations about firm value.

sufficient to correct mispricing for firms that are more likely to be undervalued and suffer from higher information asymmetry. Bonaimé (2012) use firm size to approximate degree of information asymmetry. It is reasonable to assume that small firms suffer from higher information asymmetry due to lower analyst following and lower media coverage. Thus, I expect that the tone affect on initial announcement returns will be stronger for firms that have higher information asymmetry.

Hypothesis 2 (*H2*): The effect of share repurchase announcement tone will be influenced by the degree of information asymmetry between the firm and investors.

Botosan (1997) shows that greater amount of numeric data enhances the credibility of the disclosure. Similarly, Mercer (2004) argues that the greater precision of numeric data is associated with higher investor confidence in management disclosure. Therefore, I expect that the effect of share repurchase announcement tone will be higher for press releases that contain more hard information (higher number of numeric terms).

Hypothesis 3 (*H3*): The effect of share repurchase announcement disclosure tone on repurchase announcement returns will be influenced by the number of numeric terms used in the repurchase announcement press release.

Here, it will also be interesting to explore and analyse the relationship between disclosure tone of share repurchase announcement and actual repurchases post-announcement. Managers who use more optimistic disclosure tone in share repurchase programme announcements to express their confidence in firm's prospects are expected to complete their announced repurchase commitments. So, I expect a positive relationship between the repurchase announcement disclosure tone and actual repurchase rates.

Hypothesis 4 (*H4*): The disclosure tone of repurchase programme announcement is positively related to actual repurchase (completion) rates.

Peyer and Vermaelen (2009) show that the stated motive of the share repurchase programme contains value relevant information for investors. They show that firms that repurchase for undervaluation reasons outperform others both in short-run and long-run stock price performance. As mentioned earlier, the data for the study allows for identification of the stated motive(s) of share repurchase programme. Thus, I test the value relevance of stated motive of repurchase programme to its stock price performance.

Hypothesis 5 (*H5*): The stated motive of share repurchase programme is related to share buyback announcement and post-announcement stock return performance.

I also examine the relationship between the stated motive and actual repurchases in this study. Specifically, I investigate the following question. Does the stated motive of the repurchase programme impact its completion rate? Formally, I test the following hypothesis.

Hypothesis 6 (*H6*): The stated motive of share repurchase programme is related to actual completion rate of announced repurchase programme.

The predictions in above mentioned hypotheses are based on the extant literature in the field.[29] Miller (2006) regards the role of financial press as a watchdog of accounting fraud. He argues that media fulfils this role either by rebroadcasting or by indulging in independent and original research and analysis. His results show that original investigation and analysis conveys new

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[29] Managers can also use buyback announcements to deceive the market. For example, Ahern and Sosyura (2014) show that corporation have an incentive to manage their media coverage to influence stock prices especially during important corporate events. They show that bidders in stock mergers attract a lot of media attention and hence originate substantially more news stories after the start of merger negotiations but prior to merger announcement. The strategy benefits bidder's shareholders as it results in temporary boost in bidder's stock price during the period when exchange ratio is determined, which substantially lowers the takeover cost. So, by managing media coverage managers can influence stock prices and may temporarily outsmart/fool the market. Similarly, in the case of buyback announcements as managers are not obligated to put their money where their mouth is, they can sound as positive or as optimistic as they like. Thus, one can also expect results that may not conform to the hypotheses mentioned above. So the research is also exploratory in nature besides being causal.

information to the market whereas those who rebroadcast from other intermediaries do not provide any additional information. It will be interesting to see how accurately media news coverage captures the information content and real intent behind manager's buyback announcements.

3.3 Data and research design

The data for the analysis are taken from multiple sources. First of all repurchase announcement data (repurchase announcement date and company identifier) are downloaded from the ThomsonOne banker. The sample data covers the period between 2001 and 2004. I restrict my sample to S&P 1500 firms. Only those announcements are kept in the dataset for which I can find accounting and returns data in the COMPUSTAT and the CRSP databases respectively. Actual repurchase announcement press release data are then individually downloaded using Factiva search engine. Factiva has major business and news journals that cover company press releases. Then actual press release for each announcement is saved into a separate file and coded. The coding scheme is important and necessary as it allows merging the results of disclosure tone of these press releases with other accounting and returns data from the COMPUSTAT and the CRSP.

To further differentiate my research from the existing literature, I read each repurchase announcement press release and classify these on the stated motivate of repurchase programme; the source of funds for repurchase activity, the news source that reports the press release, duration of the repurchase programme and the number of news sources that report on a specific repurchase announcement. I also look for any other news that is accompanied with repurchase announcement and classify these into two general categories good and/or bad.[30]

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[30] In consultation with (on advice of) my supervisor I work with a sample of 351 repurchase announcements given the nature of data collection process and scope of this research.

All of these sub-classifications will help to explore the topic in much greater detail compared to what has been covered by existing research. For example, the general consensus in finance literature is that buyback announcements represent managerial signal of firm undervaluation and the market reaction to these is positive on average. However, the underlying motivation for repurchase announcement may vary. Academic literature has cited several motivations for repurchase activity ranging from undervaluation to capital restructuring, from distributing excess cash to mitigate the effect of dilution and to manage EPS. An interesting research question thus is; are all repurchase announcements regarded as the same and have similar signalling power irrespective of the stated reason; or the signalling effect varies across stated reason(s) and the market reacts accordingly. It is reasonable to assume that an efficient market reacts differently to a buyback announcement motivated by undervaluation reasons as compared to a repurchase announcement made with the intention to offset dilution or gain some flexibility in managing firm resources.

Peyer and Vermaelen (2009) find that the stated reason for the repurchase programme in press release contains economically valuable information. They classify repurchase announcements in to six categories and note that several announcements mention more than one reason to justify the repurchase programme. Bonaimé (2012) however note that each repurchase programme announcement can correspond to up to 3 reasons; however firms rarely mention more than two reasons. In my dataset, I use the first two reasons mentioned in an announcement as the motive of repurchase programme. Each announcement is read and stated reason(s) are identified, classified and coded in to six categories which are as follows.

1. Undervaluation: The category includes repurchase announcements where managers believe that the market has mispriced the stock and the stock is trading below its fair value. Such announcement

typically refer to the following terms in press release; undervaluation, low current stock price, stock price underperformance, best use of funds, regards stock as good investment or return on investment etc. Since Peyer and Vermaelen (2009) regard the stated purpose of "best use of funds" in their undervaluation category, I group the two into the same undervaluation category.

2. Capital structure adjustments: These announcements typically refer to terms such as change in capital structure, adjust capital structure, to change debt to equity ratio or to offset dilution.

3. Corporate use: This is the general purpose that firms mention more frequently to justify stock repurchases. I include announcements in this category that mention the terms; corporate use, general corporate purposes. I also include announcements in to this category if firms repurchase stock for Employees Stock Option Programme (ESOP).

4. Return cash: Repurchase programmes initiated with the motive to return excess cash to shareholders. The general terms used in these announcements are; to return cash, return excess cash, return capital etc.

5. Earnings per share (EPS) and flexibility: This category includes repurchase announcements where managers express that they intend to repurchase shares to strengthen their EPS number or to gain some financial flexibility.

6. Legal: If firms repurchase due to legal reasons such as an SEC rule change or for legal settlement purposes.

Similarly, I also look for other information in share repurchase announcement news. The buyback announcements are classified based on the nature of such additional information that accompanies share repurchase announcement. This additional information varies in scope and covers topics

related to both internal matters as well as external environment of the firm in which it operates. I broadly categorise and condense this additional information into two categories; "good news" and "bad news". Good news category contains announcements that pass on another positive news along with the buyback announcement and bad news group includes announcements that have a bad news in the buyback announcement. Although, it is nearly impossible to isolate the impact of two news announcements but the objective here is to see how the market reacts to such repurchase announcements given this additional information.

3.3.1 Variables definitions

The primary variable of interest in this study is the disclosure tone of repurchase programme announcement besides the stated motives of the repurchase programme. Since the tone measure is based on soft (qualitative) data, the first step is to transform the unstructured text document in to a structured way of presentation that can be analysed more robustly. Following Tetlock et al. (2008) each text document is regarded as a "bag of words scheme" which represents all the word in the document as a "document-term-matrix". In order to infer meaningful information from this document-term-matrix, the information is condensed into two main variables using Henry-IV psychosocial dictionary of positive and negative words. I use Diction textual analysis software to perform content analysis on share repurchase announcement press releases. Diction provides average scores of positive and negative narrative disclosure tone used in a document. The positivity (tone) variable is then defined as the difference between the positive and negative tone scores scaled by their sum following Uang et al. (2006) and Henry (2008).[31]

Loughran and McDonald (2011) use different lists of positive and negative words that they believe are more appropriate to perform content

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[31] For a list of positive and negative words used in the study please refer to Henry (2008).

analysis on financial documents. They show that their list of words is better at capturing information contained in company 10K filings. However, in my data content analysis is performed on media press releases of share repurchase programme announcements which are different from company's annual reports. However, given the nature of my data, I use Henry's list of positive and negative words as it has been applied in a similar context. Henry (2008) applies these dictionaries to analyse firm's earnings press releases. To control for the variations in disclosure size and type, I include total number of words and the frequency of numeric terms used in the press release as additional control variables.

Abnormal repurchase announcement returns around the event are calculated using the standard event study approach. The 3-day (-1, 1) Cumulative Abnormal Return (CAR) is calculated around the event date (day 0). First, abnormal returns are calculated and then abnormal return is accumulated over the event window (-1, 1). Abnormal returns are defined as the excess returns due to the announcement over unconditional (without announcement) expected returns

$$AR_{it} = R_{it} - R_{mt}$$

where AR_{it} is the abnormal return on security i at time t. R_{it} is the conditional return and R_{mt} is the expected return on the market portfolio. Both equal weighted and value weighted market portfolio are used to calculate abnormal returns. The CAR approach accumulates daily abnormal return (AR) over a time horizon of t_1 and t_2 (estimation window).

$$CAR(t_1, t_2) = \sum_{t=t_1}^{t_2} AR_{it}$$

And the mean CAR is calculated as,

$$\frac{1}{n}\sum_{i=1}^{n} CAR(t_1, t_2)$$

Where *n* is the number of firms in the sample.

I following Ikenberry et al. (1995) and calculate longer-term firm performance by using Buy-and-Hold Abnormal Return (BHAR) approach. Taffler et al. (2004)favor it as it accurately captures actual investor experience. The BHAR approach is simple and intuitive. It simply compares the multiperiod returns from a buy-and-hold strategy of event firms against that of the market portfolio. Thus abnormal return of stock repurchase firms is simply the difference between their return and the return on benchmark portfolio.

$$BHAR_i(t, T) = \prod_{t=1 \, toT} \left(1 + R_{i,t}\right) - \prod_{t=1 \, toT} \left(1 + R_{B,t}\right)$$

Returns are calculated for time period *T* for security *i*. R_B is the return on the benchmark portfolio. Just as in short term return calculations, I use both equal weighted and value weighted market portfolios as benchmarks separately. Average buy and hold abnormal returns for the event firms and the market portfolio are calculated using monthly returns data. BHAR is calculated over a period of three years post announcement (i-e. from the month of the announcement to 36th month after the announcement or up to the end of the period for which data is available). Mean buy and hold abnormal return is the difference between the average buy and hold return of the event firms and that of the benchmark portfolio for the event window.

The focus of my analysis is on the disclosure tone of repurchase announcements and its effect on the market reaction to repurchase announcement. In order to fully understand the role of disclosure tone in repurchase programme announcements, I control for other factors that are likely to affect my dependant variables – (announcement) returns and completion rates. Prior literature has identified a number of factors that can

influence the market reaction to repurchase announcement. One such factor is equity undervaluation and is often mentioned as a motivation for the initiation of repurchase programme (see e.g., Brav et al. (2005); Peyer and Vermaelen (2009); Bonaimé (2012) and Chen and Wang (2012)). To proxy for firm undervaluation, I use lagged returns and ratio of book to market value. Lagged returns are calculated as buy and hold returns for a 30-day period prior to the announcement, starting from -2 days to -32 days. Book-to-Market (B/M) is simply the ratio of book value of firm assets to market value of firm assets and is measured at the end of the fiscal year prior to repurchase announcement.

Ho et al. (1997) find a positive relationship between buyback announcement returns and degree of asymmetric information between executives and outside investors. Following them and Bonaimé (2012), firm size is used as a proxy for information asymmetry. Firm size is measured as natural log of firm's market value at the end of the fiscal year prior to the repurchase announcement. Jensen (1986) suggests that firms with higher levels of cash are more likely to suffer from potential agency problems. To control for potential agency problems, I use cash as a control variable. Cash is defined as book value of cash and short term marketable securities scaled by total assets of the firm.

Firm's cash flows proxy for its capacity to complete its announced repurchase programme. Firms that generate more cash flows are more likely to have higher completion rates. Cash flows are defined as the operating cash flows of the firm which are scaled by total firm assets at the beginning of the year prior to the announcement. Dittmar (2000) and Skinner (2008) show that firm's capital structure also has a bearing on managements' decision to repurchase shares; hence, I use leverage as a control variable. Leverage is defined as the ratio of total liabilities to total firm assets using fiscal year end values before the repurchase announcement.

In addition, Chen and Wang (2012) suggest that financial constraints also play a role in explaining the market reaction to repurchase announcements. They show that financially constrained firms earn lower return on buyback announcement as compared to unconstrained firms. In order to approximate financial constraints experience by a firm they use Kaplan and Zingales (1997) (KZ) index. A higher value of KZ index represents more financial constraints on the firm.[32] Chan et al. (2010) suggest that firm's discretionary accruals also have an effect on OMSR announcement returns. I measure earnings quality using the Sloan (1996) model and decompose it into discretionary and non discretionary accruals using the Jones (1991) model. The details of the estimation procedure are explained in appendix II. Stephens and Weisbach (1998) show that the market possesses some ability to predict actual repurchases at the time of repurchase announcement. They show that initial buyback announcement returns are positively related to actual buybacks post-announcement. Therefore, I control for the effect of actual share repurchases post-announcement on repurchase announcement returns.

Actual repurchase completion rate calculations require an accurate measure of actual repurchase activity. Stephens and Weisbach (1998) highlight the problems in estimating actual share repurchases as it can neither be observed at the time of the announcement nor can be estimated with accuracy afterwards. However, an SEC rule change in December 2003 now requires firms to report the number of shares repurchased in each quarter.[33] Banyi et al.

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[32] The following formula is used to calculate the KZ score. $KZ = -1.002 * (CF_T/TA_{T-1}) -39.368 * (DIV_T/TA_{T-1}) - 1.135 * (CA_T/TA_{T-1}) + 3.139 * (LEV) + 0.283 (Q)$.
Where CF is the cash flow, DIV is the dividend and CA represents current assets of the company for the year. All these variables are scaled by lagged total assets of the firm. LEV is the ratio of total debt and book value of assets and Q is the ratio of market-to-book (M/B) value of the firm's assets.

[33] On Dec. 17, 2003, the Securities and Exchange Commission (SEC) began requiring all repurchasing firms to report the total number of shares repurchased, the average price paid per share, the number of shares that were purchased as part of a publicly announced repurchase plan, and the maximum number (or approximate dollar value) of shares remaining under other plans. This regulation applies to all quarterly and annual filings for periods ending on or after Mar. 15, 2004.

(2008) show that although no proxy is without error, however, they find Compustat's purchase of common and preferred stock minus any decrease in redeemable preferred stock to be least problematic, especially for firms with high levels of equity offerings or option exercises. To calculate the number of shares repurchased, I divide this number by the quarterly closing price of the firm. This yields the number of shares repurchased that is then scaled by total number of shares outstanding to estimate the percentage of shares repurchased. These quarterly repurchases are summed over a period of one year (4 quarters) following Chan et al. (2010). Finally to determine the percentage of shares actually repurchased in relation to the announced repurchase programme size, cumulative actual repurchases are divided by the intended size of the repurchase programme mentioned at the time of announcement.

3.3.2   Summary statistics

Table 3.1 presents descriptive statistics of the sample data. The table reports frequency distributions of share repurchase announcements along with their relative frequency by year. In addition, the table reports average short-term announcement returns, average percentage of intended repurchase programme size, average market value as expressed in natural log terms and the average Book-to-Market (B/M) value by year. The table shows that repurchase announcing firms intend to repurchase around 7.26% of their outstanding shares, on average. The average market value and book-to-market ratio of share repurchase announcing firms are 2,752 million dollars and 0.49 respectively. Mean 3-day cumulative abnormal return (CAR) around the buyback announcement is 0.67% which is lower than the number reported in earlier studies.[34]

Table 3.2 provides summary statistics on repurchase announcement returns, firm characteristics and disclosure tone of repurchase announcement

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[34] This may be due to the time period variations and lower number of observations used in the study.

press releases for sample firms. The table reports number of observations, mean, standard deviations, 10th, 50th and 90th percentiles for each variable. Repurchase announcement disclosure tone, on average, is positive with a mean value of 0.47. Sample firms on average earn an annual buy-and-hold abnormal return of around 2.56% over the next three years. So these firms outperform the market by more than 7.7% over the next 3-years post-announcement. The returns data are windsorized at the 5% and 95% levels to remove impact of extreme outliers which lowers the mean return values reported in the paper. The sample firms are not highly levered, have an average book-to-market ratio of 0.49 and repurchase around 73% of the announced repurchase programme size.[35]

Similar to Brav et al. (2005), I find that the most common motive for repurchase programme initiation appears to be undervaluation. Thirty one percent of sample firms mention undervaluation as a motive for announcing a repurchase programme, followed by corporate use motive (25%). Nearly half (47%) of all repurchase announcements contains other news information as well and most of these have positive news and only a handful contain a bad news. On average, repurchase announcement press releases have 185 words. Around 11% text of these press releases comprises of numeric terms, on average. More than one news agency reports repurchase announcement press release of a company and nearly half of these come from Dow Jones News Service (DJNS) in my dataset.

3.4   Results

Table 3.3 presents the relative frequency of the stated motives of repurchase announcements. Stock undervaluation is the most referred to motive for share repurchases in the repurchase announcement press releases (95). This is followed by general corporate use motive (72) and the motive to return cash to

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[35] Actual repurchase percentage is not truncated at the maximum level i-e. 100% repurchase of announced shares. Some firms repurchase more shares than the announced repurchase programme size.

shareholders (20). Repurchase announcements mentioning EPS and capital structure adjustment as a motive to repurchase shares have the same frequency (14) in this sample. Frequency of repurchase announcements mentioning legal reasons (13) is low and such announcements are not accompanied by any other stated motive for the repurchase programme.

Distribution of short-term announcement returns by the stated motive highlights an interesting fact that not all buyback announcements are received as value signalling by the market. The market does seem to pay attention to the stated motive of repurchase programme and reacts accordingly. For example, the observed announcement returns are highest for firms that repurchase for undervaluation reasons (1.11%) significant at the 5% level. Average announcement returns for repurchase programmes initiated for reasons other than undervaluation are not statistically different from zero.[36] Long-run returns of these firms are also not statistically different from zero.

Firms that repurchase due to legal reasons experience a negative announcement returns which are slightly significant at the 10% level. However most of these announcements were made immediately after the 9/11 terrorist attacks when the market was down and investor confidence was at its lowest. This might bias the initial announcement returns downwards and possibly have caused the negative returns reported in table 3.3. These firms however earn highest longer term abnormal returns though not statistically significant. Interestingly, firms that make a repurchase announcement without specifying any motive earn significant announcement as well as long-run abnormal returns. Thus an interesting research question here is: why firms mention any motive at the time of announcement? Other categories that show better longer-term performance are the ones that repurchase either for corporate use or for EPS or flexibility reasons, though the number are not statistically significant.

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[36] The absence of statistical significance with announcement returns might be attributed to lower number of observations for such motives.

These findings are similar to Ikenberry et al. (1995) and Peyer and Vermaelen (2009) in the sense that the market reaction to the share repurchase announcement is highest for firms that initiate repurchase programme due to firm undervaluation. Mean CAR reported in the paper is lower as compared to earlier studies. This may however be due to differences in sample selection, differences in time period and most likely due to fewer number of observations used in the study. Bargeron et al. (2014) show that long-run abnormal performance of repurchasing firms is attributable to firms that announce subsequent repurchase programme authorizations and takeover attempts. I also find that firms that repurchase for corporate use reasons earn better long-run returns. Shares repurchased under the general purpose category or for corporate use purposes include their use in takeovers and mergers and acquisition transactions.

Table 3.4 shows mean return statistics of share repurchasing firms by nature of any other news contained in the repurchase announcement press release. Mean return results suggest that firms that announce a repurchase programme without any other news earn an announcement return of around 0.69% and an annual buy and hold abnormal return of around 4.02% both significant at the 5% level. Repurchase announcements that contain a good news as well are discounted by the market and the observed announcement return on average is only 0.38% and the annual buy and hold return is around 1.74%, both numbers are not statistically different from zero.

Firms that share a bad news along with repurchase announcement are also discounted given the presence of a bad news and earn an insignificant announcement return of 0.78%. Also there is no observable long-run abnormal stock performance for such buyback announcements. Buyback announcements that contain a mixed signal by having both a good and a bad news are seen as more credible and the initial market reaction is much stronger with 3-day CAR around the announcement of around 3.9% which is significant at the 10% level.

The long run performance of these firms however is very poor with negative annual buy and hold returns of around 7%, though the number is not statistically different from zero at the conventional significance levels.

3.4.1 Firm characteristics, disclosure tone and returns

Panel A of table 3.5 presents univariate results on the determinants of short term announcement returns. Consistent with earlier studies, small firms earn significant abnormal returns on share repurchase announcement. The abnormal return for large firms is not statistically different from zero. The difference between announcement returns of small and large firms is 0.98% and is statistically significant at the 10% level. The finding is in line with Ikenberry et al. (1995) who show that small firms experience higher abnormal returns on repurchase announcement as compared to large firms. The return difference between low and high subsamples of data based on other firm and announcement characteristics is not statistically significant. However, the significance of announcement returns on these characteristics varies between subsamples.

Firms with lower B/M values earn significant abnormal returns on buyback announcement compared to high B/M value firms. Firms that experience poorer returns prior to buyback announcement earn an announcement return of 0.82% significant at the 5% significance level as compared to others that earn slightly significant return of 0.52%. Firms with lower cash flows earn higher and significant abnormal returns compared to firms with lower cash flows. The finding is inconsistent with the traditional agency theory that suggests firms with higher cash flows will benefit more from repurchase activity by reducing the agency costs of free cash flows. However, investors might view a repurchase announcement from a cash constrained firm as a stronger signal of management's belief in better future performance. Repurchase announcements are often viewed as a signal that the firm will generate higher cash flows in future. Managers by announcing the

repurchase programme are pre-committing to distribute these higher expected cash flows to shareholders. Chen and Wang (2012) also show that cash constrained firms, in fact, repurchase more shares post-announcement.

Firms that intend to purchase a lower percentage of number of outstanding shares earn significant abnormal returns as compared to firms that intend to purchase a greater portion of their outstanding shares. Consistent with Stephens and Weisbach (1998), announcement returns of firms that actually repurchase more shares is higher and significant compared to firms that repurchase fewer number of shares. This reflects that the market possesses some ability to predict actual repurchases at the time of announcement. The effect of any other news in the press release besides the share repurchase announcement is quite pronounced and such firms earn an abnormal return of 1.02% significant at the 1% level as compared to other repurchase announcement press releases that have no other news which earn an insignificant return of only 0.36%. Similarly, buyback news announcements that contain more numeric terms earn higher and significant abnormal announcement return of 0.8%.

Panel B of table 3.5 shows the effect of repurchase announcement disclosure tone on repurchase announcement returns. Each year I rank firms into terciles based on their disclosure tone measure. Firms in rank group 1 have the least positive disclosure tone in their buyback announcement press releases and firms in rank group 3 send the strongest signal by using more positive disclosure tone. Panel B1 (B2) shows mean short term (longer term annual buy and hold) abnormal returns for firms in each rank group.

The distribution of mean short term announcement returns by disclosure tone for each rank group provides support to hypothesis H1 that the market reaction is more positive for firms that use more positive disclosure tone in repurchase announcement press release. Firms that use more optimistic language in their open market repurchase press release generate an abnormal

return of 1.38% which is highly significant at the 1% level. In contrast, firms with least positive disclosure tone earn negative returns of 0.33% though not statistically different from zero. Mean difference in announcement returns of firms between rank groups 3 and 1 is 1.71% that is highly significant at the 1% level. Panel B2 of the table suggests that repurchase announcement disclosure tone has no impact on long-run performance of repurchase announcing firms.

3.4.2   Tone and short term returns

Table 3.6 reports regression results. I regress short-term repurchase announcement returns on the narrative disclosure tone of repurchase announcements and other control variables. Specifically, I run the following general multiple regression model that includes all the control variables.

$$R_{i,t} = \propto + \beta_1(\text{Positivity}) + \sum_{i=2}^{n} \beta_i \left(\text{control variables}_{i,t-1}\right) + \epsilon_i$$

where $R_{i,t}$ is the announcement return (3-day cumulative abnormal return around the repurchase announcement date). Positivity is a measure of repurchase announcement disclosure tone. Model-I simply regresses initial buyback announcement returns on the disclosure tone of repurchase announcements without any control variables. The regression coefficient is positive and highly significant. This is consistent with my hypothesis *H1* that there is a positive relationship between the narrative disclosure tone of repurchase announcement and the market reaction to it. A more positive announcement generates a stronger market reaction. A 1 unit change in disclosure tone positivity is associated with a change of 1.44% in short-term announcement returns - a result that is economically significant.

The multivariate regression results in model-II provide further support to hypothesis *HI* by showing that disclosure tone of the news announcement is significantly related to buyback announcement returns even after controlling for all other variables that may affect short term repurchase announcement

returns. Regression results show that a more positive disclosure tone positively affects the market perception about the repurchase announcement as value signalling and it responds more favourably. The coefficient on positive tone variable is highly significant reflecting the fact that it has significant explanatory power of short term announcement returns. In addition, as expected, the announcement returns are negatively related to firm size. This shows that smaller firms earn higher abnormal returns on share repurchase plan announcement. The regression coefficients on other control variables are not statistically significant.

The regression results in Model III and IV show the impact of disclosure tone on short term repurchase announcement returns for small and value firms respectively. Model V shows the impact of disclosure tone on share repurchase announcement returns when the buyback announcement contains a higher frequency of numeric terms. In model III, an interaction term of small firms and positive disclosure tone measure is regressed on CARs in addition to other control variables. Small x Positivity variable is generated by multiplying positivity tone measure with a size dummy variable that takes the value of 1 for sample firms with firm size below the sample median and 0 other wise. The coefficient on this variable captures the effect of repurchase announcement disclosure tone on initial announcement returns for small firms. Since small firms suffer from higher information asymmetry, a more positive disclosure tone for small firms thus generates a stronger market reaction to the news. The coefficient of this interaction term is 2.03 and is highly significant. The positivity (tone measure) in this specification estimates the disclosure tone effect for large firms. Its coefficient is not statistically significant. Thus, the positive tone effect on repurchase announcement returns are mainly driven by small firms. For large firms the impact of disclosure tone on announcement returns is insignificant. These findings are consistent with hypothesis *H2*.

Model IV takes into account the effect of positive disclosure tone on short-term announcement returns for value and growth firms. Value x Positivity variable is generated by multiplying positivity tone measure with a dummy variable. The dummy variable takes the value of 1 for sample firms with book to market values above the sample median and 0 other wise. The regression coefficient on this interaction is negative and significant which shows that the effect of positive disclosure tone on repurchase announcement returns is positive for firms with higher growth opportunities. One might expect this as higher growth opportunities might justify the optimistic disclosure tone and hence the market might see such announcements as more credible and value signalling.

In Model V I analyse the interactive relationship between the disclosure tone of repurchase news announcement and the presence of numeric terms in the news. Mercer (2004) argues that numbers are viewed as more credible and greater numerical precision in management forecasts increases investors' perception about credibility of management disclosure. One would expect that the impact of positive tone will be stronger if the announcement has higher numeric intensity. The interaction term Numeric x Positivity is calculated by multiplying positivity tone measure with a dummy variable that takes the value of 1 for firms with numeric terms above the sample median and 0 other wise. The coefficient on this variable is significant which provides support to Mercer (2004) argument. The impact of disclosure tone is positive on CARs when the repurchase announcement press release has more numeric terms in it. In contrast the positive tone has no effect on CARs when the announcement has fewer numeric terms in the news.[37]

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[37] Regression results in all model specifications remain robust and are very similar to ones reported in the tables when actual repurchases is excluded as an explanatory variable which might induce potential look-ahead bias.

3.4.3   Tone and long term returns

In table 3.7 I regress longer term returns on disclosure tone of share repurchase announcement and other control variables. Positive announcement tone seems to have no effect on long term firm performance. Longer term returns of buyback firms are affected by firm characteristics such as size, B/M, cash and cash flows. Size is negatively related to longer term returns of repurchasing firms. A 1 unit increase in natural log of market value (size) is associated with 1.78% decrease in annual buy and hold abnormal returns of repurchasing firms. As expected, B/M is significantly positively related to longer term returns of firms that announced a repurchase programme. The regression coefficient on B/M variable is relatively high. A one standard deviation change in book-to-market ration is associated with 2.92% change in annual BHAR. The finding is consistent with earlier evidence such as Ikenberry et al. (1995) and Peyer and Vermaelen (2009) who show that value firms earn significant longer term returns post-announcement. The regression coefficient on cash held by firms is negatively related to long run returns of repurchase announcing firms whereas firms that have higher operating cash flows do better in post announcement period. Interestingly, the coefficient on actual repurchases is negative showing evidence on managerial ability to time the market. Firms that repurchase more shares earn lower abnormal returns in the 3-year period post announcement. None of the other variables have any statistical significance.

Bonaimé (2012) and Peyer and Vermaelen (2009) show that firms that repurchase for undervaluation reasons earn significant longer term returns in the post announcement period. I test that in Model II of table 3.7. I do not find any relationship between the stated motive and long-run returns of repurchasing firms. The only motive that shows slight significance is legal reasons for the repurchase plan. However in my sample there are only 13 observations with the stated motive and most of these announcements were made when the market was down due to 9/11 terrorist attacks. Unlike Peyer

and Vermaelen (2009), the relationship between stated motive and long-run performance of repurchasing firms is not clear in this dataset.

3.4.4 Tone and actual repurchases

Table 3.8 presents tobit regression results of regressing actual share repurchases on the repurchase announcement tone and other determinants of actual repurchases. Model I presents the untruncated estimates whereas model II and III present the tobit estimates with truncation of dependant variable. Model II and III account for the censored nature of actual completion rates, which is naturally truncated at the lower bound at 0 and manually truncated at the 100% level on the upper bound. The coefficient on positive tone variable is not statistically different from zero. So the repurchase announcement disclosure tone has no explanatory power of actual repurchases post-announcement.

Actual repurchases are however positively related to cash flows and negatively related to the announced repurchase plan size. This shows that firm's ability to repurchase effects firm's decision to repurchase shares. A 1-standard deviation increase in cash flow is associated with 39.4% increase in firm's actual repurchases. The findings are similar to ones reported in Stephens and Weisbach (1998) who show that the combined effect of firm's expected and unexpected cash flows on actual share repurchases is around 38.37%, an effect that is economically meaningful and significant. Similar to Bonaimé (2012), I find a negative and significant relationship between actual repurchases and the size of announced repurchase programme. This is consistent with the idea that larger repurchase programmes are more difficult to complete. The marginal effect of announced repurchase plan size on actual share repurchases is -1.22%. consistent with Chan et al. (2004) and Bonaimé (2012) actual repurchase rates are negatively related to post-announcement returns, though the relationship is slightly significant at the 10% level.

Model III incorporates stated motives as additional explanatory variables of actual share repurchases. Unlike Bonaimé (2012), who find no relationship between the stated motive and actual completion rate, I find that firms that announced a repurchase plan for EPS/flexibility reasons or mentioned legal reasons for repurchasing shares actually repurchase fewer shares. The marginal effects of the two motives are also economically significant, i.e., 18.3% and 29.3% respectively.

3.5 Conclusion

Firms communicate with investors in a number of ways to convey economically meaningful information. Open market share repurchase announcements are often seen as a managerial signal of firm undervaluation and the market reaction to these is positive, on average. However, the most common form of repurchases – open market share repurchases are not binding commitments and often criticised to be regarded as a strong signal of equity undervaluation. The study investigates if the soft information passed on to investors at the time of repurchase announcement has some value relevance in explaining the initial market reaction to these announcements as well as longer-term returns post-announcement. I also test if the narrative disclosure tone of repurchase announcement can help predict actual repurchase completion rates of repurchase announcing firms. Specifically, I look at the narrative disclosure tone of repurchase announcement press releases and the role of the stated motive of repurchase programme on the above mentioned variables.

The analysis in this chapter suggests that not all share repurchase programmes create equal value for shareholders. The market tends to differentiate between share repurchase programmes initiated for different reasons. Consistent with Peyer and Vermaelen (2009), initial announcement return is highest for firms that mention undervaluation as a motive for stock repurchases. However, these firms show no long-run abnormal performance in my sample data. Firms that do not mention any reason in their repurchase

announcement earn both short term and long-run abnormal returns. Similarly, firms with no other news do better than firms with positive news. An interesting research question for future research is: why do some firms mention a reason/positive news if the market reaction is lower compared to firms that do not mention any reason/news in their repurchase announcement? Further empirical research is required to address the question to help us understand the discretionary disclosure options available to managers and why, when and how do they use these.

My results show that the initial announcement returns are significantly positively related to the disclosure tone of repurchase news announcement. The effect of disclosure tone is stronger for small firms – given higher degree of information asymmetry experienced by such firms, and firms with higher growth potential such as firms with lower book-to-market ratios. The positive tone impact is negative on short term announcement returns with higher B/M ratio (value) firms and positive for low B/M (growth) firms. Finally, I also find that positive disclosure tone effect is higher for firms that use more numeric terms in the news.

These results suggest that the repurchase announcement disclosure tone is value relevant information for investors. However the mechanism through which it affects announcement returns needs further exploration and is a limitation of this study. In this chapter I argue that a positive disclosure tone adds to the credibility of the undervaluation signal conveyed through repurchase announcements – which are inherently flexible and are not binding obligations. Thus the conditional variable disclosure tone in this case reinforces the undervaluation signal conveyed by repurchase announcement. However, there is also a possibility that disclosure tone may contain price sensitive information above and beyond the repurchase signal that results in a stronger market reaction. I find no relationship between repurchase announcement disclosure tone and longer term returns of repurchase announcing firms. Higher

announcement returns might be due to the positive tone effect. Repurchase announcement disclosure tone also appears to have no relationship with actual repurchase rates of firms that announced a repurchase programme.

Consistent with prior literature, I find evidence that small and value firm earn higher abnormal returns post-repurchase announcement. Stated motive of repurchase programme also has no explanatory power for longer term abnormal returns of share repurchase announcing firms. Actual share repurchases are strongly influenced by firm's ability to spend cash for share repurchase activity. Firms with higher cash flows repurchase a lot more compared to other firms. Firm's ability to complete a share repurchase programme is negatively related to announced repurchase programme size and also to post-announcement returns experienced by such firms. The stated motive(s) of repurchase programmes also have limited explanatory power for actual repurchase rates, if any.

In conclusion, the paper provides support to a number of findings reported in earlier studies and at the same time explores the effect of narrative disclosure tone of repurchase announcements on investors' reaction to repurchase announcement, longer term returns and actual repurchase decisions of repurchase announcing firms. The paper also contributes to the growing literature in finance that shows qualitative data contains value relevant information that was traditional ignored in the financial economics research. The analysis in this chapter also suggests that verbal content (soft information) of buyback announcements contain value relevant information for market participants and can explain initial market reaction to share repurchase announcement.

Table 3.1: Descriptive statistics of share buyback announcements

The table reports the distribution of repurchase announcements by year. Year represents the year of the announcement. Freq shows the number of announcements made in the year for our sample. % Freq is the percentage to total announcements in the given year. CAR is the 3 day cumulative abnormal return around the buyback announcement. % sought ratio is the percentage of outstanding shares that management states it intends to buyback at the time of announcement. Size is measured taking the natural log of the market value of the firm prior to the announcement. B/M is the ratio of book value of firm assets to its market value at the beginning of the year.

Year	Freq	% Freq	CAR	% sought	MV	B/M
2001	74	21.08	0.16	6.43	8.36	0.47
2002	94	26.78	0.88	6.06	7.78	0.50
2003	86	24.50	0.63	9.24	7.65	0.51
2004	97	27.64	0.89	7.29	7.97	0.49
All	351	100.00	0.67	7.26	7.92	0.49

Table 3.2: Summary statistics

The table reports the summary statistics of data. Positivity measures the tone of the repurchase news announcement. It is calculated as the difference between positive and negative tone estimates of diction using Henry IV psychosocial dictionary scaled by their sum. 3 day CAR is the 3 day (-1,1) cumulative abnormal return around the event date (day 0) using value weighted market return as benchmark return. Annual BHAR is the average annual buy-and-hold return of repurchasing firms. The buy-and-hold return is calculated over a period of three years post announcement against the value weighted market return as the benchmark and the three year BHAR is then divided by 3 to get annual BHAR. Size is measured the natural log of firm market value prior to the announcement. B/M is the ratio of book value of firm assets to its market value at the beginning of the year. Leverage is the ratio of total firm liabilities to total assets. Cash is the sum of cash and short term marketable securities scaled by total assets. Cash flow represents the cash flow from operations scaled by total assets. Prior BHR is the cumulative buy and hold return of the firm from 30 days prior to the announcement to 2 days before the announcement (-30 to -2). Financial constraints are measured by KZ index. Discretionary accruals are the discretionary firm accruals as measured by Jone's (1991) model. Actual Repurchases show the percentage of shares actually repurchased during the first four quarters of the announcement scaled by intended repurchase percentage. Undervalue, capital structure, corporate use, return cash, EPS/flexibility and Legal represent the stated motives of the repurchase plan. Secondary is an indicator variable 1 for secondary announcements and 0 otherwise.. Mentions represent the number of news agencies that reported the repurchase plan. Other news is a dummy variables equal to 1 if the there is any other news in the repurchase announcement and 0 otherwise. Total word and numeric terms represent the frequency of total words and numeric terms in buyback news announcement. Dow Jones news is a dummy variable equal to 1 if Dow Jones reported the repurchase plan and 0 otherwise.

				Percentiles		
Label	N	Mean	Std Dev	10th	50th	90th
Positivity	351	0.47	0.48	0	0.5	1
3 Day CAR	351	0.66	4.73	-5.38	0.62	7.23
BHAR	351	2.56	19.74	-22.32	-0.68	32.48
Size	351	7.92	1.66	6.04	7.78	10.19
Book to Market	351	0.49	0.23	0.2	0.5	0.77
Leverage	351	0.37	0.56	0.11	0.33	0.73
Cash	351	0.15	0.28	0.01	0.08	0.35
Cash flow	351	0.16	0.12	0.03	0.15	0.3
Prior return	351	-0.04	0.17	-0.26	-0.02	0.14
Financial Constraint	351	1.95	2.43	0.5	1.87	3.24
Discretionary Accruals	321	0.04	0.37	-0.19	0	0.34
Actual Repurchase	341	0.73	0.79	0.01	0.5	1.57
Undervalue	351	0.31	0.55	0	0	1
Capital Structure	351	0.04	0.2	0	0	0
Corp Use	351	0.25	0.52	0	0	1
Return Cash	351	0.06	0.23	0	0	0
EPS or Flexibility	351	0.04	0.2	0	0	0
Legal	351	0.04	0.19	0	0	0
Secondary	351	0.57	0.5	0	1	1
Media Mentions	351	1.72	0.79	1	2	3
Other News	351	0.46	0.5	0	0	1
Total Words	351	184.5	125.44	83	157	332
Numerical Terms	351	21.32	19.63	6	16	42
Dow Jones News	351	0.52	0.5	0	1	1

Table 3.3: Stated Motives, their relative frequency and returns

The table reports the frequency distribution of share buyback announcements by their stated motive. The numbers at the diagonals represent the frequency of the stated motive and the other numbers represent the joint frequency of motives where there was more than one stated motive. 3 day CAR is the 3 day (-1,1) cumulative abnormal return around the event date (day 0) using value weighted market return as benchmark return. Annual BHAR is the average annual buy-and-hold return of repurchasing firms. The buy-and-hold return is calculated over a period of three years post announcement against the value weighted market return as the benchmark and the three year BHAR is then divided by 3 to get annual BHAR.

	Undervalue	Capital structure	Corporate use	Return cash	EPS/flexibility	Legal	None
1	95						162
2	2	14					
3	14	8	72				
4	4	1	1	20			
5	3	2	3	1	14		
6	0	0	0	0	0	13	
3 day CAR	1.11**	0.65	-0.44	1.04	0.33	-2.61*	0.98***
Mean BHAR	0.49	-0.83	2.09	-0.97	2.01	7.07	3.61**

***,**,* represent significance at 1%, 5% and 10% significance levels respectively

Table 3.4: Announcement and long-run returns by other news type

The table reports the summary statistics announcement and post announcement long term returns by news type. News type is defined as a dummy variable equal to 1 it the news announcement contains any other information/news besides share repurchase programme announcement and 0 otherwise. Announcement returns are represented by CAR which is the 3 day (-1,1) cumulative abnormal return around the event date (day 0) using value weighted market return as benchmark return. Long term returns are represented by BHAR. Annual BHAR is the average annual buy-and-hold return of repurchasing firms. The buy-and-hold return is calculated over a period of three years post announcement against the value weighted market return as the benchmark and the three year BHAR is then divided by 3 to get annual BHAR.

News Type	N Obs	Variable	Mean	Std Dev	Min	Max
No News	177	CAR	0.69**	4.63	-9.59	9.25
		BHAR	4.02**	20.73	-26.39	47.56
Good News	133	CAR	0.38	4.38	-9.59	9.25
		BHAR	1.74	18.54	-26.39	47.56
Bad News	32	CAR	0.78	6.01	-9.59	9.25
		BHAR	0.54	19.50	-26.39	47.56
Both	9	CAR	3.9*	6.22	-9.59	9.25
		BHAR	-6.97	16.63	-26.39	18.57

***,**,* represent significance at 1%, 5% and 10% significance levels respectively

Table 3.5: Determinants of buyback announcement returns

The Panel A of the table reports the mean three day cummulative abnormal returns (CAR) of share repurchasing firms for subsets of data, subsets are formed by segmentng the dataset in to low and high groups of firms for each determinant. Low (High) means that the subsample contains firms with below (above) the median value of the determinant. For a definition of determinants please refer to description of table 2. In Panel B, panel B1 and B2 report the mean 3 day (-1,1) CAR and the mean annual BHAR of firms that are ranked by the tone of repurchase announcemnet news respectively. The last row panel of panel B1 and B2 report the difference between the mean returns of firms in rank group 3 and the firms in rank group 1 along with the significant test of difference of means between the two groups. Firms are sorted in 3 groups based on the tone score of firm in each year. Tone measures the positivity of the repurchase news announcemnet and is calcuted as the difference between the positive and negative tone score of each news announcement scaled by their sum. Diction is used to calculate positive and negative tone measures using Henry IV psychosocial dictionary.

Panel: A				
Determinant			**Low - High**	
	Low	**High**	**Difference**	**t-stat**
Size	1.15***	0.17	0.98*	1.96
Book to Market	0.83**	0.50	0.33	0.65
Prior return	0.82**	0.50*	0.32	0.62
Cash flow	0.95***	0.35	0.60	1.18
Percent sought	0.80**	0.52	0.28	0.55
Actual Repurchase	0.36	0.97***	-0.62	1.22
Other News	0.36	1.02***	-0.65	1.30
Total Words	0.60*	0.72*	-0.12	0.23
Numerical Terms	0.53	0.80**	-0.26	0.52

Panel: B				
Positivity Rank	**B1: CAR**			
	N	**Mean**	**t Value**	**Pr > |t|**
1	117	-0.33	-0.73	0.464
2	110	0.91*	1.9	0.060
3	124	1.38***	3.58	0.001
Difference (3 - 1)		1.71***	2.91	0.004
	B2: BHAR			
1	117	3.34	1.61	0.109
2	110	2.00	1.12	0.267
3	124	2.31	1.43	0.154
Difference (3 - 1)		-1.03	0.39	0.693

***,**,* represent significance at 1%, 5% and 10% significance levels respectively.

Table 3.6: Effect of disclosure tone on short-term returns

The table reports the regression results. The dependent variable is the 3-day (-1, +1) cumulative abnormal return (CAR) around the event date (day 0) using value weighted market return as benchmark. The main independent variable is Positivity. Positivity measures the tone of the repurchase news announcement. It is calculated as the difference between positive and negative tone estimates of diction using Henry IV psychosocial dictionary scaled by their sum. Please refer to description in table 2 for a definition of control variables. Small x Positivity, Value x Positivity and Numeric x Positivity is the interaction of dummy variables with positivity where small, value and numeric are dummy variables equal to 1 for small firms, value firms and announcement with high frequency of numeric terms and 0 otherwise respectively. White (1980) heteroskedasticity-consistent standard errors are used to compute t-statistics.

Label	Model I		Model II		Model III		Model IV		Model V	
	Coeff.	t-stat	Coeff.	t-stat	Coeff.	t-stat	Coeff.	t-stat	Coeff.	t-stat
Intercept	-0.02	-0.06	2.43	1.42	-0.45	-0.43	2.01	1.25	**3.33****	**1.97**
positivity	**1.44*****	**2.86**	**1.59*****	**2.83**	0.54	0.84	**2.23*****	**3.13**	0.94	1.58
Size			**-0.38****	**-2.1**			**-0.36****	**-1.98**	**-0.44****	**-2.47**
Book to Market			-0.52	-0.42	-0.62	-0.49			-0.76	-0.63
Leverage			-0.35	-0.94	-0.40	-0.91	-0.27	-0.79	-0.41	-1.25
Cash			0.47	0.32	0.59	0.39	0.42	0.29	0.29	0.20
Cash flow			-1.83	-0.73	-1.84	-0.73	-2.20	-0.86	-1.60	-0.64
Prior return			0.81	0.46	1.12	0.62	0.85	0.48	0.21	0.12
Financial constraint			0.04	0.41	0.04	0.41	0.06	0.64	0.02	0.21
Repurchase Plan Size			0.00	0.05	0.02	0.34	0.01	0.13	0.00	0.02
Discretionary Accruals			-0.84	-1.1	-0.75	-0.99	-0.75	-0.98	-0.79	-1.04
Actual Repurchase			0.55	1.55	0.50	1.44	0.48	1.34	0.53	1.46
Other news			0.84	1.36	0.62	1.02	0.81	1.32	0.51	0.85
Total Words			0.00	1.01	0.00	0.92	0.00	1.09	0.00	0.27
Numeric terms			-0.02	-0.54	-0.01	-0.41	-0.02	-0.54		
Small x Positivity					**2.03****	**2.56**				
Value x Positivity							**-1.36***	**-1.71**		
Numeric terms x Positivity									**1.89****	**2.36**
Adjusted R-Sq.	0.018		0.022		0.026		0.030		0.034	

***,**,* represent significance at 1%, 5% and 10% significance levels respectively

Table 3.7: Determinants of long-term returns

The table reports the regression results. The dependent variable is annual BHAR. Annual BHAR is the average annual buy-and-hold return of repurchasing firms. The buy-and-hold return is calculated over a period of three years post announcement against the value weighted market return as the benchmark and the three year BHAR is then divided by 3 to get annual BHAR. Positivity measures the tone of the repurchase news announcement. It is calculated as the difference between positive and negative tone estimates of diction using Henry IV psychosocial dictionary scaled by their sum. . Size is measured the natural log of firm market value prior to the announcement. B/M is the ratio of book value of firm assets to its market value at the beginning of the year. Leverage is the ratio of total firm liabilities to total assets. Cash is the sum of cash and short term marketable securities scaled by total assets. Cash flow represents the cash flow from operations scaled by total assets. Prior BHR is the cumulative buy and hold return of the firm from 30 days prior to the announcement to 2 days before the announcement (-30 to -2). Financial constraints are measured by KZ index. Actual Repurchases show the percentage of shares actually repurchased during the first four quarters of the announcement scaled by intended repurchase percentage. Discretionary accruals are the discretionary firm accruals as measured by Jone's (1991) model. Undervalue, capital structure, corporate use, return cash, EPS/flexibility and Legal represent the stated motives of the repurchase plan.

Label	Model I		Model II	
	Coeff.	t-stat	Coeff.	t-stat
Intercept	11.16	1.67	10.6*	1.61
positivity	0.78	0.33	1.35	0.58
Size	**-1.71****	**-2.59**	**-1.78****	**-2.61**
Book to Market	**12.7****	**2.51**	**12.7****	**2.53**
Leverage	0.14	0.08	0.21	0.13
Cash	**-8.6*****	**-2.96**	**-10.1*****	**-2.75**
Cash flow	**19.4****	**2.08**	**19.3***	**1.96**
Prior return	-0.27	-0.03	1.49	0.19
Financial constraint	0.25	0.84	0.27	0.92
Repurchase Plan Size	0.17	0.78	0.22	1.04
Discretionary Accruals	-3.12	-1.13	-3.42	-1.28
Actual Repurchase	**-2.55****	**-2.26**	**-2.04***	**-1.75**
Other news	-1.11	-0.46	-0.54	-0.22
Total Words	-0.02	-1.54	-0.02	-1.41
Numeric terms	0.03	0.42	0.03	0.46
Undervalue			-0.23	-0.10
Capital Structure			-0.50	-0.10
Corp Use			-0.94	-0.51
Return Cash			-5.53	-1.51
EPS or Flexibility			-1.14	-0.24
Legal			**13.8***	**1.74**
Adjusted R-Sq.	0.055		0.057	

***,**,* represent significance at 1%, 5% and 10% significance levels respectively

Table 3.8: Actual repurchases tobit regressions

Table 8 presents coefficient estimates from tobit regressions on actual repurchase rates. Model I is untruncated and Model II and III are truncated at 100% of actual repurchases. Positivity measures the tone of the repurchase news announcement. It is calculated as the difference between positive and negative tone estimates of diction using Henry IV psychosocial dictionary scaled by their sum. . Size is measured the natural log of firm market value prior to the announcement. B/M is the ratio of book value of firm assets to its market value at the beginning of the year. Leverage is the ratio of total firm liabilities to total assets. Cash is the sum of cash and short term marketable securities scaled by total assets. Cash flow represents the cash flow from operations scaled by total assets. Prior BHR is the cumulative buy and hold return of the firm from 30 days prior to the announcement to 2 days before the announcement (-30 to -2). Financial constraints are measured by KZ index. . Actual Repurchases show the percentage of shares actually repurchased during the first four quarters of the announcement scaled by intended repurchase percentage. Discretionary accruals are the discretionary firm accruals as measured by Jone's (1991) model. Undervalue, capital structure, corporate use, return cash, EPS/flexibility and Legal represent the stated motives of the repurchase plan.

Label	Model I		Model II		Model III	
	Coeff.	t-stat	Coeff.	t-stat	Coeff.	t-stat
Intercept	1.04***	3.84	0.70***	4.28	0.66***	4.06
positivity	-0.02	-0.23	-0.03	-0.48	-0.06	-1.02
Size	-0.03	-0.97	0.00	-0.04	0.01	0.57
Book to Market	-0.13	-0.57	-0.02	-0.16	-0.03	-0.26
Leverage	0.02	0.24	0.00	-0.04	0.00	-0.08
Cash	-0.21	-1.28	-0.18	-1.85	-0.13	-1.35
Cash flow	1.23***	2.96	0.57**	2.23	0.49*	1.95
Prior return	0.08	0.28	0.20	1.17	0.20	1.15
Annual BHAR	-0.004*	-1.90	-0.002*	-1.66	0.00	-1.25
Financial constraint	0.00	-0.04	0.00	0.01	0.00	0.06
Repurchase Plan Size	-0.026***	-3.12	-0.015***	-2.98	-0.015***	-3.06
Discretionary Accruals	-0.12	-1.02	-0.05	-0.74	-0.05	-0.73
Other news	-0.03	-0.34	-0.05	-0.78	-0.09	-1.44
Total Words	0.00	0.58	0.00	0.61	0.00	0.27
Numeric terms	0.00	-0.21	0.00	-0.31	0.00	-0.19
Undervalue					0.08	1.6
Capital Structure					0.08	0.59
Corp Use					-0.02	-0.38
Return Cash					0.16	1.33
EPS or Flexibility					-0.23*	-1.77
Legal					-0.37**	-2.37
No. Of Obs.	311		311		311	
Log Likelihood	-359.48		-222.12		-215.05	

***,**,* represent significance at 1%, 5% and 10% significance levels respectively

Chapter 4

Insider Trading and Open Market Share Repurchases

4.1 Introduction

The corporate finance literature regards open market share repurchase announcements as a managerial signal of equity undervaluation. A survey of US corporate executives on firm payout policy suggests that undervaluation is the primary rationale behind managements' decision to repurchase a firm's stock (Brav et al. (2005)). However, the market may not view such an announcement as a strong signal of undervaluation. This is partly due to the fact that firms are increasing relying on share repurchases to distribute cash to shareholders as an alternative to dividends (see e.g., Fama and French (2001); Grullon and Michaely (2002) and Skinner (2008)); and partly because open market repurchase announcements only represent managements' commitment to repurchase shares but are not binding obligations on the part of firm management to complete (Stephens and Weisbach (1998) and Chan et al. (2010)).

In addition to the above factors investors may also discount the open market repurchase "signal" due the possibility that such an announcement may be driven by managerial incentives rather than signalling stock undervaluation to investors. As the market generally views the repurchase announcement as good news, managers may announce the repurchase programme to sell their shares at higher post-announcement prices. Edmans et al. (2014) demonstrate that managers' strategically time the disclosure of positive news (in months in which their equity vests), so that they can cash out at a higher stock price. Fried (2001) and (2005) also suggests that open market repurchase announcements reflect opportunistic managerial behaviour and claims that the empirical

evidence on share repurchases is more consistent with his "managerial opportunism" theory as compared to signalling theory.

The intuition in this paper is that the market should respond more favourably to a repurchase announcement when insiders' private information, as reflected in their personal trades, supports the repurchase signalling theory. The objectives of this study are twofold. First, I argue that a repurchase announcement will be a more credible signal of equity undervaluation when it is supported by insider actions. Specifically, insiders who buy more (or sell less) stocks of their firm before an open market repurchase announcement signify that they believe their stock to be under-priced. Holding additional firm's equity is costly and exposes already undiversified insiders to considerable risk. This is particularly true if the stock is overpriced. So, investors should take into account how insiders have traded in their personal account before the repurchase announcement in their reaction to stock buyback signal. Second, there is also a possibility that insiders may announce a repurchase programme to cash out at a higher post-announcement price (Fried (2005)).[38] If this is the case then such insiders are more likely to sell after the repurchase announcement. These post-announcement insider sales will be particularly beneficial for insiders when announcement returns are high. So, post-announcement insider sales will be higher when repurchase announcement returns are high.

Seyhun (1998) and Lakonishok and Lee (2001) argue that small firms present the greatest potential of gains from insider trading. Smaller firms are more likely to be mispriced compared to large firms as the latter are under more scrutiny from analysts and media, and thus are generally priced more efficiently. They claim that insiders can predict long-run price performance of small firms (for up to two year) and hence can trade profitably in such firms.

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[38] Fried (2001) suggests that repurchase announcements can be used as a false signalling device as these are not binding obligations on part of the management. Massa et al. (2007) and Chan et al. (2010) provide evidence that managers use repurchase programmes to fool the market.

Therefore, I expect higher insider sales post-announcement for small firms. Similarly, I expect higher post-announcement insider sales for growth firms where the repurchase announcement is less likely to be a signal of stock undervaluation.

Finally, I explore the signaling effect of post-announcement insider trades on a firm's longer-term stock price performance. Insiders will sell more stock of their firm when they believe it to be either over-priced or at least not significantly under-priced. Thus post-announcement insider trades signal insiders' private information about a firm's true value. Thus, firms where insiders sell more shares post-announcement should not outperform or underperform in the long-run as compared to other repurchase announcing firms where insiders retain more equity in their firm. Therefore, I expect post-announcement net insider sales to be either unrelated or negatively related to longer-term returns of repurchase announcing firms.

I test these predictions by employing a sample of 8,945 open market repurchase programmes announced between 1990 and 2012. My analysis suggests that the repurchase announcement returns are higher for firms where insiders retain more equity (purchase more or sell fewer stocks) in their firm prior to the event (repurchase announcement). Firms with lower net insider sales earn buy-and-hold abnormal return of 2.4 percent in the 3-day (-1, 1) window around the event, that is 0.80 percent greater than firms with higher net insider sales before the event. The difference is highly significant at conventional levels.[39] However, pre-announcement trades affect only short-term announcement returns and I find no significant difference in longer-term returns of the two groups.

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[39] The results hold when event firms are sorted on 6-month trading window before the announcement. Although, the magnitude of return difference between low and high net insider sales groups is smaller in this case but the difference is still statistically significant. 5-day (-2, 2) return difference between the two groups is similar to the number reporter above.

My regression results indicate that short-term repurchase announcement returns are significantly related to pre-announcement insider trades. Insider trading literature suggests that purchases are more informative than insider sales as insiders may sell for reasons unrelated to signalling.[40] For example, Lakonishok and Lee (2001) show that only insider purchases provide value relevant information while insider sales have no predictive ability. Though pre-announcement insider purchases are strongly positively related to the 3-day announcement returns but I find that insider sales are also negatively related to returns. The market reaction to repurchase announcement is stronger for undervalued (value) firms and for firms that suffer from higher information asymmetry (small firms). My results also indicate that pre-announcement insider trades closer to the event are more value relevant as the 3-month insider trading has a stronger effect on the 3-day returns as compared to insider trades during the 6-month period.[41]

Next I investigate the relationship between post-announcement insider trades and repurchase announcement returns. Consistent with Fried's (2005) theoretical argument that manager may announce repurchase programmes to sell their shares at a higher price, I find empirical evidence that insiders sell more shares in the 3-month window post-announcement as compared to pre-announcement 3-month window. There however is no significant difference in insider purchases between the two periods. In order to minimize the litigation risk, insiders trade more cautiously in the 6-month (-3, 3) window centred on the repurchase announcement date as compared to the 12-month (-6, 6) window.

Analysis of insider trades based on firm characteristics indicates that insiders sell (purchase) more (less) shares when their firm is less likely to be

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[40] Ofek and Yermack (2000) and Jin (2002) show that insider sales may be driven by reasons other than signalling such as liquidity needs and option exercises or stock-based grants.
[41] Regression coefficients on 3-month insider trade variables (purchases, sales, net sales) are higher than those of 6-month insider trades.

undervalued. Insiders also sell significantly more shares when repurchase announcement returns are high allowing them to cash out at higher stock prices. I further show that controlling for repurchase announcement returns, insiders sell more shares when a firm is less likely to be under-priced (low book-to-market ratio) and offers potential gains to exploiting insider trades (small firms). Regression results show that insider sales (purchases) are significantly positively (negatively) related to short-term announcement returns suggesting that insiders sell greater number of shares when repurchase announcement returns are high. These findings provide empirical evidence that insiders may use repurchase programmes in their self-interest rather than signalling undervaluation. This is the first research study (to the best of my knowledge) that provides empirically evidence on Fried's (2001; 2005) managerial opportunism theory of repurchases.

Finally, I explore the relationship between post-announcement insider trades on the longer-term returns of firms that announce a repurchase program. I find mixed results for the signalling effect of post-announcement insider sales on the longer-term returns of share repurchasing firms. Higher post-announcement insider sales signal that insiders believe their stock to be either overvalued or fairly valued but not significantly undervalued. Consistent with this, I find that post-event 1-month net insider sales is not related to first year buy-and-hold abnormal return (BHAR) and weakly negatively related to second year BHAR. However, regressions of 3-month net insider sales post-announcement show that it is positively related to first year BHAR but negatively related to second year BHAR of share repurchasing firms.[42]

This paper contributes to the growing literature addressing the credibility of share repurchase programme announcements as a signal of equity undervaluation and also to the corporate payout policy literature, more

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[42] The unexpected positive relationship of 3-month net insider sales with first year BHAR might be due to higher demand for the firm's shares due to its repurchase activity resulting in higher returns for the year.

generally. Vermaelen (1981) and Comment and Jarrell (1991) evaluate the relative market reaction to repurchase tender offers, Dutch auctions and open market share repurchases and find that the latter is considered to be a least effective signalling tool with the lowest announcement returns as compared to other repurchase methods. Ikenberry et al. (1995; 2000) and Peyer and Vermaelen (2009) document significant positive drift in the longer-term returns of share repurchasing firms and attribute it to the market's underreaction to repurchase signal. Fried (2001; 2005) and Chan et al. (2010) show that repurchase announcements are used by managers in their self-interests rather than conveying value relevant information to investors. Fenn and Liang (2001) show that managers with a higher number of stock options use repurchase announcements to artificially increase stock prices. I add to the literature by empirically documenting that insiders, in fact, take advantage of higher post-announcement stock prices and sell more heavily.

The paper also adds to the literature on insider trading. Seyhun (1998), Lakonishok and Lee (2001) and Agrawal and Nasser (2012) show that insider trading contains value relevant information for market participants. This research study also sheds light on the trading behaviour of insiders around buyback announcements and their investment horizon. I contribute to the literature on insider trading by demonstrating that insider trades both before and after the repurchase announcement provide value relevant information to investors in evaluating the credibility of repurchase announcement as a signal of undervaluation as well as insiders views about firm value.

The remainder of this chapter is organised as follows. Section 4.2 provides some background to research questions explored in the study. In section 4.3 I describe data sources, sample selection criteria and report summary statistics of the sample data. In section 4.4, I present and discuss my empirical results. Finally, I conclude in section 4.5.

4.2 Background

Academic literature has mainly focused on the value signalling aspect of share repurchase announcements. Especially in the corporate finance literature, positive repurchase announcement returns are explained by signalling theory which regards such announcements as a signal of equity undervaluation (see e.g., Vermaelen (1981) and Comment and Jarrell (1991)). With Ikenberry et al. (1995) began another phase of research on share repurchases where they document significant positive drift in returns of repurchase announcing firms over the next four years. They attribute this abnormal long-run performance of repurchasing firms to market's underreaction to repurchase signal. Later, Peyer and Vermaelen (2009) show that unlike many other stock market anomalies which disappeared over time, repurchase announcing firms continue to outperform in the long-run. They argue that longer-term abnormal returns of repurchasing firms results as the market corrects itself from an overreaction to bad news before the repurchase announcement.

Business press however raised early concerns about the dubious nature of repurchase signal.[43] Fried (2001) was amongst the first academics to formerly question the idea that repurchase announcements be uniformly viewed as a managerial signal of equity undervaluation. He proposes an alternative "managerial opportunism" hypothesis and suggests that managers opportunistically use share repurchase programmes to maximise their personal wealth. He suggests that managers of undervalued firms may announce and carry out share repurchases to transfer wealth from selling shareholders to themselves and remaining shareholders. In cases where managers want to sell equity they may announce a repurchase programme to sell their shares at higher post-announcement stock prices. Fried (2005) highlights that insiders

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[43] "When it comes to stock-buyback, public traded companies show a lot of bark than bite. It's oh-so-easy for a company to announce a buyback program. And it's gratifying, no doubt, for a company to watch its shares jump as a result of announcements. But the open secret on Wall Street is that few companies actually buy anywhere near the amount of stock that they indicate they might." – The Wall Street Journal (Mar. 27, 1995)

are not barred from trading after the repurchase announcement and hence can time the market around the repurchase announcement event.[44] He raises serious concerns about the credibility of repurchase announcements as a reliable signal of stock under-pricing and claims that the empirical evidence on repurchases is inconsistent with the signalling theory and terms buyback announcements as a "false signalling device".

However, observing insider trades around repurchase announcements affords us with the possibility to infer insiders' private information about firm value and repurchase programme objective(s). For example, Lakonishok and Lee (2001), Fidrmuc et al. (2006) and Agrawal and Nasser (2012) show that insider trading provides value relevant information to market participants about insiders' beliefs regarding firm value and its future prospects. Repurchase announcement signal will be more credible when insiders trade in the direction of their signal. In other words buyback signal will be a more credible signal of undervaluation if it is supported by insiders' actions. Specifically, insiders who believe their firm's stock to be undervalued should sell less and/or buy more equity of their firm prior to the repurchase announcement.[45]

This is consistent with the signalling explanation of repurchase announcement as undiversified insiders will only purchase or hold more equity if they believe their firm's stock to be undervalued. Buying addition equity of own firm's stock is especially costly when the firm's stock is overvalued and exposes already undiversified insiders to considerable risk. Investors should incorporate this (insider trading) information in their reaction to share repurchase announcement. Thus the market reaction to a firm's repurchase

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[44] Section 16 (b) of Securities and Exchange Act contains "short-swing" profit rule and prohibits insiders from buying and selling their firm's shares in a short period of time. Insiders are required to hold purchased shares for at least 6-months. However, insiders already owning significant stock of their firm can still profit from selling at post-announcement prices.

[45] Babenko et al. (2012) present a simple model of managerial behaviour based on signalling literature and find that investor reaction to repurchase announcement is stronger for firms where insiders purchase more shares in the six month period before repurchase announcement.

announcement should be more positive for firms where insiders acquire/retain more equity of their firm prior to the announcement.

Fidrmuc et al. (2006) and Agrawal and Nasser (2012) also argue that insider purchases serve as a more informative signal as these are more costly. Insiders put greater personal wealth at stake by purchasing more equity and bear the cost of holding less than an optimally diversified portfolio as a result. Compared to purchases, insider sales may be a less informative (negative) signal to the market as insider sales may be driven by their liquidity needs rather than changes in their expectation about the firm's future cash flows. Seyhun (1998), Lakonishok and Lee (2001) show that the market reacts more strongly to insider purchase decisions as compared to sales. Thus, I also analyse the market reaction to both buy and sale trades around repurchase announcements.

There however also exists a significant body of literature that shows managers engage in opportunistic behaviour and informed trading. For example, Kim and Varaiya (2003) find that managers engage in opportunistic trading and sell more heavily in quarters when their firm is repurchasing shares. Gosnell et al. (1992) find evidence that corporate insiders get rid of most of their equity stake in the company in the five months preceding a bankruptcy announcement. Yermack (2009) shows that CEOs gift stocks before significant declines in their stock prices thereby allowing themselves to benefit from increased personal income tax savings.

The flexibility of open market share repurchases affords managers with the possibility to ustilise these opportunistically in their self-interest rather than as a market signal. Fenn and Liang (2001) and Chan et al. (2010) show that managers may intentionally mislead the market by announcing repurchase programmes for their personal gain. Kothari et al. (2009) find that a range of personal incentives and career concerns motivates managers to time news disclosures. They show that managers delay the release of bad news up to a

certain threshold but immediately release good news. In a recent paper, Edmans et al. (2014) show that managers strategically time the disclosure of discretionary news to coincide with months in which their equity vests. They show that managers disclose significantly more positive news in months in which their equity vests, thus allowing them to sell their stocks and/or exercise options at a higher price. A closer look at the distribution of share repurchase related corporate news in their data shows that more than half of all buyback announcements and updates are made in months in which managers equity vests. This suggests that managers may time the disclosure of share repurchase announcements to sell at higher stock prices.

The paper also tests how managers trade after the repurchase announcements. If insiders use buyback announcements to time the market then they will sell more when stock prices soar after the repurchase announcement. Insider sales will be especially higher when the market reaction to repurchase announcement is stronger. Thus, I expect a positive relationship between net sales and short-term announcement returns. Higher insider stock sales or lower purchases post-announcement also signal that insiders believe their stock to be either overvalued or at least not significantly undervalued. Thus insider sales post-announcement should be either unrelated or negatively related to longer term returns of repurchase announcing firms.

4.3   Data and summary statistics

Share repurchase announcement data is extracted from the Thomson Financial Security Data Company (SDC) Mergers and Acquisition database between January 1, 1990 and December 31, 2012. I restrict my repurchase announcements data to open market share repurchases only. I delete multiple repurchase announcements by a firm that are made within a period of two years. In such cases I only keep the first announcement. This also eliminates the problem of duplicate announcements. Banyi et al. (2008) document that an announcement may appear more than once in the SDC data as it may report the

same announcement more than once if it appears in different news sources on different dates.

Insider trading data come from the Thomson Financial insider trading database. Insider trades are obtained from the Form 4 that is filed with Security and Exchange Commission (SEC) whenever insiders make a stock sales or purchase transaction. I following Babenko et al. (2012) and only consider open market stock purchases and sales and exclude stocks accumulated via option exercises and grants. In order to focus on economically significant trades, I delete all trades that involve exchange of fewer than 100 shares. Prior literature suggests that insider purchases may be more informative as insiders often sell for reasons unrelated to signalling, such as diversification and liquidity needs (see e.g., Kahl et al. (2003) and Ofek and Yermack (2000)). Babenko et al. (2012) also highlight that anecdotal evidence suggests managers are more likely to be sued for their sales based on private information. However, I focus on both purchase and sale transactions as insiders can exploit both active and passive trading strategies around the repurchase announcement to achieve the desired outcomes. For example, an insider may be able to generate similar economic effect by selling less prior to the repurchase announcement rather than actively purchasing more stocks.

I follow Babenko et al. (2012) to calculate number of shares sold (purchased) by insiders as the sum of shares sold (purchased) by all insiders over a given time window scaled by total number of outstanding shares of the firm.[46] If no sales or purchase data are available for a firm due to non-trading activity, I set insider trades (sale and purchase) equal to 0. The net sales are defined as the difference between insider sales and purchases over a given time window.

In addition to aggregate insider sales, purchases and net sales, I also use abnormal sales, abnormal purchases and abnormal net sales measures. I use

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[46] Insiders are as defined by Thomson Financial Insider trading database.

two measures to calculate abnormal trades (abnormal sales, abnormal purchases and abnormal net sales). First, I calculate normal trades using methodology similar to Kahle (2000), as the average monthly trades in the previous three year period starting six month before the buyback announcement. Next abnormal trades are defined as the difference between the actual insider trades and the average insider trades over the last three year period for the same time window. It is possible that insiders might have equity vesting plans or more need for cash over certain time periods during a year so they might have concentrated trading activity in those periods. Agrawal and Nasser (2012) suggest that a time series control i-e, insider trades over the same period a year before the event serves as a good control for such firm characteristics. So, my second measure of abnormal trades defines normal trades as the last year trades over the same time window.

The market reaction to repurchase announcement is calculated using stock return data from the CRSP database. I define abnormal repurchase announcement return as the difference between the 3-day (-1, 1) buy-and-hold return of the event firm centered on the announcement date (day 0) and the buy-and-hold return of the market over the same window. The market return is the daily value weighted return of CRSP index. As an alternative, I use 3-day cumulative abnormal returns (CAR) around the event date (-1, 1), defined as the sum of the difference between the event firm return on the day and the return on the market.[47] To calculate longer-term abnormal returns, I use buy-and-hold abnormal returns (BHAR) approach. Taffler et al. (2004) favour BHAR methodology as it accurately captures investor's experience. Buy-and-hold abnormal return of the event firm is the difference between the buy-and-hold return of the firm and the market over the one year and two year periods post-announcement, where a year is defined as 252 trading days starting from the event date (day 0).

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[47] Results are qualitatively similar when I use cumulative abnormal returns instead of buy-and-hold abnormal returns.

Intended size of the repurchase programme is measured as the percentage of intended dollar value to be spent on repurchase activity over the total market value of the firm at the beginning of year. Stock price run-up is calculated as 40-days buy-and-hold return of a firm starting 4 days prior to the repurchase announcement day. For other accounting data, I rely on the COMPUSTAT database. All the variables in the final dataset are winsorized at the 1st and 99th percentiles to mitigate the effect of extreme observations.

Table 4.1 presents the frequency, average market value, average book-to-market ratio and average percentage of intended size of announced repurchase programmes by year. My final dataset contains 8,945 unique share repurchase programmes announced between 1990 and 2012. The highest number of share repurchase announcements were made in years 1998 and 1999. Average size of the repurchase programme over the entire sample period is slightly higher than the number reported in earlier studies; this is mainly due to larger size of intended repurchase programmes announced after the financial crisis of 2007-2008. Mean book-to-market ratio of repurchase announcing firms is 0.64 which is similar to other studies. The average nominal market value of repurchase announcing firms for the entire sample period is around $3,845 million.

Panel B of table 4.1 shows the number of share repurchase announcements by industry classification. Manufacturing industry accounts for nearly 39 percent of the total repurchase announcements in the dataset. Repurchase announcements made by finance and insurance companies represent nearly one fourth of all repurchase announcements made during the sample period. Given their frequency and following earlier studies such as Chan et al. (2004) and Peyer and Vermaelen (2009), I include these in my analysis.

Table 4.2 presents summary statistic of announcement and post-announcement returns, insider trading and other firm characteristics of sample

firms. Panel A of the table presents short-term and longer term returns of firms that announce a share repurchase programme. Mean 3-day buy-and-hold abnormal return (BHAR) around the buyback announcement date (-1, 1) is 2.3 percent which is similar to the 3-day cumulative abnormal return (CAR) centered on the announcement day of 2.4 percent. These buyback announcement returns are also similar to announcement returns reported in earlier studies such as Ikenberry et al. (1995) and Peyer and Vermaelen (2009) but slightly higher than the ones reported in later studies such as Babenko et al. (2012) and Bonaimé (2012). According to Kothari et al. (2007) short-term returns are not much affected by risk adjustment(s). They show that the potential error in estimation of daily expected return is only 0.05% which is much smaller than the reported short-term announcement returns.

The mean one year buy-and-hold abnormal return is 4.5 percent which supports the finding of positive drift in returns after repurchase announcement as documented by earlier studies e.g., Peyer and Vermaelen (2009). The mean stock price run-up in the 40 trading days prior to repurchase announcement starting 4 days before the announcement is -6.7 percent. This suggests that managers are more likely to announce a share repurchase programme after significant declines in stock price.

Panel B of the table shows summary statistics for insider trades over different time windows around share repurchase announcement. As expected insider sales are generally larger than purchases. In the one month (0, 30) post-announcement period, insiders sell on average 0.064% of outstanding equity while they purchase only 0.021%. The net sales for the window are thus 0.043%. In the 3-month (0, 90) post-announcement window the difference between insider sales and purchases increases to 0.13% of total shares outstanding. However using either measure of benchmark trades (described above), abnormal net sales are negative in both 1 and 3 month post-announcement windows. Firm characteristics are reported in panel C of table

4.2. Firm size is measured as log of total assets and both mean and median values are similar. Leverage is ratio of total debt to total assets. Cash, cash flow, capital expenditure and research and development expenses are defined as percentages of cash, operating cash flows, capital expenditure and research and development expenses over total firm assets respectively. Tobin's Q is ratio of market-to-book value and return volatility is the standard deviation of daily stock returns in the one year period before the repurchase announcement. All accounting variables represent fiscal year values prior to the buyback announcement. The averages reported for these variables are comparable to ones reported in Babenko et al. (2012).

4.4 Results

4.4.1   Pre-announcement trades and short-term returns

Table 4.3 shows mean short-term and longer-term returns for firms that announce a share repurchase programme by high and low net insider sales in the pre-announcement period. The left (right) hand side panel is categorised on 3-month (6-month) insider trades before therepurchase announcement. Low (High) net insider sales represent higher (lower) purchases and/or lower (higher) sales during the period. Consistent with the undervaluation argument, the market reacts more positively to share repurchase announcements where insiders retain more equity prior to repurchase announcement. Average 3-day BHAR around the repurchase announcement for firms with high net insider sales in the three-month window before the repurchase announcement date is only 1.6 percent as compared to average return of 2.4 percent for firms with lower net insider sales. Thus, mean 3-day BHAR around the repurchase announcement is 0.8 percent higher for firms with lower net insider sales and is significant at the 1 percent level.

Mean 3-day CAR and 5-day BHAR around the repurchase announcement between low and high net insider sales firms are 0.9 percent and

1.1 percent respectively and are significant at the 1 percent level. These findings suggest that the market considers insider trading in evaluating the credibility of repurchase signal and responds more favourably to those where insider retain greater ownership interest in the firm. However, the difference between low and high net insider sales groups for longer-term returns is not significant. Specifically, difference of 1st year and 2nd year BHAR between the two groups of firms is not statistically significant.

Table 4.4 presents results from regressing short-term announcement returns on insider trading measures calculated for different time windows before the repurchase announcement. Specifically, I regress 3-day BHAR around the repurchase announcement event on insider trading variables in different model specifications. I control for other factors identified in earlier studies that may affect short-term repurchase announcement returns. I follow Kahle (2002) and include stock price run-up as a control variable in my regression specifications. Stock price run-up controls for the possibility of pseudo-market timing and also serves as a control for tax effects (Babenko et al. (2012)). Schultz (2003) suggests that abnormal market returns calculated around an event might be biased if managers' decisions are influenced by firms' recent stock price performance. This suggests that abnormal returns around repurchase announcements might be biased upwards when they are preceded by significant decline in stock price. If however, share repurchase announcement are preceded by significant increases in stock price, the relative tax advantage of share repurchases over dividends is significantly reduced (Lie and Lie (1999)).

To control for differences in firm size, I use log of total firm assets. Ikenberry et al. (1995); Fama and French (1992) and Peyer and Vermaelen (2009) suggest that smaller firms tend to have higher returns. They also document that value firms earn higher returns in the long-run as compared to growth firms. I use book value to market value ratio as a proxy for firm

undervaluation as used in earlier studies. I control for repurchase programme size as literature (e.g., Chan et al. (2010) and Bonaimé (2012)) suggests that repurchase programme size might affect investors' reaction to repurchase announcement.[48] Dittmar (2000) suggests that repurchase programmes are also used by managers to make capital structure adjustments. Therefore I control for firm leverage in my regression models. Firms' growth and investment opportunities can also affect both insider trading as well as repurchase announcement returns. Managers may hold greater ownership interest in a firm with higher growth potential and attractive investment opportunities and thus is more likely to earn higher returns. I use tobin's Q to proxy for firms' growth and investment opportunities. Using Petersen (2009) methodology, I report t-statistics based on robust standard errors after adjusting for clustering at the firm level. The regression results in all model specifications are also robust to industry fixed effects.

The dependant variable in all model specifications is 3-day BHAR in table 4.4. Model 1 regresses short-term announcement returns on insider purchases during the 6-month window before the repurchase announcement and other control variables. The coefficient on the pre-announcement 6-month insider purchases is positive and significant at conventional significance levels. This suggests that the market reaction is stronger for firms where insiders purchase more shares before the buyback announcement event. Model 2 shows that the market reaction is even stronger and highly significant at the 1 percent level for insider purchases made in the more recent period closer to the announcement date (purchases in the 3-month window before the repurchase announcement).

In models 3 and 4 I introduce net insider sales variable for the 6-month and 3-month pre-announcement periods respectively. Net insider sales account for both the active and passive trading strategies of insiders. Regression results

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[48] Although the empirical evidence on this is mixed.

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in models 3 and 4 suggest that higher net insider sales is significantly negatively related to announcement returns at the 5 percent and 1 percent levels respectively. The results indicate that investors take into account pre-announcement insider trading information in their reaction to the buyback signal. Insiders purchasing more or selling less equity before a repurchase announcement appear to be signalling their confidence in their firm's stock being worth more than its current market value.

Cheng and Lo (2006), Huddart et al. (2007) and Agrawal and Nasser (2012) suggest that insiders prefer a passive trading strategy to reduce litigation risk. It is also argued that insider sales are less informative than insider buys as insider might sell for a number of other reasons unrelated to signalling private information. To test this, in models 5 and 6 announcement returns are regressed on insider sales in the pre-announcement 3-month and 6-month event windows respectively. Coefficients on insider sales variables are significant at conventional significance levels in both models and suggest that pre-announcement insider sales too have some explanatory power for short-term repurchase announcement returns.

4.4.2 Post-announcement insider trades

In this section, I test whether insiders announce repurchase programmes to be able to sell their holdings at higher post-announcement prices. The first (second) panel in table 4.5 presents mean differences in insider trades between pre- and post-announcement periods over 3-month (6-month) windows. The mean difference between 3-months pre- and post-announcement insider sales is -3.4 and is highly significant at the 1 percent level. However the difference between pre- and post-announcement purchases is not statistically significant. The net sales difference between the two periods, which is mainly due to differences in insider sales, is -2.93 and is again highly significant at the 1 percent level. It is also interesting to note that both abnormal net sales measures are negative in the pre- and post-announcement periods, although the

difference in abnormal net sales 2 measure is statistically significant. This is consistent with insiders potentially reducing their trading around share repurchase announcements to avoid being sued. It also suggests that insiders actually sell fewer shares in the 3-month period before the repurchase announcement rather than buying more shares. This passive trading strategy could suggest that insiders want to minimise litigation risk associated with active trading around the repurchase announcement. However, the difference between 3-month pre- and post-announcement abnormal net sales as measured against three year average trades prior to the repurchase announcement is still negative and significant at the 1 percent level.

The pattern however seems to be opposite for pre- and post-announcement 6-month average insider trades. Insiders sell more in the 6-month period before the repurchase announcement as compared to average sales in the post-announcement 6-month period. The difference between average insider sales in the two periods is 13.9 and highly significant. Insiders also seem to purchase slightly more on average in the post-announcement 6-month period. The differences between pre- and post-announcement periods insider trading activity for both abnormal net sales measures over the 6-month period are also positive and significant.[49] This suggests that managers are more cautious about their trading in the 6-month (-3, 3) window centered on the announcement date rather than a much longer 12-month (-6, 6) window around the repurchase announcement.

Insiders are likely to sell more post-announcement when they believe their firm's stock to be either overvalued or at least not significantly undervalued. This suggests that post-announcement insider sales will be especially high for firms that are less likely to be undervalued. Fried (2005)

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[49] One possible reason for this reverse trend might be that insiders believe that the market has under reacted to the repurchase signal and believe their stock remains significantly undervalued. Another explanation could be that insiders might want/have to retain a certain proportion of firm equity due to contractual or control reasons.

also suggests that managers use repurchase announcements to artificially boost share price so that they can sell their equity holdings at a higher price. Thus insiders announcing repurchase programmes to sell their stock will sell more shares when the stock is less likely to be undervalued and when repurchase announcement returns are high.

Table 4.6 reports mean insider trades for different proxies of firm undervaluation and announcement returns. Panel A of table 4.6 shows mean insider trades for subsamples by high and low book-to-market value firms. Peyer and Vermaelen (2009) rely on book-to-market ratio as a measure of firm undervaluation. Firms with book-to-market ratio above (below) the sample mean are classified as value (growth) firms. Difference in mean trades of value and growth firms show that insiders in growth firms, in fact, sell more and buy fewer shares in the 1-month and 3-month periods post-announcement. The difference between net sales of the two groups is also highly significant. A similar trend is observed in the 3-month trades post-announcement.

Panel B of table 4.6 shows mean 1-month and 3-month insider trades for subsamples of firms by high and low stock price run-up. Firms that experience significant declines in share price prior to the repurchase announcement are more likely to be undervalued. Insiders in firms that have higher (lower) run-up return, i.e., above (below) the sample mean, sell more (less) and purchase fewer (more) shares. The difference between insider trades (sales and purchases) of the two groups is also highly significant. Panel C partitions the sample data on pre-announcement 6-month net sales. Babenko et al. (2012) suggest that pre-announcement insider trades can signal their belief about firm valuation. They argue that higher pre-announcement insider purchases add credibility to a firm's repurchase undervaluation signal as buying additional equity exposes undiversified insiders to considerable risk and they will only hold more equity if they believe their firm to be undervalued. My results show that the differences between post-announcement 1-month and

3-month mean insider sales (purchases) for high and low net sales firms are positive (negative) and highly significant. These findings are consistent with the argument that insiders sell more equity after the repurchase announcement when the firm is either overvalued or fairly valued but not undervalued.

Panel D of table 4.6 partitions the sample data on 3-day buy-and-hold returns around the repurchase announcement. Higher (lower) return firms are defined as firms with 3-day buy-and-hold return above (below) the sample mean. Consistent with Fried's (2005) argument, I find that insiders sell more shares post-announcement when repurchase announcement returns are higher. However, there is no significant difference in purchases of the two subsamples. The net sales difference between the two groups of firms is also highly significant. Overall table 4.6 suggests that insiders sell more shares post-announcement especially when their stock is less likely to be undervalued and when the market reacts more positively to the repurchase announcement.

As a further test, in table 4.7, I report average net insider sales post-announcement of two-way sorted portfolios of firms. First, each year I rank firms into high and low short term announcement return groups. I then sort firms in each rank group into two subgroups based on firms' book-to-market ratio, size and return volatility in panels A, B and C respectively.[50] Panel A of table 4.7, reports mean net insider sales in each announcement rank group for subsamples by low and high book-to-market value firms. Insiders sell significantly more shares in growth firms as compared to value firms in the post-announcement period even after controlling for repurchase announcement returns.

In panel B, firms with high and low repurchase announcement returns are sorted into subgroups by market capitalization. Corwin (2003) and Zhang

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[50] Sorting on these firm characteristics is based on mean values for the sample data. For example, large (small) firms are defined as firms with size above (below) the average firm size in the sample data.

(2006) proxy for degree of information asymmetry between insiders and investors by firm size. Small firms suffer from a higher degree of information asymmetry as they receive little media coverage unlike large firms, and are followed by fewer analysts. Lakonishok and Lee (2001) also find that the highest potential gains from insider trading are possible in small firms as these are less efficiently priced due to higher information asymmetry. Such results suggest that insiders in small firms sell down more of their stock holdings after the repurchase announcement as compared to insiders in large firms. This is especially true for firms with high announcement returns. For such firms the mean difference in the 1-month (3-month) net insider sales between small and large firms is 1.95 (4.94), significant at the 5 percent level.

Panel C sorts firms with high and low repurchase announcement returns into subgroups by their daily return volatility over the previous year before the repurchase announcement. Babenko et al. (2012) argue that it is more risky for undiversified insiders to hold more equity of their firm when the stock volatility is high. However, I do not find any significant difference in post-announcement net insider sales between high and low volatility firms. This suggests that stock volatility may not be the most important factor for insiders in their decision to sell stocks post-announcement.

Similar to Babenko et al. (2012) where they argue that pre-announcement insider purchases can add credibility to their repurchase undervaluation signal, my empirical analysis suggests that post-announcement insider trades can also signal insiders' private information regarding firm value. Post-announcement insider sales will be positively related to short-term announcement returns when insiders announce a repurchase to cash out at higher stock prices as suggested by Fried (2001; 2005). Higher post-announcement insider sales also signal that they do not believe their stock to be significantly undervalued.

However, the literature also suggests that the market under reacts to share repurchase signal (see e.g., Ikenberry et al. (1995; 2000) and Peyer and Vermaelen (2009)) and repurchasing firms earn higher longer-term returns. Post-announcement insider trades thus can signal insiders' expectations about future firm performance. Insiders will retain more equity when they believe that the market has underreacted to their repurchase signal and the stock is still under-priced. Higher post-announcement insider sales signal managerial pessimism about future firm performance. On this basis, I expect post-announcement insider sales to be negatively related to longer-term returns of such firms.

Finally, in table 4.8 I regresses post-announcement insider trades on short-term repurchase announcement returns, longer-term returns of share repurchasing firms and other control variables in different model specifications. Short-term announcement return is 3-day buy-and-hold abnormal return around the repurchase announcement. I restrict long-run post-announcement performance to two years as Seyhun (1998) suggests that insiders can predict stock price performance for up to two years in to the future. I use 1st year BHAR and 2nd year BHAR in different model specifications. Other control variables are as defined earlier in section 4.3, data and descriptive statistics. T-statistics are reported in parenthesis and are reported after adjusting for heteroskedasticity in standard errors as suggested by White (1980). Regression results in all model specifications are also robust to industry fixed effects.

The dependent variable in models 1 to 3 is the 1-month net sales post-announcement. Regression results in model 1 suggest that insider sales in the 1-month post-announcement period are significantly positively related to (short-term) repurchase announcement returns. This indicates that insiders take advantage of increase in stock price after the repurchase announcement and sell more heavily. Model 2 in table 4.8 shows that net insider sales are significantly

positively related to short-term returns but unrelated to post-announcement first year buy-and-hold abnormal returns. Net insider sales in model 3 are significantly negatively related to longer-term post-announcement (second year buy-and-hold abnormal) returns. This is consistent with the argument that a higher post-announcement insider sale represents insiders' pessimism about firms' longer-term stock price performance. Insiders sell more shares when they believe that the stock will not outperform in the long-run.

Lakonishok et al. (1994) show that value firms earn higher returns in the long-run as compared to growth firms after the repurchase announcement. As value firms are more like to be undervalued, I find that insiders in such firms sell fewer shares after the repurchase announcement. Table 8 shows that the book-to-market ratio is significantly negatively related to post-announcement net insider sales. I also find that the stock price run-up is significantly positively (negatively) related to insider sales and net insider sales (purchases) in all regression models. This indicates that insiders might be employing a contrarian trading strategy around the repurchase announcement. As firms with higher pre-announcement returns are less likely to be undervalued or at least not significantly undervalued, thus insiders in such firms sell more post-announcement to cash out at higher stock prices.

My analysis also suggests that firm size is unrelated to post-announcement net insider sales. Firm size is insignificant in all three (1-3) models where the 1-month net insider sales is used as a dependent variable. However, intended repurchase programme size is slightly positively related to net insider sales. Since repurchase programme size is often linked to the credibility of repurchase signal (Chan et al. (2010)), this finding suggests that insiders sell more post-announcement when they announce to repurchase a greater number of outstanding shares. I find that firm leverage is significantly negatively related to net insider sales and positively related to insider purchases (column 5 in table 4.8) in the post-announcement period. Higher leverage is

associated with higher risk of bankruptcy. Insider sales in such firms could then send a very negative signal about firm prospects. Thus insiders may sell more cautiously when leverage is high. Insider net sales and sales post-announcement are significantly positively related to Tobin's q. Higher Tobin's q represents higher market valuation and the observed positive relationship is consistent with the argument that insiders sell more when their firm's stock is less (more) likely to be undervalued (overvalued).

As a robustness test, in models 4 and 5 respectively I separately regress 1-month sales and 1-month purchases post-announcement on short-term repurchase announcement returns and other explanatory variables. Regression results in model 4 show that insider sales are positively related to repurchase announcement returns and the coefficient is highly significant at the 1 percent level. The signs on other variables are as expected. Unlike the regression models with net insider sales as regressand, firm size is significantly negatively related to 1-month insider sales post-announcement. This is in line with Lakonishok and Lee (2001) who highlight that insiders of small firms are better able to predict future returns and time their trades accordingly. Insiders in small firms sell more after the repurchase announcement.

Model 5 shows that 1-month insider purchases are significantly negatively related to short-term announcement returns. When announcement returns are high, undervaluation will be eliminated or significantly reduced and thus it will be more costly for insiders to purchase more shares. Also the incentive to purchase an undervalued stock will be eliminated when stock price increases after the repurchase announcement. Thus insiders will purchase fewer shares when investors react more positively to the repurchase announcement signal. However, as expected, book-to-market is significantly positively related to post-announcement insider purchases. This suggests that insiders purchase more equity when the firm is undervalued.

Finally, as a further robustness test in regression models 6 to 8 I regress 3-month net insider sales post-announcement on the same independent variables. Results are very similar to regression results of models 1 to 3. One distinction however is that 3-month insider sales are positively related to one year BHAR which was insignificant in the case of 1-month net sales. The relationship however with second year BHAR is still negative and significant only at the 10 percent level. The signs on other control variables are expected.

4.5 Conclusion

This chapter analyses insider trades around open market repurchase announcements to infer insiders' private information about firm value, and its relevance to investors in assessing the credibility of an open market repurchase announcement as a signal of firm undervaluation. Lower pre-announcement net insider sales signal to the market that insiders believe the stock to be under-priced. However, higher post-announcement sales also signal to the market that the stock is either over-priced or fairly priced.

The empirical evidence in the paper suggests that investors react more positively to repurchase announcements where insiders retain more equity before the repurchase announcement. However, my analysis also suggests that insiders sell more shares post-announcement when repurchase announcement returns are higher. This is particularly true for firms that are less likely to be undervalued (growth firms) and present the highest potential gains from exploiting insider trading such as small firms. I find empirical evidence that post-announcement insider sales are significantly positively related to repurchase announcement returns and negatively related to firm size. I also document a negative relationship between post-announcement insider sales and longer-term returns (second year buy-and-hold abnormal return) This is consistent with the expectation that insiders sell more shares post-announcement and such firms are less likely to outperform in the long-run.

The findings of this chapter suggest that investors pay attention to pre-announcement insider trades in determining the credibility of repurchase announcement undervaluation signal and respond accordingly. My results indicate that investors view insider trades as a signal of insiders' private information and regard insiders to be rational and trading to take advantage of any mispricing, rather than as a tool to deceive the market. However, higher insider sales post-announcement suggest that insiders may also announce repurchase programmes to sell their equity at higher post-announcement stock prices. Thus, there is also a possibility that managers may engage in "pump and dump" behaviour to mislead investors and pursue self-serving interests. Government regulatory bodies have put in place some regulatory safeguards to prevent managers from engaging in such opportunistic behaviour (please refer to footnote 44). Also managers have higher discount rates as they hold under diversified portfolios that makes such "pump and dump" strategy more costly for them. However, this possibility cannot be completely ruled out and requires further investigation. The negative relationship between post-announcement sales and longer-term returns suggests that the market realises that firms where insiders sell more shares after the buyback announcement are less likely to be undervalued and hence do not out perform in the long-run.

Table 4.1: Distribution of repurchase announcements by year and industry

The table reports the distribution of repurchase announcements by year and industry. Panel A reports the distribution by year. Year is the fiscal year in which repurchase announcement was made. Frequency counts the number of open market repurchase programmes announced in a given year. Book-to-market is the ratio of book value of assets to market value at the beginning of the fiscal year. Market value is the average market value of firms in millions of dollars. Intended percentage is the percentage of outstanding shares that management states it intends to repurchase at the time of announcement.

Panel B reports the distribution of repurchase announcements by industry. Industries are classified based on two digit Standard Industrial Classification (SIC) code in COMPUSTAT.

Panel A: Distribution by year.

Year	Frequency	Book-to-market	Market value ($M)	Intended percentage
1990	433	0.84	898.85	7.32
1991	114	0.86	1223.93	8.59
1992	215	0.61	1498.94	7.35
1993	240	0.59	1651.03	5.85
1994	446	0.65	1378.79	6.14
1995	421	0.68	1384.05	6.99
1996	559	0.58	2264.09	6.46
1997	488	0.54	1787.50	7.23
1998	866	0.65	1803.72	8.34
1999	635	0.73	1819.54	8.02
2000	372	0.78	3837.12	9.03
2001	361	0.67	6959.89	8.37
2002	250	0.74	3917.20	8.77
2003	253	0.60	4313.64	7.94
2004	311	0.48	6314.72	8.51
2005	360	0.47	6983.02	8.02
2006	354	0.47	9137.10	8.48
2007	522	0.57	7084.00	9.21
2008	556	0.74	3543.54	9.90
2009	182	0.77	5204.74	9.73
2010	300	0.62	6745.56	10.00
2011	426	0.62	5842.62	10.08
2012	281	0.69	8051.59	11.18
All	8945	0.64	3854.37	8.26

Panel B: Distribution of repurchase announcements by industry

Industry	Frequency	Percent	Cumulative frequency	Cumulative percentage
Agriculture, forestry, and Fishing	21	0.23	21	0.23
Construction	100	1.12	121	1.35
Finance and Insurance	2205	24.65	2326	26.00
Manufacturing	3486	38.97	5812	64.97
Mining	200	2.24	6012	67.21
Public administration	28	0.31	6040	67.52
Retail trade	644	7.2	6684	74.72
Services	1419	15.86	8103	90.59
Transportation and communication	537	6	8640	96.59
Wholesale trade	305	3.41	8945	100.00

Table 4.2: Summary statistics of key variables

The table reports summary statistics for the main variables for firms that announced open market share repurchase programmes. The table reports number of observations (N), mean, standard deviation (SD) and the 1st, 50th and 99th percentiles of sample data. Panel A reports on announcement and longer-term return statistics (in percentage terms) of share repurchase announcing firms. 3-day CAR (BHAR) is the 3 day (-1, 1) cumulative (buy-and-hold) abnormal return around the announcement date (day 0) using CRSP index value weighted market return as benchmark. 1st year BHAR is the 1 year (0, 252 days) buy-and-hold abnormal return against the value weighted return on the market starting from the event date (day 0). 2nd year BHAR is the second year (253, 504 days) buy-and-hold abnormal return starting from the first anniversary of event date. Stock price runup is the 40 days buy-and-hold return of event firms starting 4 days prior to the repurchase announcement.

Panel B reports summary statistics on insider trading around repurchase announcements. 1 (3)-month sales (purchases) is the number of shares sold (bought) by insider in the one (three) month period after repurchase announcement normalized by the number of outstanding shares and multiplied by 10,000. 1-month (3-month) net sales is the difference between number of shares sold and bought by insiders in the one (three) month period post-announcement normalized by the number of outstanding shares and multiplied by 10,000. 1-month (3-month) Abnormal net sales is the one (three) month difference between net insider sales and net insider sales in the time period last year. 1-month (3-month) Abnormal net sales 2 is the one (three) month difference between net insider sales and normal net insider sales for the same period (number of month) where normal net insider sales are measured as the average monthly difference number of share sold and bought by insiders in the previous three year period starting six month before the repurchase announcement. All trades are normalized by the number of outstanding shares and multiplied by 10,000. Pre-3(6)-month net sales is the difference between the number of shares sold and bought by insiders in the three (six) month period before repurchase announcement normalized by the number of outstanding shares and multiplied by 10,000.

Panel C provides summary statistics on firm characteristics for my data. Firm size is the log of book value of assets. Leverage is the ratio of total debt to total firm assets. Book-to-market is the ratio of book value of firm assets to its market value. Cash (Cash flow) is the cash (operating income before depreciation) divided by book assets. Capital expenditure (R&D expense) is the capital expenditures (research and development expenditures) scaled by book assets. Cash, cash flow, capital expenditure and R&D expense are shown as percentages. Tobin's Q is the ratio of market to book value of assets. Return volatility is the volatility of stock returns measured over 1 year prior to repurchase announcement.

| Variables | N | Mean | SD | Percentiles | | |
				1st	50th	99th
Panel A: Returns						
3-day CAR	8945	2.40	7.90	-23.0	1.80	31.0
3-day BHAR	8945	2.30	7.70	-22.6	1.60	30.3
1st-year BHAR	8944	4.50	47.90	-84.8	-1.60	212.9
2nd-year BHAR	8652	6.60	49.90	-88.4	0.10	229.8
Stock price runup	8942	-6.70	17.80	-57.5	-4.90	41.2
Panel B: Insider trades						
1-month Sales	8945	6.40	26.24	0.00	0.00	206.1
1-month Purchases	8945	2.00	9.04	0.00	0.00	70.5
1-month Net sales	8945	4.33	27.20	-68.2	0.00	199.8
1-month Abnormal net sales	8945	-1.92	38.11	-186.3	0.00	164.5
1-month Abnormal net sales 2	8945	-1.88	32.72	-122.1	-0.29	157.1
3-month Net sales	8945	12.72	65.58	-144.3	0.00	492.5
3-month Abnormal net sales	8945	-11.76	124.57	-785.1	0.00	372.8
3-month Abnormal net sales 2	8945	-5.89	86.08	-375.5	-0.42	360.6
Pre-3-month Net sales	8945	9.79	56.34	-156.8	0.00	409.1
Pre-6-month Net sales	8945	41.64	197.82	-286.8	0.95	1551.4
Panel C: Firm Characteristics						
Firm size	8945	2.78	0.87	0.98	2.74	5.1
Leverage	8919	0.54	0.26	0.07	0.53	1.0
Book-to-Market	8900	0.64	0.44	0.06	0.55	2.5
Cash	8945	16.15	18.34	0.09	8.28	77.3
Cash flow	8859	12.12	11.06	-25.72	12.05	47.7
Capital expenditure	8945	4.58	5.44	0.00	3.02	30.0
R&D expense	8945	2.65	5.09	0.00	0.00	24.4
Tobin's Q	8900	2.61	2.57	0.40	1.83	17.4
Return volatility	8942	0.03	0.02	0.01	0.03	0.1

Table 4.3: Pre-announcement net insider sales and returns

The table shows mean short-term and longer-term returns by high and low net insider sales for firms that announced a share repurchase programme. The first (second) panel categorises returns by 3 (6) months net sales in the pre-announcement period. Pre-3(6)-month net sales is the difference between the number of shares sold and bought by insiders in the three (six) month period before repurchase announcement normalized by the number of outstanding shares and multiplied by 10,000. Post-3(6)-month net sales is the difference between the number of shares sold and bought by insiders in the three (six) month period post-repurchase announcement normalized by the number of outstanding shares and multiplied by 10,000. 3-day BHAR is the 3 day (-1, 1) buy-and-hold abnormal return around the event date (day 0). 3-day CAR is the 3 day (-1, 1) cumulative abnormal return around the event date (day 0). 5-day BHAR is the 5 day (-2, 2) buy-and-hold abnormal return around the event date (day 0). 1st year BHAR is the 1 year (0, 252 days) buy-and-hold abnormal return starting from the event date. 2nd year BHAR is the second year (253, 504 days) buy-and-hold abnormal return starting from the first anniversary of the event date. Abnormal returns are estimated against the value weighted market return as the benchmark. High (low) columns report mean returns of firms with pre-announcement net sales above (below) the mean value of insider net sales. The difference (Diff) column reports the difference between the mean returns of firms with high and low pre-announcement net insider sales. T-test is used to test the significance of the difference from zero. P-values associated with the t-test are reported in the table.

Variables	Pre 3 Months net sales				Pre 6 Months net sales			
	high	low	Diff	P-value	high	low	Diff	P-value
3-day BHAR	0.016	0.024	-0.008***	0.0001	0.019	0.023	-0.004**	0.044
3-day CAR	0.017	0.026	-0.009***	0.0001	0.021	0.025	-0.004**	0.0336
5-day BHAR	0.013	0.024	-0.011***	0.0001	0.014	0.024	-0.010***	0.0001
1st year BHAR	0.052	0.044	0.008	0.5409	0.036	0.047	-0.011	0.4192
2nd year BHAR	0.062	0.067	-0.005	0.7529	0.061	0.067	-0.006	0.6957

Significance at the 1%, 5%, and 10% levels is denoted by ***, **, and *respectively.

Table 4.4: Announcement returns and pre-announcement insider trades

The dependent variable in all model specifications (column 1-6) is the three-day BHAR calculated as the three day (-1, 1) buy-and-hold abnormal return around the announcement date (day 0) using value weighted return on the market as the benchmark. All the trading variables are calculated in the pre-announcement period. 3 (6)-month sales (purchases) is the number of shares sold (bought) by insider in the three (six) month period before repurchase announcement normalized by the number of outstanding shares and multiplied by 10,000. 3-month (6-month) net sales is the difference between number of shares sold and bought by insiders in the three (six) month period before repurchase announcement normalized by the number of outstanding shares and multiplied by 10,000. Intended percentage is the target value of shares the firm plans to repurchase as listed in the announcement normalized by the market value of equity. The other control variables are as defined in table 2. T-statistics in parentheses are based on standard errors adjusted for clustering at the firm level.

	(1)	(2)	(3)	(4)	(5)	(6)
Intercept	3.29***	3.23***	3.53***	3.53***	3.53***	3.54***
	(7.25)	(7.09)	(7.84)	(7.89)	(7.83)	(7.83)
6-month purchases	0.53**					
	(2.33)					
3-month purchases		1.52***				
		(3.14)				
6-month net sales			-0.13**			
			(-2.44)			
3-month net sales				-0.52***		
				(-2.97)		
3-month sales					-0.34*	
					(-1.91)	
6-month sales						-0.11**
						(-2.15)
Stock price runup	-4.83***	-4.82***	-4.92***	-4.84***	-4.83***	-4.9***
	(-8.00)	(-7.98)	(-8.12)	(-8.01)	(-7.99)	(-8.1)
Firm size	-1.05***	-1.03***	-1.11***	-1.1***	-1.12***	-1.12***
	(-9.29)	(-9.08)	(-9.97)	(-9.91)	(-9.97)	(-10.01)
Book-to-market	1.36***	1.34***	1.37***	1.35***	1.38***	1.38***
	(4.34)	(4.29)	(4.33)	(4.29)	(4.38)	(4.37)
Intended percentage	0.01	0.01	0.01	0.01	0.01	0.01
	(0.76)	(0.76)	(0.79)	(0.8)	(0.79)	(0.78)
Leverage	0.78**	0.76**	0.79**	0.78**	0.82**	0.81**
	(2.13)	(2.07)	(2.17)	(2.13)	(2.23)	(2.22)
Tobin's Q	0.07*	0.07*	0.08*	0.08*	0.08*	0.08*
	(1.71)	(1.69)	(1.92)	(1.85)	(1.83)	(1.9)
R-squared	4.03%	4.14%	4.05%	4.08%	4.00%	4.03%

Significance at the 1%, 5%, and 10% levels is denoted by ***, **, and *respectively.

Table 4.5: Difference between pre- and post-announcement insider trades

The table reports the average insider trades in the pre- and post-announcement 3(6)-month periods. Pre (post) column reports trades before (after) repurchase announcement. The difference (Diff) column reports the difference between pre- and post-announcement insider trades and also shows if the difference is significantly different from zero. The significance test is based on t-test and the associated p-values are also reported in the P-value column. Sales (Purchases) are defined the number of share sold (bought) by insiders during the 3 (6)-month window before and after repurchase announcement and normalized by the number of outstanding shares and multiplied by 10,000. Net is the difference between number of shares sold and bought by insiders during the time window. Abnormal net sales is the difference between net insider sales and net insider sales in the time period last year over the same time window. Abnormal net sales 2 is difference between net insider sales and normal net insider sales for the same period (number of months) where normal net insider sales are measured as the average monthly difference number of share sold and bought by insiders in the previous three year period starting six month before the repurchase announcement. The p-value rows are associated with t-test of the difference of abnormal net sales from zero.

	3 Months trades				6 Months trades			
	Pre	Post	Diff	P-value	Pre	Post	Diff	P-value
Sales	15.41	18.81	-3.4***	0.0001	54.17	40.27	13.9***	0.0001
Purchases	5.37	5.30	0.07	0.8136	11.13	12.281	-1.15*	0.0619
Net sales	9.79	12.72	-2.93***	0.0003	41.64	26.741	14.9***	0.0001
Abnormal net sales	-10.46	-11.76	1.30	0.4256	-7.99	-29.863	21.87***	0.0001
p-value	0.001	0.001			0.006	0.001		
Abnormal net sales 2	-8.82	-5.89	-2.93***	0.0003	4.43	-10.474	14.9***	0.0001
p-value	0.001	0.001			0.0441	0.001		

Significance at the 1%, 5%, and 10% levels is denoted by ***, **, and *respectively.

Table 4.6: Post-announcement insider trades in subsamples

The table reports post-announcement 1-month and 3-month mean insider trades for different subsamples of firms. Panel A subsamples the data based on book-to-market ratio. High (low) book-to-market ratio refers to firms with book-to-market ratio above (below) the sample mean. Panel B subsamples data based on stock price runup. High (low) stock price runup refers to firms with stock price runup above (below) the sample mean. Panel C subsamples the data based on 6-month pre-announcement net sales. High (low) 6-month pre-announcement net sales refers to firms with net sales above (below) the sample mean. Finally, Panel D subsamples the data based on three day (-1, 1) repurchase announcement returns. High (low) announcement returns refer to firms with three day BHAR above (below) the sample mean. The trade variables are as defined in tables 2 and 4. The difference between column 1 and 2 for each panel is reported in the Diff column. One sample t-test tests for the difference to be significantly different from zero. P-values associated with t-test are also reported in column 4 of each panel.

Variables	Panel A: Book-to-Market ratio				Panel B: Stock price runup			
	low	high	Diff	P-value	high	low	Diff	P-value
1-month Sales	7.43	4.83	2.6***	0.0001	7.45	5.14	2.31***	0.0001
1-month Purchases	1.66	2.52	-0.86***	0.0001	1.43	2.69	-1.26***	0.0001
1-month Net sales	5.69	2.26	3.43***	0.0001	5.96	2.37	3.59***	0.0001
3-month Sales	21.32	15.00	6.32***	0.0001	20.41	16.89	3.52**	0.017
3-month Purchases	4.32	6.79	-2.47***	0.0001	3.89	6.99	-3.1***	0.0001
3-month Net sales	15.95	7.81	8.14***	0.0001	15.66	9.2	6.46***	0.0001
Variables	Panel C: Net sales 6m Pre-announcement				Panel D: Ann. Return (3-day BHAR)			
	high	low	Diff	P-value	high	low	Diff	P-value
1-month Sales	15.61	4.4	11.21***	0.0001	7.44	5.57	1.87***	0.0001
1-month Purchases	1.61	2.09	-0.48**	0.0313	1.97	2.03	-0.06	0.778
1-month Net sales	13.85	2.27	11.58***	0.0001	5.43	3.45	1.98***	0.000
3-month Sales	43.58	13.45	30.13***	0.0001	20.82	17.21	3.61**	0.015
3-month Purchases	4.81	5.41	-0.60	0.3225	5.46	5.17	0.29	0.537
3-month Net sales	36.98	7.47	29.51***	0.0001	14.3	11.46	2.84**	0.041

Significance at the 1%, 5%, and 10% levels is denoted by ***, **, and *respectively.

Table 4.7: Two-way sorted subsamples for repurchase announcing firms

The table reports average post-announcement insider net sales in the 1-month and 3-month time windows for subsamples sorted on two variables. Vertically, every year the data is sorted into two groups based on repurchase announcement ranks. Low (high) rank refers to firms that have lower (higher) announcement returns. Horizontally, panel A subsamples the data based on book-to-market ratio. High (low) book-to-market ratio refers to firms with book-to-market ratio above (below) the sample mean. Panel B subsamples the data based on firm size. Small (large) refers to firms with firm size below (above) the sample mean. Panel C subsamples the data based on stock return volatility. High (low) stock return volatility refers to firms with stock return volatility above (below) the sample mean. Variables are as defined in tables 2 and 4. The difference between column 1 and 2 for each panel is reported in the Diff column. One sample t-test tests for the difference to be significantly different from zero. P-values associated with t-test are also reported in column 4 of each panel.

Ann. Return Rank	Panel A: Book-to-market				
	Variable	low	high	Diff	P-value
Low	1-month Net sales	4.47	1.65	2.82***	0.0004
	3-month Net sales	14.76	6.32	8.44***	0.0001
high	1-month Net sales	7.02	2.79	4.22***	0.0001
	3-month Net sales	17.25	9.13	8.11***	0.0001
Ann. Return Rank	Panel B: Firm size				
	Variable	small	large	Diff	P-value
Low	1-month Net sales	3.45	3.38	0.06	0.9332
	3-month Net sales	14.12	9.39	4.73**	0.0147
high	1-month Net sales	6.07	4.12	1.95**	0.0234
	3-month Net sales	15.95	11.00	4.94**	0.0138
Ann. Return Rank	Panel C: Return volatility				
	Variable	high	low	Diff	P-value
Low	1-month Net sales	3.37	3.43	-0.06	0.9378
	3-month Net sales	13.13	10.82	2.30	0.2598
high	1-month Net sales	5.16	5.30	-0.15	0.8639
	3-month Net sales	15.29	12.65	2.65	0.1851

Significance at the 1%, 5%, and 10% levels is denoted by ***, **, and *respectively.

Table 4.8: Relationship between post-announcement insider trades and returns

The table reports regression results of insider trades on short-term and longer-term returns of firms that announce a repurchase programme. The dependent variable in models (columns) 1-3 is the 1-month net insider sales. Models (columns) 4-5 regress 1-month insider sales and 1-month insider purchases on explanatory variables respectively. In models (columns) 6-8, the dependent variable is the 3-month net insider sales. T-statistics are in parenthesis and are reported after adjusting standard errors for heteroskedasticity as suggested by White (1980). The variables are as defined in table 2.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Intercept	9.15***	9.14***	9.35***	11.93***	2.91***	28.12***	28.02***	28.64***
	(5.7)	(5.69)	(5.79)	(7.7)	(5.5)	(7.32)	(7.31)	(7.37)
3-day BHAR	25.58***	25.6***	25.8***	16.59***	-7.83***	48.49***	48.35***	53.26***
	(5.65)	(5.64)	(5.58)	(3.78)	(-4.27)	(4.39)	(4.38)	(4.75)
1st year BHAR		0.29					4.68***	
		(0.41)					(2.71)	
2nd year BHAR			-0.89*					-2.66*
			(-1.71)					(-1.86)
Stock price runup	16.25***	16.25***	16.75***	11.92***	-4.01***	30.08***	30.04***	31.4***
	(7.95)	(7.95)	(8.08)	(5.99)	(-6.13)	(6.36)	(6.36)	(6.6)
Firm size	-0.28	-0.29	-0.35	-1.54***	-1.29***	-2.56***	-2.59***	-2.61***
	(-0.73)	(-0.74)	(-0.89)	(-4.18)	(-9.77)	(-2.76)	(-2.8)	(-2.79)
Book-to-market	-2.76***	-2.77***	-2.93***	-1.37	1.28***	-7.36***	-7.56***	-8.1***
	(-2.7)	(-2.72)	(-2.89)	(-1.44)	(3.17)	(-3.11)	(-3.23)	(-3.5)
Intended percentage	0.05	0.06	0.06*	0.07**	0.02	0.23**	0.23**	0.24**
	(1.49)	(1.5)	(1.7)	(2.04)	(1.45)	(2.09)	(2.13)	(2.19)
Leverage	-6.76***	-6.74***	-6.39***	-4.19***	2.55***	-13.56***	-13.35***	-12.96***
	(-5.45)	(-5.42)	(-5.08)	(-3.55)	(5.64)	(-4.67)	(-4.6)	(-4.39)
Tobin's Q	0.55***	0.54***	0.51**	0.65***	0.09	1.07**	1.05**	1.01**
	(2.69)	(2.69)	(2.47)	(3.33)	(1.57)	(2.23)	(2.19)	(2.09)
Adj. R-Squared	2.37%	2.37%	2.43%	1.75%	2.64%	1.86%	1.97%	2.02%

Significance at the 1%, 5%, and 10% levels is denoted by ***, **, and *respectively.

Chapter 5

Conclusion

5.1 Concluding Remarks

The last couple of decades have witnessed a remarkable increase in stock repurchase programmes. As a result of their increasing popularity and the amount of money involved, stock buybacks have attracted a lot of attention from academic researchers as well as from business analysts and the financial media. This thesis comprises of three empirical papers (chapters) on open market share repurchase programmes with particular focus on agency issues associated with such programmes.

In general, the market views the repurchase announcement as good news and hence responds positively. Vermaelen (1981) regards repurchase announcements as a managerial signal of equity undervaluation and explains the associated positive abnormal returns as a market response to the undervaluation signal. Consistent with this, Brav et al. (2005) find that undervaluation is the most commonly referred to motive in share repurchase programmes. Earlier research documents significant short term announcement returns as well as positive drift in the longer-term returns of repurchase announcing firms (e.g., Vermaelen (1981); Ikenberry et al. (1995, (2000); Chan et al. (2004)).

However, recent studies raise doubts about repurchase announcements as a (strong) signal of stock under-pricing. This is partly because repurchase programmes can be used for other reasons such as distributing excess cash, adjusting capital structure etc. and partly because such announcements are not binding obligations on the part of firm management to implement. In addition, repurchase announcements have a positive effect on executive compensation, especially stock based compensation, as compared to dividends that decrease

the value of the stock by the amount of dividend. Fried (2001; 2005) argues theoretically that repurchase programmes are more beneficial to managers and have little value signalling content for shareholders, if any. Thus repurchase announcements can be used opportunistically (i.e., agency driven) by managers for their personal wealth incentives, or at least cosmetically due to their flexibility. So, how credibly a repurchase announcement signals stock undervaluation represents an empirical question.

In my first empirical study in chapter 2 of this thesis, I test whether the market distinguishes between agency driven and value signalling open market share buybacks by observing the underlying managerial wealth and repurchase incentives. In theory, better convergence between executive and shareholder wealth interests and risk preferences should lower agency costs thus increasing the "perceived" credibility of managements' buyback announcements (signals). My findings suggest that executive compensation arrangements play an important role in explaining the market reaction to, and actual share repurchase decisions of, firms that announce repurchase programmes. This study contributes to the literature by demonstrating that the market approximates the value signalling effect of a buyback announcement by observing the underlying managerial wealth and repurchase incentives and hence responds accordingly.

My third chapter addresses the open market buyback announcement credibility issue directly by capitalising on the soft information conveyed in repurchase announcements press releases. This is novel to the literature on share buybacks. Recent studies suggest that news disclosure tone affects investors' reaction to an information event. In this study, I demonstrate that the narrative disclosure tone of buyback press releases contains value relevant information and has significant explanatory power for short-term announcement returns. I find, however, disclosure tone of repurchase announcement is unrelated to longer-term returns and actual repurchase rates post-announcement. This finding is consistent with literature in this area that

shows narrative disclosure tone only impacts short-term returns. The hand collected data I employ in this study also allows me to explore other aspects of buyback announcements where the extant literature is limited.

In chapter 4 I analyse insider trading behaviour around buyback announcements. The key insight of this paper is to infer insiders' private information about firm value by observing their trading behaviour around the repurchase announcement. Insiders add credibility to the (repurchase) undervaluation signal by trading parallel to their signal (i.e., purchasing more or selling fewer shares before the repurchase announcement). However, insiders seeking to time the market (cash out at a higher price) will sell more shares post-announcement. My analysis shows that, consistent with the undervaluation signalling argument, investors respond more positively to buyback announcements where insiders buy more or sell less equity before the announcement event.

However, I also document that insiders sell more shares in the first three months post-announcement. This is especially true for firms that are less (more) likely to be undervalued (overvalued) and for smaller firms that present the greatest potential for gain from exploiting insider trading. Net insider sales are significantly positively related to announcement returns. Finally, I show that higher post-announcement net insider sales are slightly negatively related to longer-term returns suggesting that such firms do not out perform in the long-run.

I believe this research adds significantly to the literature on share buybacks, in particular by highlighting the agency issues associated with share repurchase programmes. My findings indicate that the market is conscious of the managerial incentives attached to stock buybacks and their potential for opportunistic use. Investor reaction to repurchase announcements is sensitive to (i) executive compensation arrangements, (ii) the information content and disclosure tone of buyback announcement press releases, and (iii) insider

trading patterns around the repurchase announcement. I view my research as adding significantly to our understanding of the competing motives behind share buyback announcements and how the market treats and reacts to these. It appears that the market realises that a management's promise to spend billions of dollars on share repurchases may not necessarily add to shareholder wealth. Thus, repurchase announcements cannot be uniformly viewed as a signal of better firm prospects or current undervaluation. Insiders also use such programmes for personal gain. In summary, my research highlights novel factors that contribute in explaining investor reaction to repurchase announcements.

5.2 Further work

While working on my PhD thesis, several interesting and related research ideas have emerged and I intend to pursue some of these after my doctoral degree.[51] For example, the different trading patterns of institutional and individual investors around the repurchase announcement event have not been explored in the literature. Conditional on data availability my idea is to explore how different investor clienteles react to repurchase announcements and to what extent sophisticated investors can "see through" those of an opportunistic or cosmetic nature.

Research suggests that institutional and retail investors trade in different directions. Kausar et al. (2013), for example, suggest that this differential trading behaviour of retail and institutional investors can help explain anomalous market reaction to news events. As buyback announcements can be seen as a dubious signal, it is important to understand how different investor clienteles react to this disclosure. The literature also suggests that individual investors are drawn by attention grabbing events independent of direction of news whereas sophisticated/professional investors are more careful in their reaction to news events. There is a research gap in the share buyback

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[51] I have discussed these with my supervisor and we may collaborate on these in near future.

literature here in terms of how the overall market reaction might be driven by these different investor groups. In my future work, I specifically intend to explore the differential trading behaviour of institutional and retail investors associated with share repurchase information. Also, building on my second empirical study in chapter 3 I am interested in exploring how sophisticated and unsophisticated (retail) investors react to narrative information issued with the share repurchase announcement.

Chapter 3 further suggests that narrative disclosure tone is positively related to announcement returns but unrelated to longer-term returns. I speculate that this short-term market reaction may be solely driven by increased trading activity of retail investors in response to such attention grabbing repurchase news. There may also be a possibility of wealth transfer from retail investors to sophisticated investors associated with the news event. Retail investors may trade more actively around the repurchase announcement because of its saliency but may lose to sophisticated investors in the longer-run who are more likely to trade on the information content of the news.

In addition to these research questions, I am also interested in exploring the possible association between managers' self-serving use of share buyback programmes and their accounting manipulations, and other opportunistic reporting behaviour, as well as other self-serving behaviours discussed in the literature such as option re-pricing which raise further agency issues.

Appendix

Appendix I

The value of executive's stock option is calculated using Black and Scholes European option price formula as modified by Merton (1973) that takes into account dividend payments. Options value is defined by the following formula

$$Se^{-dT}N(d_1) - Xe^{-rT}N(d_2)$$

where

$$d_1 = \frac{\ln(S/X) + (r - d + \sigma^2/2)/T}{\sigma\sqrt{T}}$$

$$d_2 = \frac{\ln(S/X) + (r - d - \sigma^2/2)/T}{\sigma\sqrt{T}}$$

S = Price of the underlying stock

X = Strike price of the option

T = Time to maturity of the stock option

r = Risk free rate

d = Dividend rate

σ = Volatility of the stock returns

N = Cumulative normal distribution function

Since delta is defined as the first derivative of option value with respect to price. In order to get the percentage change in option value I have the following equation

$$delta\ (\Delta) = \frac{\partial(option\ value)}{\partial(stock\ price)} \times (stock\ price/100)$$

$$= e^{-dT}N(d_1) \times (S/100)$$

Vega is defined as the first derivative of option value with respect to stock return's volatility.

$$Vega = \frac{\partial(option\ value)}{\partial(stock\ volatility)} \times (1/100)$$

$$= S\sqrt{T} \times e^{-dT}N(d_1) \times 0.01$$

In order to estimate the dollar changes in the value of the executive's wealth I multiple the estimated value of delta and vega with the total number of options held by the executive. I compute the delta of the executive's portfolio of stocks and options by adding the delta of restricted stock and shares held by the CEO to the Delta of his options portfolio.

Appendix II

Accruals are measured at the fiscal year-end prior to a repurchase announcement to avoid look-ahead bias using the following equation.

$$\text{Accruals} = (\Delta CA - \Delta Cash - \Delta CL + \Delta STD - DEP) / TA$$

where

ΔCA	=	change in current assets
$\Delta Cash$	=	change in cash
ΔCL	=	change in current liabilities
ΔSTD	=	change in debt included in current liabilities
DEP	=	depreciation and amortization expense
TA	=	Total Assets

Accruals calculated using the above formula are then decomposed into discretionary and non discretionary accruals using Jones (1991) model;

$$\frac{\text{Accrual}_i}{TA_i} = \propto_0 \frac{1}{TA_i} + \propto_1 \frac{\Delta Sales_i}{TA_i} + \propto_2 \frac{\Delta PPE_i}{TA_i} + \epsilon_i$$

where

$\Delta Sales$	=	change in sales
ΔPPE	=	change in Plant Property and Equipment (PPE)

Non-discretionary accruals are defined as the fitted value from the above model for a particular firm and discretionary accruals are then defined as the residual value which is the difference between the total accruals and the expected or fitted value scaled by total assets of the firm. In the above model, regression coefficients are estimated every year using the Fama and French (1997) 48 industries classification for all stocks listed on NASDAQ/AMEX/NYSE. Non-discretionary and discretionary accruals are then calculated as follows.

$$NDA_i = \propto_0 \frac{1}{TA_i} + \propto_1 \frac{\Delta Sales_i}{TA_i} + \propto_2 \frac{\Delta PPE_i}{TA_i} \quad \rightarrow \quad DA_i = \frac{Accrual_i}{TA_i} - NDA_i$$

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