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Share repurchases, Signalling effect and Implications for Corporate Governance: Evidence from India

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Abstract

It is worth mentioning that a great deal of financial liberalization, privatization and internationalization policies in emerging economies have significantly increased the corporate restructuring activities like mergers, acquisitions, share repurchases, and stock splits, among others. Indeed, the activity that is investigated in this paper is 'share repurchases' and its effect on stock returns and price-to-earnings (P/E) ratio. More deeply, this paper will answer the research question—does a share repurchase offer abnormal returns around the announcement? Thus, it is performed in one of the Asian emerging markets—India. To do so, we use event-study method to examine abnormal returns and P/E signaling around the announcement of 64 share repurchases, announced during 2008-2009. It is found that stock performance does not adequate, and notices lower as well as negative earnings during post-buyback period. Briefly, we conclude that share repurchases assure short-term returns, and observe lower P/E compared to pre-buyback period. In addition, we show some interesting results that derived from industrial and services sectors. The outcome of this paper would help financial analysts, financial advisors, corporate enterprises and regulatory bodies in designing policies on earnings distribution, managerial incentives, takeovers, and so forth of regulatory aspects.

Keywords: Capital market studies; Corporate governance; Event-study; India; Price-to-earnings; Signaling effect; Share buybacks; Share repurchases; Stock returns; Undervaluation.

1. Introduction

The capital market is a creation of variety of investors who trade pecuniary assets in the form of equities, which is frictionless; however, investor's perception technically depends on the market outlook (e.g. Majumder, 2011). Therefore, equity market is said to be an efficient in light of corporate event announcements, such as, accounting disclosures, stock splits, share repurchases (buybacks), right issues, bonus issues, mergers, acquisitions, takeovers, open offers, dividend issues, and so forth, which encloses new information¹ and dissemination (e.g. Machiraju, 2007; Weston, Chung & Hoag, 1998). All these activities in turn—influence the functioning of stock market, which is treated as a signaling effect (e.g. Brown & Warner, 1985; Fama, Fisher, Jensen & Roll, 1969). Share buyback is a corporate financial strategy, which involves capital reshuffle decisions (e.g. Benhamouda & Watson, 2010; Thirumalvalavan & Sunitha, 2006), takeover defensive mechanism (e.g. Denis, 1990; Ginglinger & L'her, 2006; Liang, Chan, Lai & Wang, 2012), and puffiness in earnings-per-

¹ In other words, Majumder (2011) argues that the equity price today is an outcome of the combined effect of news/information released in the market. For example, post-election certainty, or uncertainty in policies of newly elected governments often induces a panic among investors, which may lead to a major downfall in equity prices, and we define these announcements are non-corporate, macroeconomic or institutional news.

share (EPS) whilst distributing surplus cash to the shareholders (e.g. Benhamouda & Watson, 2010). Indeed, undervaluation is the most important reason behind share repurchases (Ha, Hong & Lee, 2011). In a theory, firms frequently make use of equity repurchases to disclose information about stock undervaluation; moreover, it is a tactic for sending a bullish signal to the market (Jagannathan & Stephens, 2003). In particular, “signaling theory proposes that the credibility of a signal from a repurchase announcement increases when managers of the repurchasing firm are themselves exposed to risk of signaling failure” (Liu & Gombola, 1998, p. 30). In the perspective of corporate governance, information relating to share buybacks fully disclosed to shareholders (e.g. Hermalin & Weisbach, 2012; Task Force Report, 2006). Evidently, most of the early research has documented positive signaling effect around share repurchase announcements (e.g. Comment & Jarrell, 1991; Gonz alez & Gonz alez, 2004; Hyderabad, 2009; Ikenberry, Lakonishok & Vermaelen, 1995; Kim, 2007; Padgett & Wang, 2007).

Share repurchase activity has developed radically, and then fetched a major payment method since many years in the finance education, research and practice (e.g. Hung & Chen, 2010; Stowe, McLeavey & Pinto, 2009). [In our approach, if share buyback causes signaling effect, does it beneficial to the shareholders, or also causes double signaling power on the price-to-earnings \(hereinafter, P/E\) ratio? To address these queries, we examine 64 share repurchase programs announced by the Indian companies during 2008-2009. We apply the event-study method to check and investigate the debate does signaling effect or undervaluation is exhibited in India? If occurred, do Indian investors benefitted from share repurchases. We thus describe that share buybacks have been absent in respect of abnormal stock earnings during post-buyback period. We also report that stock behavior is not being a satisfactory, and notice lesser as well negative returns during post-buyback; hence, assure positive returns in the short-term. At the outset, this is an exclusive Indian study from the emerging economies group, which focuses on signaling effect in light of equity buybacks. Of course, we examine P/E behavior around buyback announcements. In addition, we suggest policy guidelines for strengthening corporate governance framework in view of repurchases.](#)

Conceptually, corporate restructuring is a long-term business strategy to boost shareholders value in terms of ownership structure, EPS, accounting earnings and abnormal stock returns, among others (e.g. Ray, 2010; Weston et al., 1998). It involves in two models: financial restructuring (e.g. changes in the capital structure), and operational reengineering (e.g. changes in the business model). Therefore, buybacks are part of the finance tactics. Thus, stock repurchase refers to the reversal of equity offerings (e.g. Kahle, 2002; Machiraju, 2007). Moreover, it has considered as one of the classic methods to lift

company's stock price. In particular, share repurchases distribute cash to the existing shareholders in exchange of firm's outstanding equity (e.g. Ray, 2010). Consequently, EPS is the major indicator for stock valuation, often higher-EPS leads to increase share price (e.g. Damodaran, 2002). Further, share buybacks help firms to discover EPS based compensation targets; specifically, number of shares repurchased in a quarter is the purpose of cash flow of the firm (Firth & Yeung, 2005). **However, changes in EPS and volatility in stock may influence the P/E. Therefore, we examine both stock and P/E margins in the present paper.**

Typically, shareholders get an exit opportunity at premium price over the prevailing market price, whilst firms pursue vista to reduce its equity capital. Previous studies exhibit that the motives² behind share buybacks are boosting market perception, showing rosier financials, benefitting from tax gains, and increasing the promoter's stake (e.g. Ginglinger & L'her, 2006; Webb, 2008). In the past twenty years, there has been a meteoric rise in employing share repurchases in the U.S. from US\$5 billion in 1980 to US\$349 billion in 2005. By the end of March, 2010, the authorized buybacks have reached about US\$68.5 billion, which is 52 per cent of the US\$125 billion in 2009 (Lu, Ozdaglar & Simchi-Levi, 2010). Subsequently, U.S. has become the largest market for share buybacks, followed by the UK (Benhamouda & Watson, 2010). In the Indian setting, vigorous increase in the inflow of foreign equity investments is the key factor due to the established policies that are equivalent to international markets (see Dongre, 2012; Reddy, Nangia & Agrawal, 2012). Consequently, this inimitable rise has accredited the investors, for instance, foreign institutional investors and home-based mutual funds (Majumder, 2011). We then forward to present some regulatory aspects of share buybacks.

In India, the financial option of share repurchases has been permitted from October 31, 1998 (e.g. Banerjee & Chakraborty, 2004; [indiabudget.nic.in]). There were six buyback offers in 1999, eight in 2000, and then increased 22 in 2008-09. Since 1998, roughly 300 firms have been practiced buyback offers (Hyderabad, 2009). According to Thomson Reuters report, India was the 15th most active nation in share buybacks globally, for example, Reliance Energy's US\$885.9 million buyback offer, recorded as the biggest corporate event in Asia during 2008-09 (Economic Times, 2008).

It is further necessary to comprehend the Indian buyback regulatory system and its consequences as a token of subject coverage. Early 90's, the economy functioned in an environment that has regimented by government control and regulations, later moved to a

² See, for example, Benhamouda and Watson (2010) investigate the motive behind 267 UK share repurchases during 2001-2004.

market-driven system (e.g. Machiraju, 2007; Reddy et al., 2012). Until the enactment of Companies (amendment) act of 1999, no company limited by shares, or no company limited by guarantee having a share capital buy its own securities unless the consequent reduction of capital has affected, and sanctioned pursuant to the provisions of sections 100 to 104, and 402 of the act. However, the concept of share repurchases has proposed in the Companies Bill, 1977. Afterward, the Companies (amendment) Ordinance of 1998 promulgated on Oct 31, 1998 containing the provisions on share buybacks, but it has not been passed. Thereafter, a new ordinance of 1999 was circulated on Jan 7, 1999. The new era of share buybacks has introduced in the Companies act of 1956 by the Companies (amendment) act, 1999 in sections 77A, 77AA, and 77B. Accordingly, Securities and Exchange Board of India (SEBI) issued SEBI (Buyback of Securities) Regulations 1998, which is a running enactment (e.g. Banerjee & Chakraborty, 2004; Ray, 2010).

1.1. Motivation and objective of the study

We therefore present our motivation and objective of the study. The anonymous revolutionize in buybacks is considered as an opportunity to study the stock and P/E behavior around repurchase announcements. Thus, we are strongly motivated by the studies that corroborate diverse issues on share repurchases, for instance, signaling effect, anti-takeover method, earnings performance, information disclosure in light of corporate governance, and so forth (e.g. Comment & Jarrell, 1991; Denis, 1990; Dittmar, 2000; Fama & French, 2001; Grullon & Michaely, 2002; Hermalin & Weisbach, 2012; Hribar, Jenkins & Johnson, 2006, Hung & Chen, 2010; Hyderabad, 2009; Jiraporn, 2006; Liang *et al.*, 2012; Padgett & Wang, 2007; Peyer & Vermaelen, 2009; Task Force Report, 2006; Valenti, Luce & Mayfield, 2011; Weigand & Baker, 2009). Previous Indian studies (e.g. Thirumalvalavan & Sunitha, 2006) find sturdy signaling influence that reacted more positively around a given announcements. Nevertheless, they have not specified any insightful information to the investors, or stock broking firms—whether buybacks assure positive returns? In fact, no Indian study examined both stock volatility and P/E changes around repurchases. Therefore, we aim to test the significant changes in share price and P/E during pre-buyback and post-buyback period. More specifically, we offer policy guidelines on information disclosure and share buybacks in the view of corporate governance practices. In sum, our study adds some contribution to the share repurchases literature from the Asian emerging markets: India.

The remaining paper is organized as follows. Section 2 presents the review of earlier literature. Section 3 explains method and data. Section 4 discusses signaling results. Section 5 outlines implications for corporate governance. Section 6 concludes the paper.

2. Review of earlier contributions

To understand the consequences of signaling effect around different corporate events, we present extensive literature that studied in western and emerging economies. Chen and Fraser (2010) estimate stock market prices in view of dividends, and earnings during 1965-2006 in 10 global markets. They suggest that expected earnings have significant power in driving stock prices in the markets of the U.S., the UK, Japan, Korea, and Malaysia, while expected dividends have relatively more influence on the indicators of Thailand, Taiwan, and Indonesia. In the course of share repurchases, most scholars reported on (*in*) developed markets, such as, the U.S., Canada, and Japan, may have different effects in markets with different degrees of development (Hung & Chen, 2010). Comment and Jarrell (1991), and Vermaelen (1981) find positive abnormal returns around share repurchase announcements, which they interpret it as a signal of undervaluation. In fact, subsequent scholars also indicate that undervaluation is the most frequent rationale for equity buybacks (e.g. Dittmar, 2000). In a similar study, Peyer and Vermaelen (2009) report long-term abnormal returns as a rectification of an overreaction to bad news prior to repurchases. We thus survey both past and recent contributions on share repurchases, and then presented in two groups: theoretical debate and signaling effect.

2.1. Share repurchases: A theoretical debate

Stock repurchases had gained recognition in the United States, and then engulfed European countries (e.g. France, Germany, Italy, and the UK), Australia, New Zealand, and Asian countries (e.g. China, India, Japan, Malaysia, and Taiwan). Thus, it is necessary to debate on various theoretical aspects that contemplate share buybacks: strategic financial decision of capital reshuffle (e.g. Benhamouda & Watson, 2010; Thirumalvalavan & Sunitha, 2006), dividend declaration whilst paying excess cash flow to equity investors (e.g. Li & McNally, 2007), and information discrepancy between insiders, and outside owners (e.g. Kim & Varaiya, 2008). In particular, it is a takeover defensive tactic (e.g. Denis, 1990; Dittmar, 2000; Ginglinger & L'her, 2006); similar studies include connotation of legal restrictions, and governance issues (e.g. Cerveny, Wittlin, O'Brien & Trocchio, 2010; González & González, 2004; Harris & Ramsay, 1995; Hung & Chen, 2010; Jansson & Larsson-Olaison, 2010; Rau & Vermaelen, 2002).

Capital structure reshuffle would be an important motivation while designing strategies for repurchases (Benhamouda & Watson, 2010). Indeed, stock repurchases allow the firm to buy back its own outstanding stock, adjusting the firm's capital structure as well board composition (Webb, 2008). In particular, these programs are greater news when foreign institutional investors support a firm (Ginglinger & L'her, 2006). In exceptional

cases, shareholders do not favor management using surplus cash flows, although it may not distress the net present value of a firm (Jensen, 1986). Typically, excess capital utilized to buy back outstanding equity shares thus result in a positive market reaction. A firm usually repurchases its stock through open market at prevailing market value (Webb, 2008). Open market repurchases method is flexible; hence, it becomes an effective tool for administration purposes. These programs typically take place over a period of one year or more, and the firm can buy its own stock when they judge that it is undervalued (Stephens & Weisbach, 1998). Li and McNally (2007) document that most organizations likely to go for share buybacks, if they have superior free cash flows, lesser market-to-book ratio, weaker prior stock performance, and insiders large shareholdings. Therefore, announcement returns strongly related to the private information possessed by company insiders. In this issue, Kim and Varaiya (2008) examine insider-timing assumption by inspecting insiders trading activities during share buybacks trading. They suspect that information discrepancy between insiders and outside owners of a buyback firm would create asymmetric prospects for insiders to do their trades in a period when the firm is truly engaged in buyback trading.³

Most buyback firms tend to be hefty, and have greater disbursement ratio, which may lead distributing surplus cash to equity owners (Benhamouda & Watson, 2010); thus, Kahle (2002) evidence that larger offers attract superior market response. Firms in the U.S. have become less payout entities, but it has corresponded with a spectacular rise in share repurchases during 1978-1999 (Fama & French, 2001); hence, firms engage in repurchases trading more actively when the price falls in the issue market. Jansson and Larsson-Olaison (2010) state that Swedish firms do not repurchase stock to distribute excess cash, or fend off takeovers; hence, they do in-addition to dividends but not substitute. In a similar argument, buybacks are typically less profitable as there is no new capital coming into the firm, because they have the longest investment duration (Cumming & Johan, 2008).⁴ In the subject of defensive strategy, Denis (1990) examines the defensive changes in the corporate payout policy. Repurchase is an effective method for countering the hostile takeovers, as there is a high probability of the target firm maintaining independence. Likewise, buybacks may reduce the likelihood of a takeover, and trigger a decrease in firm value, thus likely to strengthen the controlling shareholders (Ginglinger & L'her, 2006). In a different motive,

³ However, information irregularity gives a possible unfair lead to insiders over outside owners, because insiders of a firm would be selling their equity holdings when the firm itself is supporting the price by buying back its own shares (Kim & Varaiya, 2008).

⁴ Cumming and Johan (2008, p. 198) examine 518 exited venture capital backed firms in Canada during 1991-2004. In a buyback exit, the entrepreneur repurchases the firm from the VC and there exists no issues arising from information asymmetry.

Dittmar (2000) suggests that buybacks use to counter the dilution effect of management and employee stock options.

On the other hand, González and González (2004) analyze the consequences of legal restrictions on the size of repurchase program. They suggest that the obligation of a boundary on the amount of common stock favors the use of open market repurchases (OMRs), compared to other methods such as tender offer repurchases (TORs), and Dutch actions (DAs). Hence, TORs, and DAs are notably larger than OMRs (Comment & Jarrell, 1991). In the cross-country aspects, Rau and Vermaelen (2002), and Rees (1996) document that UK buyback activities have lesser abnormal returns compared to the U.S. firms. Hence, there are two important factors causing lesser returns: the UK regulatory environment discourages share buybacks to take advantage of an undervalued stock price, and many buyback programs setup to allow pension funds to earn tax credits (e.g. Rau & Vermaelen, 2002). Harris and Ramsay (1995) discuss the implications for regulating buybacks in the Australian market. Conversely, González and González (2004) describe that prevalence of corporate governance would be a motivation for examining stock reaction around buybacks in the Spanish market. Webb (2008) examines the relationship between the extent of share repurchases, and measures of corporate governance in the banking industry. Webb also states that corporate governance plays a vital role in both the market response, and strategic decisions. In the relevant issues of regulatory governance, Cervený et al. (2010) find that changes in legal provisions affect buybacks in various aspects. Generally, in a theory, buybacks are guided by the intrinsic value of the share, which is privileged than the market price, when management purses the shares to be undervalued (Hung & Chen, 2010). However, for some companies, total cash distributions (dividends and repurchases) may be a more practical measure of return to investors than dividends alone (Stowe et al., 2009).⁵

In sum, repurchase is a strategic finance choice, which is a strong motivational factor in various long-term business decisions: capital reshuffle (e.g. Baker, Powell & Veit, 2003; Benhamouda & Watson, 2010; Dixon, Palmer, Stradling & Woodhead, 2008; Webb, 2008),⁶ signaling share undervaluation (e.g. Crawford & Wang, 2012; Ikenberry, Lakonishok & Vermaelen, 2000; Ikenberry & Vermaelen, 1996; Wansley, Lane & Sarkar, 1989),⁷

⁵ When a firm buyback its overvalued shares, consequently it dilutes the outstanding shares and shifts wealth from long-term shareholders to sellers (Stowe et al., 2009).

⁶ In Dixon et al. (2008) survey, the authors find that the important motive behind share repurchases is “to achieve optimum capital reshuffle”, followed by to return excess cash to shareholders, to improve the company’s earnings per share, as a method of increasing the firms gearing, and because the company lacked sufficient investment opportunities to use available cash, among others presented in a 14-point measurement.

⁷ In addition, Wansley et al. (1989) find that “to signal investors that managers are confident about the firm’s future” is also a motive behind share repurchases.

distributing surplus cash flows (e.g. Li & McNally, 2007), reducing agency costs (e.g. Jensen, 1986), takeover defensive strategy (e.g. Denis, 1990; Dittmar, 2000; Ginglinger & L'her, 2006; Liang et al., 2012; Neuhauser, Davidson & Glascock, 2011), and avoid dividend taxation (Baker et al., 2003).⁸ In Dittmar's (2000) view, motive behind repurchases depends upon the firm specific situation. However, purpose for repurchases likely changes at the different stages of lifecycle (Liang et al., 2012).⁹ On the other hand, "judging from the financial press [...] Chief Financial Officers (CFOs) are asked why firms repurchase stock, the most frequently mentioned reason is: improving EPS numbers" (as cited In Hribar et al., 2006, p. 4).

2.2. Share repurchases and signaling effect: The empirical debate

We thus report our understanding on the signaling effect around repurchase announcements that has examined in various institutional settings. Theoretically, signaling power is the key elucidation for firms' buyback activity (Ikenberry et al., 1995), and information is the most regularly encountered justification for stock repurchases causes signaling hypotheses (Stephens & Weisbach, 1998). Signaling effect consists in the swell of positive, or negative, when the investors could not discriminate the value of firm's outlay opportunities (González & González, 2004). However, price reactions to the announcement in the last decade appear to be less sympathetic compared to previous findings (Ginglinger & L'her, 2006). Of course, volatility of stock price is the meticulous risk faced by investors (Kim, 2007), and individual stock return volatility was more than doubled during 1962-97 (Campbell, Lettau, Malkiel & Xu, 2001). We describe the prominent reviews in light of signaling effect (e.g. Bartov, 1991; Comment & Jarrell, 1991; Grullon & Michaely, 2002; Kahle, 2002; Kim, 2007; Li & McNally, 2007; Padgett & Wang, 2007). In the Indian context, very few scholars focus on stock earnings around equity repurchases (CNI, 2009; Hyderabad, 2009; Thirumalvalavan & Sunitha, 2006). Thereafter, we also have reviewed special studies on bank buybacks (Webb, 2008), and the impact on accounting performance (Evans & Evans, 2001).

Bartov (1991) analyses 150 announcements during 1986-92, find that buyback firms have higher book-to-market ratio, and higher proportion of institutional investors. In particular, Comment and Jarrell (1991) investigate the signaling hypotheses, and examine three methods of repurchasing stock, *tender offers*, *Dutch auction*, and *open market repurchases*.

⁸ Also, see the theoretical discussions with some international examples, for instance, what is the game plan for share repurchases (Stonham, 2002).

⁹ Liang et al. (2012) find size, sales growth, ROA, and dividend-to-asset ratios are consistent with the life cycle process. They also explore that repurchase firms in the early stage tend to have considerably higher value-to-price ratios, whereas firms in the later stage produce higher free cash flows.

They exhibit that fixed-price tender offers signaling the most information to investors, and least in case of open market repurchases. Oyon, Markides and Ittner (1994) examine 41 U.S. offers during 1971-1985, thus firms re-buying their shares do have a raise in earnings in the offer-year, and firms that make tender offer, do not happen earnings augment in the years following the buyback. Similarly, Ikenberry et al. (1995) hypothesize that stock repurchases primarily serve as a signaling mechanism, and thereby provide new information; study 1,239 open market repurchases announced between 1980 and 1990. They indicate that investing in stock repurchase companies evidenced 12.1 per cent abnormal returns over 4 years. For the U.S., Grullon and Michaely (2002) test the substitution effect between dividends and share repurchases for 15,843 firms during 1972-2000, thus average payout ratio was relatively constant in spite of decline in the dividend-payout ratio. Interestingly, Kahle (2002) examines how stock options affect the decision to repurchases. Kahle finds that managers repurchase to maximize their own wealth and fund employee stock options.

Conversely, Kim (2007, p. 332) study the changes in daily return volatility associated with 905 open market offers during 1990-92. Thus, firms actively buy back their shares when the price falls that reduce daily return volatility. Li and McNally (2007) inspect the determinants of firms' repurchase decision, and the market reaction during 1987-2000. They find that market reacts more positively when stocks undervalued, and initiates new repurchase programs. Chua (2010) shows that mean cumulative market-adjusted returns for the period $[0, +1]$, and $[-1, +1]$ is substantial at 1.25 per cent, and 1.33 per cent respectively; whereas, weakly-performed firms exhibit the positive, and significant for the period $[0, +1]$. More recently, Liang et al. (2012) studies the 4,285 offers in the U.S. during 1990-2006. They find that motive for repurchases alter depending on the firm's lifecycle stage.¹⁰ Specifically, a firm in the growth stage tends to pursue a buyback plan to signal its undervalued stock; whereas a firm in the mature stage is prone to repurchase to distribute surplus free cash flows. In fact, Liang et al. find five-day abnormal return was about 3.44 per cent.¹¹ Likewise, Chen and Wang (2012) investigate 4,710 U.S. repurchases between 1990 and 2007. They find that both initial and long run stock price reactions are significantly less

¹⁰ However, firm's growth opportunity situation is strongly influenced by its development stage in the firm's lifecycle (Liang et al., 2012).

¹¹ On the one hand, one can observe the fruitful results on share repurchases in 33 economies (see Haw, Ho, Hu & Zhang, 2011). On the other hand, one can study the pattern of long-run returns following open market share repurchases, for instance, in Canadian (McNally & Smith, 2007) and American (Yook, 2010) markets.

favorable for constrained firms than for unconstrained. They also display inferior post-buyback abnormal returns for constrained compared to unconstrained firms.¹²

Similarly, for the UK, Padgett and Wang (2007) inspect the short-term signaling power of open market share repurchases during 1999–2004. The 5-day (1.13%) and 11-day (1.21%) abnormal returns are statistically significant.¹³ For France, Ginglinger and L'her (2006) evaluate 363 repurchases during 1998–99. They find positive market reaction; hence, it depends upon the corporate governance and market structure measures. They also observe overall positive reaction of 0.57 per cent (0, +1). For Spain, González and González (2004) analyze 58 open market repurchases and 24 sellbacks. They notice 1.74 per cent of abnormal returns (-1, +1), 2.04 per cent (-2, +2), and 1.95 per cent (-3, +3).

Contrary to the above observations, Stephens and Weisbach (1998) observe negative abnormal returns during the period preceding buyback program, which indicates that firm's normally buy back when their stock price is undervalued. For Malaysia, Ramakrishnan, Ravindran and Ganisen (2007) assess share buybacks during 1999–2006, and find positive effects to share prices during buyback and after buyback contrasted to pre-buyback. Firth and Yeung (2005) examine various characteristics of open market share buybacks in Hong Kong. They suggest that firms initiating buybacks have excess cash flow, and are undervalued. They also find that market-adjusted returns contiguous the first share buyback are a task of undervaluation¹⁴. In Taiwanese market, Hung and Chen (2010, p. 109) analyze the undervaluation of 1,145 repurchases during 2000–06. They explore that higher the upper bound of the declared price range announced, the more undervalued the stock price, and the more certainly the market reacts afterward, especially in the long-term.

Particularly in bank-related firms, Webb (2008) has undertaken 224 repurchases during 2002–04, and exhibits positive signaling. Webb has reported 0.85 per cent of AAR on 0 window, conversely CAR is 0.41 per cent. In the subject of accounting performance, Evans and Evans (2001) compare accounting performance of repurchasing companies and non-repurchasing companies. They notice that performance of repurchasing companies fails to improve in the post-announcement period.

In the Indian context, we found few scholars that investigate share repurchases in the aftermath of SEBI (Buyback of Shares) Regulations, 1998. Thirumalvalavan and Sunitha

¹² Depending on the financial constraint measure, the three-day abnormal returns for constrained firms range from 0.23 per cent to 0.75 per cent, which is lower than the average abnormal returns of 0.92 per cent to 1.83 per cent for unconstrained firms (Chen & Wang, 2012).

¹³ See the European literature on share purchases (Crawford & Wang, 2012; Lee, Ejara & Gleason, 2010; von Eije & Megginson, 2008).

¹⁴ It is usually proxied by prior abnormal stock returns and the number of shares acquired (Firth & Yeung, 2005).

(2006) test the signaling effect of buyback and dividend announcements for 22 firms during 2002-04, find abnormal returns across various repurchase levels. Their results describe that market was reacted more favorably to repurchases compared to dividends. An individual research organization, CNI (2009) examines 22 buybacks during 2008-09. CNI corroborate that 50 per cent of the companies have reported their post-buyback share prices decline by 50 per cent. In the recent past, Hyderabad (2009) considers 68 repurchases, reports that AAR is 2.83 per cent, and CAR is 6 per cent on the announcement date.

However, at the outset, it is our job to find what the knowledge gap in the aforementioned literature is. First, we have not found much empirical work on share buybacks with respect to Indian market; in fact, an extensive literature (we did in this paper). Second, both western and emerging literatures do not examine the P/E behavior around share repurchase announcements. Thus, we study P/E behavior in our paper. In addition, we study sector-wise signaling. Lastly, we try to establish a connection between signaling and corporate governance, and offer lawful implications for institutional progress.

2.3. Signaling hypotheses development

With this literature backdrop, we develop signaling hypotheses to counterpart the objective of the study. In a practice, firms persuade investors in view of undervaluation of their share price; therefore, it is imperative to study the signaling effect of repurchase announcements. The signaling hypotheses¹⁵ imply new and affirmative information about the firm's future earnings prospects (Hung & Chen, 2010).¹⁶ For instance, "research has shown that equity cash flows–dividends, share repurchases and equity issues–are perceived by investors as signals of management's assessment of a firm's performance and prospects" (Dixon et al., 2008, p. 889). Earlier scholars have shown that there exist positive abnormal returns around such announcements (e.g. Comment & Jarrell, 1991). Whereas the majority of earlier research pursued various theories on share buybacks, such as, *information signaling hypotheses* (e.g. Ikenberry et al., 1995; Peyer & Vermaelen, 2009), and *free cash flow hypotheses* (e.g. Grullon & Michaely, 2002).¹⁷ More specifically, information signaling hypotheses suggests that the firm has an enticement to repurchase their own stock as a better self-investment when their share price is undervalued (Liang et al., 2012). Undertaking the

¹⁵ Information signaling hypotheses is normally based on the idea that asymmetric information between insiders and outsiders causes the firm's stock to be mispriced (Liang et al., 2012). In light of free cash flow hypotheses, Easterbrook (1984) and Jensen (1986) describe that share buybacks condense the amount of free cash flow under the control of firm.

¹⁶ In case of underpricing—a negative price reaction during pre-buyback period (Hung & Chen, 2010, p. 104).

¹⁷ For instance, "according to the undervaluation hypothesis, repurchases are used by managers to reveal information about equity undervaluation. If managers believe that the firm is undervalued relative to their superior private information, then they may attempt to disclose this potentially value-increasing information by repurchasing the company's stock" (as cited In Ha et al., 2011, p. 521).

recommendations, and views of Crawford and Wang (2012), Ginglinger and L'her (2006), González and González (2004), Hyderabad (2009), Ikenberry et al. (2000), Lee et al. (2010), Li and McNally (2007), Lim and Park (2011) and Webb (2008), we develop the following hypotheses to achieve the goal of our study. In this setting, we predict that open market buybacks produce positive stock returns and P/E, which is similar to Hyderabad (2009). The hypotheses are as follows.

Hypothesis 1: There is no significant difference between stock returns during pre-buyback period.

Hypothesis 2: There is no significant disparity between stock returns during post-buyback period.

Hypothesis 3: There is no significant difference between stock returns and P/E during pre-buyback period.

Hypothesis 4: There is no significant deviation between stock returns and P/E during post-buyback period.

3. Method and data

3.1. Event-study method

Capital market efficiency is the key supposition underlying the use of finance theory, and diverse techniques in event studies (e.g. Brown & Warner, 1985; Fama et al., 1969; Johnson, 1998; Johnson, Natarajan & Rappaport, 1985).¹⁸ In a theory, earnings management applies around corporate events: IPOs, management buyouts, stock repurchases, mergers, acquisitions and accounting disclosures, among others (e.g. Cohen & Zarowin, 2010).¹⁹ Buybacks usually employ by the firms to give some information to the stock market; thus, there is a need to study the signaling effect (e.g. Ginglinger & L'her, 2006; Hyderabad, 2009; Ikenberry et al., 1995; Li & McNally, 2007), and its impact on the wealth of shareholders in terms of P/E earnings. We then apply event study method (e.g. González & González, 2004; Padgett & Wang, 2007) to compute abnormal returns, and percentage of changes in P/E. The price changes, or returns on each day for each firm has computed by comparing closing price of two days, i.e. current and previous day, and dividing the difference by closing price of the previous day. The same approach is employed while computing the changes in P/E.

We select (both even and odd: chosen anonymously; of course, after reviewing methodology section in the previous studies, e.g. Hyderabad, 2009) *T1*, *T3*, *T10*, *T30*, *T50*, *T70*, *T90*, and *T110* event periods. The event period 110-day means, 110 days before and after the opening date of buyback program; therefore, opening date of buyback is designated

¹⁸ Johnson et al. (1985) argue that applications of finance theory provide better measures of firm performance compare to accounting-based techniques. See Campbell, Lo and Mackinlay (1997) for basic econometrics of financial markets. Hence, our model is slightly different from the standard methods that explain windows.

¹⁹ Cohen and Zarowin (2010) examine both real and accrual-based earnings management activities around 1,511 U.S. seasoned equity offerings between 1987 and 2006. They document how the propensity for firms to tradeoff real versus accrual-based earnings management activities around SEOs varies cross-sectionally.

as zero (0). We found that expected returns are calculated using different asset pricing models like capital asset pricing model, market model, market-adjusted model, and so forth. On the other hand, we also found some recent studies that use market index for estimating expected returns (e.g. Reddy, Nangia & Agrawal, 2012). Therefore, we use BSE-SENSEX Index as a market index to estimate market returns.

We compute simple returns using the following standard formulae (e.g. Hyderabad, 2009).

$$R_{it} = \sum \left[\frac{CP_t - CP_{t-1}}{CP_{t-1}} \right]$$

Where, R_{it} – simple returns of a stock; CP_t – closing price of a stock; CP_{t-1} – previous day closing price of a stock.

Then, we compute market returns.

$$R_{mt} = \sum \left[\frac{CP_{mt} - CP_{mt-1}}{CP_{mt-1}} \right]$$

Where, R_{mt} – market returns for the BSE-Sensex; CP_{mt} – closing index value; CP_{mt-1} – previous day closing index value. Further, abnormal returns are computed as follows.

$$AR_{it} = \sum [R_{it} - R_{mt}]$$

AR_{it} – excess returns for a given stock.

Subsequently, an average abnormal return for each stock is computed.

$$AAR_{it} = \sum \frac{1}{n} (AR_{it})$$

AAR_{it} – average abnormal returns; n – sample size. In order to examine the cumulative effect of events, we produce cumulative abnormal returns.

$$CAR_{it} = \sum AR_{it}$$

CAR_{it} – cumulative abnormal returns.

In fact, we (could) regress the data using cross-sectional regression models but it is not being performed in our paper due to incompleteness and readiness of share repurchase disclosures in India. Hence, we compute analysis of variance (*ANOVA-one-way*) to locate any significant difference between the means of stock returns and P/E, and it is appropriate for our sample size, also to accomplish the objective of this paper.

3.2. Data collection

Relevant information on share buybacks is collected from four sources. Sample size is extracted from SEBI,²⁰ and Capital Market's Capitaline database in which open market

²⁰ SEBI is a capital market regulatory body located in Mumbai, India. Relevant information on market regulatory and provisions of various acts are available at [<http://www.sebi.gov.in>].

share buybacks are included, during 2008–2009. Subsequently, market information is collected with reference to commencement date (opening date) of buyback program. The statistical data: daily share prices, market index, daily turnover, and P/E for the given sample are absorbed from the *Bombay Stock Exchange (BSE)* online database, and *Centre for Monitoring Indian Economy (CMIE)-Prowess* database. We then sort and select 64 buybacks whose complete information is available during the sample period (see Table 1).

[Insert Table 1 about here]

4. Results and discussions

4.1. Descriptive statistics for stock returns and P/E

Share repurchases typically regarded as a good signal to the stock market (Liang et al., 2012).²¹ Empirically, these announcements report abnormal returns around 2 per cent to 3 per cent (e.g. Comment & Jarrell 1991). Most event studies compute simple and market-adjusted returns around repurchase announcements. In the Malaysian market, Ramakrishna et al. (2007) found positive effects of price returns during- and post-buyback compared to pre-buyback period. In case of India, Hyderabad (2009) notices that AAR on the date of announcement is 2.83 per cent, while CAR is about 6 per cent. Table 2 shows descriptive statistics for stock returns (see Panel A) and P/E changes (see Panel B). We find that stock returns during post-buyback tumbled as well negative that can be observed on -3rd window (1.36%), and -1st window (0.21%) compared to +1, and +3 windows.

Interestingly, a highest stock return (1.36%) is noticed during pre-buyback. Further, we observe AAR and CAR during both the periods. AAR reports extremely a good result on -3rd window (1.49%), and -1st window (0.31%). It thus infers that stock has greatly performed compared to market returns. In contrast, AAR has fell-down by 0.73 per cent, and 1.04 per cent on +1st, and +3rd windows respectively during post-buyback. Similarly, CAR results as good as AAR in the respective windows. However, we suspect that the post-buyback investor sentiments have not been sympathetic with buyback offering companies in India, because repurchases strategically help in rebuilding the capital structure to prevent takeovers from rivalry firms, and facilitate to increase proprietors stake in the firm. Figure 1 shows graphical picture on stock returns, AAR and P/E changes.

[Insert Table 2 about here] and [Insert Figure 1 about here]

We therefore discuss P/E changes. Stock performance shows lower returns; similarly, P/E also has affected. We observe that P/E during pre-buyback, which is on -3rd,

²¹ Liang et al. (2012) argue that firms in the early stage face more information asymmetry; therefore, firms have greater incentive to repurchase shares due to mispricing than firms do in the later stage.

and -1st windows report higher change compared to +1, and +3 windows (0.72%, 0.38%, 0.10%, and -0.26% respectively). If we observe closely both stock and P/E changes during post-buyback (e.g. see Table 2 and Figure 1), thus P/E has seriously affected compared to stock returns. Additionally, we also have shown number of firms with positive returns. Of course, it would be concrete evidence on buyback programs in the emerging nations like India. In other words, a share repurchase also influences the P/E behavior (not only stock) around a given announcement. Therefore, it is proven that there would be significant P/E signaling during post-buyback.

We then forward to test the hypotheses. Table 3 depicts the results for one-way analysis of variance with respect to stock returns and P/E changes. We further divide the outcome into four panels, Panel A, B, C, and D. Panel A describes inference with regard to pre-buyback stock returns. Thus, P-value 0.19607 is greater than the significant α level 0.05 (at 95% confidence level). As a result, we accept the null hypothesis (H1), and interpret that there is no significant mean difference among stock returns during pre-buyback period. Panel B outlines the result of post-buyback stock returns, and find that P-value is greater than α level 0.05, i.e. 0.42976. Therefore, we accept the null hypothesis (H2), and infer that there is no significant difference among the means of stock returns during post-buyback.

Conversely, Panel C and Panel D describe P/E changes in both the periods respectively. Likewise Panel A and B, we observe similar changes for P/E. In the Panel C and D, P-value is greater than α level 0.05, i.e. 0.82203, and 0.43288 respectively. We also accept the null hypothesis in case of P/E (H3, and H4), and infer that there is no significant difference among the means of P/E changes in both the periods. In this setting, one could conclude that share repurchase programs not only influence the stock prices but also cause the P/E signaling around announcements. In addition to the above results, we also compute Pearson's correlation; however, significant results have not been found.

[Insert Table 3 about here]

4.2. Sector-wise signaling results

Table 4 shows sector-wise proportional results with respect to stock returns and P/E. For superior analysis and discussions, we divide the sample size into two sectors. Discussion A represents a sample of 42, consists production, manufacturing, chemicals, and textiles that refers to *Industrial, Production, and Machinery (IPM)*. On the other hand, Discussion B consist a sample of 22 scripts refers to *IT, Finance, and Services (IT&FS)* that includes information technology, banking, finance and other allied services.

In Group A, we observe that the stock returns in IPM during pre-buyback are healthier compared to post-buyback. It is noticed that 0.96 per cent of stock returns on -3rd window, which is the highest stock return; similarly, P/E turned positively. During post-buyback period, P/E has declined by 29.03 per cent on +70th window, which is noticed a highest collapse in the sector. Group B shows services sector performance during both the periods. Stock returns on -3rd, and -1st windows, i.e. 2.14 per cent, and 0.82 per cent is higher than +1, and +3 windows during post-buyback; similar results reported for P/E in the respective periods. **In addition, we also have shown number of firms with positive returns.** Among these results, IT&FS has performed extremely vigorous compared to IPM during both the periods. In brief, share buybacks have affected the industrial sector negatively, though service sector has shown subordinate results especially during post-buyback. **Therefore, we confer that services sector repurchases usually outperform the industrial sector. However, our results are strictly restricted to India.**

[Insert Table 4 about here] and [Insert Figure 2 about here]

5. Implications for corporate governance

We found few studies that exclusively focus on share repurchases and corporate governance. Hence, we do not establish any object that corporate governance affects share repurchases and vice-a-versa. Thus, we recommend the following studies that are based in Singapore (Chua, 2010), Sweden (Jansson & Larsson-Olaison, 2010), and the U.S. (Kim & Varaiya, 2008), which imparts the knowledge on information disclosure, repurchase announcements and corporate governance practices. To propose legal implications in light of buybacks and corporate governance, we follow various guidelines that have suggested in different institutional settings (Chen & Wang, 2012; Hermalin & Weisbach, 2012; Hung & Chen, 2010; Jansson & Larsson-Olaison, 2010; Jiraporn, 2006; Kadir & Muhamad, 2012; Task Force Report, 2006; Webb, 2008).

To instruct the awareness on share buybacks and corporate governance, Jiraporn (2006) states that firms tend to repurchase less stock where shareholder rights are weaker. The author also argues that firms with weak shareholder rights are better able to develop, and preserve more cash within the firm. Kim and Varaiya (2008) describe that insufficient disclosure on open market share repurchases in the U.S.; in most cases, outside shareholders have no knowledge of whether their firm employs repurchase trades. They also evidence that insiders do increase the net number of shares sold in a quarter, when the firm engaged

in share buyback trading.²² Webb (2008) examines the relationship between stock repurchases and corporate governance on 224 firms during 2002-04. Board structure and executive stock ownership do not influence the market response. In particular, insider equity has less influence on repurchases. In a recent study, Jansson and Larsson-Olaison (2010) suggest that corporate governance affect stock repurchasing behavior. They suggest that diversity in national and firm-level corporate governance consider in order to accurately assessing the outcomes of regulatory reforms. In a relevant observation, Hung and Chen (2010) explore a weaker signaling power of the legal price range, because repurchasing firms usually set the price range based on their own specific considerations, but not on the legal criteria. More recently, Chen and Wang (2012) describe that buybacks result a decline in corporate liquidity for repurchasing firms, whereas for constrained firms, reduced liquidity can be detrimental to shareholders wealth. Specifically, Hermalin and Weisbach (2012, p. 220) argue that healthier disclosure requirements may exaggerate agency problems, and allied costs, including executive rewards. Further, improved disclosure provides benefits, but it also entails costs, for example, executive pay, and the distortions in managerial behavior.

With this literature support, we suggest some lawful policy guidelines for Indian regulatory framework in the view of share repurchases. In the given country perspective, corporate governance related listing requirements are largely based on the recommendations of the Cadbury and Higgs Reports, and the Sarbanes-Oxley Act. Further, improvements in corporate governance practices seem mostly to be a voluntary (Task Force Report, 2006). Moreover, this agenda has undergone a stretched drive from ratifying the Companies Act, 1956 through the Companies Bill, 2009 (Singh, Kumar & Uzma, 2011),²³ and New Companies Act 2011-12. The Task Force Report also states that share buybacks must disclose full-information to the given shareholders. *We thus observe that buybacks, and corporate governance is a new research paradigm observed in the recent years, which has examined by few academic scholars, committees, and groups. Therefore, Indian scholars have greater opportunity to focus on the emerging issues that are relevant to governance at large: shareholding pattern, information transparency, and disclosure on buyback programs,*

²² Insiders usually get an incentive to sell when a firm supports the price by repurchasing its own shares (Kim & Varaiya, 2008).

²³ Radical changes have taken place since the 1991 liberalization policy; they include the elimination of the office of Controller of Capital Issues, and the introduction of the free market-pricing regime for security issues. Thereafter, SEBI was established pursuant to the enactment of the SEBI Act for all aspects of capital market activities (Singh et al., 2011).

insider trading,²⁴ announcements, and stock returns. For instance, the given country should amend key securities laws relating to insider trading, corporate ownership and institutional ownership pattern, among others, which can be similar to Malaysia (Kadir & Muhamad, 2012). In fact, it can be practiced internally and externally while commencing share repurchases, thus may help regulators while investigating scandals, wrong information, and insider trading activities. On the other hand, a better corporate payout policy in financial restructuring models like repurchases or dividends, would control insider activity and improve firms' earnings and managerial incentives, as well (e.g. Douglas, 2007; Weigand & Baker, 2009). Lastly, it is important that advanced corporate governance policies, rules or regulations are essential both for high firm performance and for public good (e.g. Valenti et al., 2011). In addition, there must be a *Comprehensive Corporate Governance Mechanism* for dealing major financial restructuring events, such as, acquisitions and takeovers (e.g. Indian Takeover Code, a review by Reddy, Nangia & Agarawal, 2011), valuation guidelines (e.g. as suggested in Reddy, Agrawal & Nangia, 2013), and related matters of ownership structure, board meetings and corporate disclosures.

6. Concluding remarks

Share repurchases have become one of the important research areas in corporate finance discipline, which imparts strong considerations for strategic corporate policy. Since 1998, many Indian firms have announced significant number of share buyback programs. We therefore examined the signaling effect (both stock returns and P/E ratio) around share repurchase announcements. In our study, we find that buyback offers have not been showed significant abnormal stock earnings during post-buyback period. More specifically, we study the effect of given announcements in both industrial and services sectors. Further, it concludes that lower stock returns are observed during post-event windows of industrial sector whereas similar stock returns are reported in both pre- and post-buyback for services sector. Of course, we strongly accept earlier studies, and suggest that Indian buyback announcement results found to be lower as well negative during post-event days but assure positive returns in the short-term (e.g. Ginglinger & L'her, 2006; Padgett & Wang, 2007; Ramakrishnan et al., 2007; Thirumalvalavan & Sunitha, 2006). By contrast, lower abnormal returns and P/E are reported during post-buyback period. We then conclude that buybacks

²⁴ The meaning of insider trading is that "buying or selling of shares by people who know, or is in possession of certain information about the shares and the information, is not yet released to the public. The information is of such a nature that if known to the public would affect the price of the shares [...]. For example, a director who sells all his shares shortly before the announcement that the company suffers a large loss" (Kadir & Muhamad, 2012, pp. 78-79). Also, see Firth, Leung & Rui (2010).

offered by Indian-based listed firms assure short-term returns and observe lower P/E in the aftermath of announcements. Our study has strong implications to the existing literature on share buybacks. In addition (*as a part of academic research*), we have suggested few legal guidelines for improving the corporate governance framework in the view of information disclosure and insider trading that corroborates the given share repurchases.

Authors thus put forward some limitations to the study. First, the work presented in this paper has considered the period of two years, i.e. 2008-2009. Second, sample is a limitation; due to less number of buyback firms, we have limited scope to generalize the results in industry-wise, though results are reported in sector-wise, i.e. industrial and services sectors. Lastly, we have not been performed any statistical tests for sector-wise/industry-wise results due to less sample size (e.g. see Table 1). However, a strategic intent behind share repurchases in the Indian capital market, factors that affect lower returns during post-buyback period, which deserve future research. In fact, most academic literature on share repurchases does not focus on valuation, thus focusing on institutional features, and other important economic issues, such as, agency effect, and taxation effects of post-repurchases are some of the thrust areas for doing further research (e.g. Stowe et al., 2009). Furthermore, scholars can investigate the essential areas in corporate finance, for example, regarding stock signaling which is the most powerful financial restructuring announcement from a given set of activities: accounting disclosures, buybacks, dividends, mergers, acquisitions and takeovers.

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Table 1:
Number of share buybacks: Industry-wise breakup

Industry/Sector	2009	2008	Sample	Industry/Sector	2009	2008	Sample
Apparels & Accessories	3	1	4	IT Consulting & Software	3	4	7
Auto Tyres, Parts & Equipment	1	2	3	Personal Care Products		1	1
BPO/KPO	1		1	Pharmaceuticals	2	5	7
Broadcasting & Cable TV	1		1	Plastic Products and Furniture	2	1	3
Cement & Cement Products	1	1	2	Publishing	2		2
Coal		1	1	Reality, Construction & Electric Utilities	2	2	4
Commodity Chemicals	2	1	3	Specialty Chemicals	2		2
Exploration, Production, Oil Equipment & Services	2	2	4	Sugar		1	1
Financial Services (NBFC's)	2	2	4	Textiles	1		1
Industrial Goods and Gasses		2	2	Telecom Equipment & Cables	3	2	5
Industrial Machinery, Iron & Steel/Interm. products	4	1	5	Transportation - Logistics		1	1
Final sample					34	30	64

Notes: Industry classification is done with respect to prevailing stock information on Bombay Stock Exchange (BSE) located in Mumbai, India [available at <http://www.bseindia.com>]; Sample period is based on calendar year.

Table 2:
Descriptive statistics of stock returns and P/E changes during pre-buyback and post-buyback period

	Pre-buyback period								Post-buyback period							
	-110	-90	-70	-50	-30	-10	-3	-1	+1	+3	+10	+30	+50	+70	+90	+110
<i>Panel A: Stock returns</i>																
Mean	0.10	0.75	0.37	-0.46	0.14	-0.35	1.36	0.21	0.01	-0.65	1.24	-0.39	-0.13	0.27	-0.37	0.53
Median	-0.03	-0.22	0.25	-0.20	-0.33	-0.60	0.86	0.41	-0.03	-0.38	0.16	-0.38	-0.02	0.41	-0.38	0.10
Standard deviation	2.93	5.49	3.95	4.12	5.08	4.06	4.48	4.83	3.28	3.15	5.45	2.95	3.73	3.49	2.99	4.40
Kurtosis	1.40	7.95	0.92	0.94	3.56	1.67	11.13	1.72	0.79	-0.46	3.88	1.29	0.52	3.52	3.72	5.87
Skewness	-0.05	2.44	0.33	-0.07	1.53	0.20	2.58	-0.44	0.13	0.00	1.69	-0.12	0.23	-0.83	0.40	1.53
Minimum	-8.97	-7.39	-9.92	-11.79	-7.70	-12.98	-4.78	-16.48	-8.02	-7.64	-10.32	-8.88	-8.92	-13.25	-9.42	-10.34
Maximum	8.81	25.15	10.92	9.30	20.00	10.06	24.51	12.62	9.96	6.27	19.92	7.00	9.99	8.16	11.23	17.61
AAR	-0.11	0.56	-0.39	-0.35	0.43	-0.97	1.49	0.31	-0.73	-1.04	0.98	-0.47	0.14	-0.31	-0.41	0.24
CAR	-6.80	35.58	-25.18	-22.11	27.24	-61.86	95.53	19.97	-47.03	-66.84	62.83	-30.20	9.23	-19.52	-26.53	15.31
NFPR	32	28	37	29	27	27	37	34	32	25	37	27	32	38	26	35
<i>Panel B: P/E changes</i>																
Mean	0.83	0.42	0.65	-0.44	-0.33	-0.13	0.72	0.38	0.10	-0.26	0.70	-0.42	-0.20	-19.71	-0.22	-0.11
Median	0.00	-0.21	0.37	-0.19	-0.22	-0.37	0.07	0.47	0.00	-0.30	0.15	-0.39	-0.13	-0.07	-0.30	0.00
Standard deviation	5.84	6.29	3.83	4.12	9.97	4.07	4.64	4.83	3.36	4.16	5.58	4.66	3.69	156.21	2.85	6.58
Kurtosis	35.36	8.78	1.00	0.91	27.06	1.59	10.97	1.78	0.83	8.95	4.77	21.14	0.57	63.80	2.08	21.68
Skewness	5.16	0.01	0.28	-0.06	-3.81	0.07	2.29	-0.53	0.18	1.91	0.34	-3.41	0.18	-7.98	-0.14	-3.01
Minimum	-8.80	-27.53	-9.59	-11.78	-64.08	-12.98	-9.89	-16.44	-8.12	-7.67	-19.92	-28.64	-8.90	-1248.94	-9.38	-39.68
Maximum	40.77	22.23	10.70	9.15	23.45	10.07	24.50	12.58	9.96	20.64	19.48	8.88	9.99	23.45	8.56	17.59
NFPR	34	30	41	31	30	29	34	37	33	29	36	28	32	32	27	34
No. of observations	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64

Notes: AAR refers to average abnormal returns, and CAR refers to cumulative abnormal returns; NFPR refers to number of firms with positive returns; of course, we have included 'zero value'; No. (Number) of observations are equal in both stock returns and P/E changes.

Table 3: Analysis of variance (ANOVA—one way) results						
<i>Source of Variation</i>	<i>SS</i>	<i>df</i>	<i>MS</i>	<i>F</i>	<i>P-value</i>	<i>F crit</i>
<i>Panel A: Pre-buyback Stock returns</i>						
Between groups	329.17	15	21.9445	1.29761	0.1961*	1.6763
Within groups	17046.87	1008	16.9115			
Total	17376.04	1023				
<i>Panel B: Post-buyback Stock returns</i>						
Between groups	23760.61	15	1584.0407	1.02142	0.4297*	1.6763
Within groups	1563222.13	1008	1550.8156			
Total	1586982.75	1023				
<i>Panel C: Stock returns and P/E during Pre-buyback</i>						
Between groups	263.25	15	17.5501	0.66324	0.8220*	1.6763
Within groups	26673.07	1008	26.4613			
Total	26936.32	1023				
<i>Panel D: Stock returns and P/E during Post-buyback</i>						
Between groups	23545.49	15	1569.6991	1.01845	0.4328*	1.6763
Within groups	1553595.94	1008	1541.2658			
Total	1577141.43	1023				
<i>Notes: (*), the asterisk refers to that we accept the null hypothesis (H1, H2, H3 & H4) at 95% confidence level, because P-value is greater than α level 0.05, i.e. $P > 0.05$.</i>						

Table 4:
Stock and P/E signaling results of industrial and service sectors during pre-buyback and post-buyback period

	-110	-90	-70	-50	-30	-10	-3	-1	+1	+3	+10	+30	+50	+70	+90	+110
<i>Group A: Industrial, Production and Machinery (IPM) – Number of observations: 42</i>																
Mean of stock returns	0.23	0.17	0.16	-0.51	0.43	-0.34	0.96	-0.11	-0.18	-0.20	0.80	-0.62	-0.15	0.61	-0.45	1.33
Standard deviation	2.56	3.04	3.34	3.47	5.28	2.96	2.42	4.53	3.39	2.68	3.65	2.30	3.53	3.14	3.24	4.55
Mean of P/E	1.34	-0.15	0.33	-0.70	-0.35	-0.34	0.74	-0.02	-0.26	0.27	0.95	-1.05	-0.24	-29.03	-0.20	0.38
Standard deviation	6.64	5.18	3.21	3.45	11.75	2.96	2.48	4.54	3.35	4.18	3.63	4.91	3.49	190.58	3.06	7.60
NFPR (stock)	21	21	23	17	18	18	26	24	19	17	25	17	19	27	15	27
NFPR (P/E)	23	23	25	17	20	18	25	25	20	20	25	18	19	22	16	26
<i>Group B: IT & Financial Services (IT&FS) – Number of observations: 22</i>																
Mean of stock returns	-0.17	1.86	0.77	-0.36	-0.42	-0.36	2.14	0.82	0.35	-1.50	2.08	0.04	-0.09	-0.37	-0.21	-1.00
Standard deviation	3.47	8.18	4.80	5.06	4.50	5.53	6.73	5.21	2.95	3.70	7.66	3.80	4.00	3.93	2.33	3.50
Mean of P/E	-0.16	1.52	1.24	0.05	-0.31	0.26	0.68	1.16	0.79	-1.26	0.21	0.79	-0.13	-1.91	-0.26	-1.04
Standard deviation	3.46	7.77	4.66	5.06	4.59	5.53	7.07	5.15	3.19	3.81	7.97	3.74	3.98	7.40	2.32	3.50
NFPR (stock)	11	7	14	12	9	9	11	10	13	8	12	10	13	11	11	8
NFPR (P/E)	11	7	16	14	10	11	9	12	13	9	11	10	13	10	11	8

Notes: NFPR refers to number of firms with positive returns; of course, we have included 'zero value'.

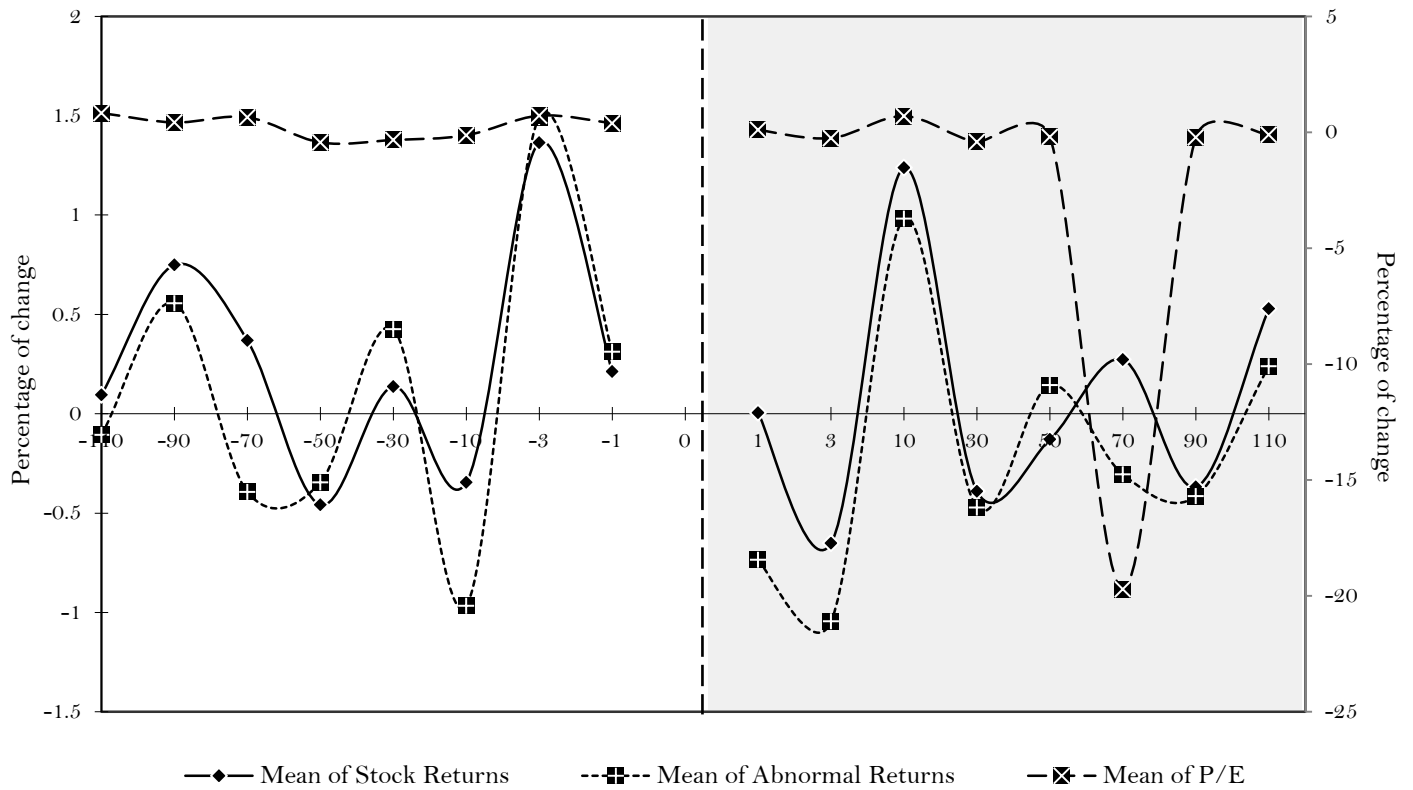


Figure 1. Stock and P/E signaling results during pre-buyback and post-buyback period

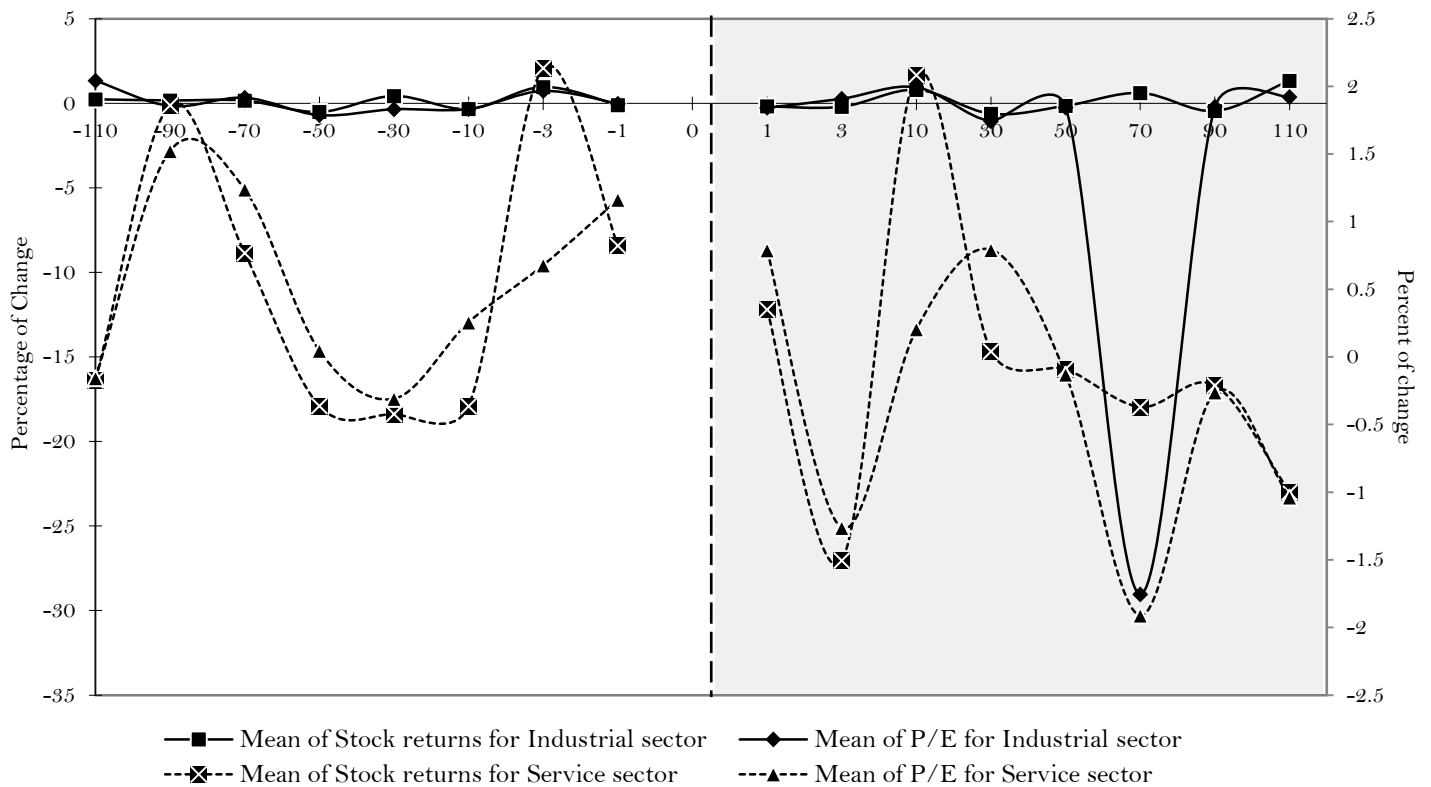


Figure 2. Stock and P/E signaling results of industrial and service sectors during pre-buyback and post-buyback period