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# DO INSIDERS TRADING BEFORE OPEN MARKET SHARE REPURCHASE ANNOUNCEMENT GIVE AN ADDITIONAL SIGNALING? A STUDY IN THE INDIAN CONTEXT

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## ABSTRACT

*This paper aims to derive an undervaluation signal from the insider trading of Indian companies, where the ownership is complex and concentrated, investors' protection is weak, and the insider rules and regulations are not stringent like a developed country. It also examines the relationship between insider trading and the actual share repurchase by the firm. A sample of 78 companies spanning from 2008–09 to 2014–15 is analysed in this study because of the unavailability of insider data in the Indian context. The paper finds that insider trading of sample firms are more than matching firms before buyback announcement. Insider buying before share repurchase announcement positively influences share repurchase decisions. We observed that insider buying has a positive and significant relationship, whereas insider selling has a negative and significant relationship with announcement return. We also found that insider buying has a positive and significant relationship with actual share repurchase and program completion. The study is constrained by the small sample size, so the results must be viewed by keeping this limitation in mind. The paper is the first study in the Indian context wherein the insider trading literature is extended to share repurchase to find out undervaluation signal associated with it.*

**Keywords:** insider trading, signaling hypothesis, share repurchase, buy hold return

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## INTRODUCTION

Undervaluation as a primary motive for share repurchase is well accepted in throughout the world, and vast literature is available in its support (Vermaelen, 1981; Dann, 1981; Comment & Jarrel, 1991; Bartov, 1991; Ikenberry, Lakonishok, &Vermaelen, 1995; Dittmar, 2000; Yarram, 2014). It is further reported that tender offer gives more credible and strong signal of undervaluation than open market share repurchase (Comment & Jarrel, 1991). However, investors may not think share repurchase announcement as a tool indicating undervaluation because of the growing popularity of share repurchase as a mechanism of the excess cash distribution to the investors instead of paying a dividend (Grullon & Michaely, 2002; Skinner, 2008).

The key argument of the paper is about investors' way of understanding the credibility of the undervaluation signal conveyed by the open market share repurchase announcement and their reaction to it. Management stock ownership and insiders action provide credibility to the undervaluation signaling because insider will lose money if the share to be bought is over valued. So, investors keep a close watch on the insider buying and selling before buyback announcement to evaluate the signaling content of the announcement. Seyhun (1986) reported that if insiders are active traders, then they will buy before a good news and sell definitely before a bad news. Similarly, insiders buy shares before repurchase announcement by perceiving that shares are undervalued and do exactly the opposite when they perceive the shares to be overvalued. In the long run, insiders gain profit through purchase of undervalued share before share repurchase announcement and prevent loss by selling overvalued share before an announcement.

Insider activities are debatable regarding the advantage and disadvantage associated with the investors. Insiders have superior price sensitive information than the investors, so they are in a position to take the benefit of this information asymmetry and make windfall gain. In contrast, Carlton and Fischel (1983) suggested that insiders are the most informed trader in the market. Therefore, they communicate the most sensitive information to the market through their trading and make the stock price more informative and promote optimal allocation of resources. So, by following the second philosophy, this paper examines the insider trading before share repurchase announcement for extracting the information within it. To put our argument more formally, we present the managerial behaviour model based on the signaling literature (John & Mishra, 1990; Oded, 2005; Leland & Pyle, 1977). These studies suggest that insiders purchase more shares before share repurchase announcement because the announcement is tended

to be made during undervaluation of the stock. Intuitively, insider buying before share repurchase announcement serves as a strong signal for undervaluation and helps the investors to understand the motive of share repurchase.

Insider trading is extensively studied in the finance literature. However, the major chunk of the studies is focused on developed market settings like the U.S. The evidence of insider trading has been documented on the basis of the U.S. stock market over 40 years. The studies on insider trading in emerging countries depict that the regulatory intervention in these countries is not as tight as in the developed countries. Therefore, the study of insider trading in emerging countries gives a new perspective to the existing literature and specifically addresses the issue (Fernandes & Ferreira, 2009). The variation of a developing market setting in developed countries like U.S. and an emerging country like India can be seen from the 2009 ranking of investor protection as reported by the Doing Business project of the World Bank. According to this ranking, India occupies the 44th position, whereas the U.S. occupies the 5th position. Furthermore, accounting disclosure transparency, reported by the World Economic Forum Global Competitiveness Report 2010–2011, is stronger for U.S. firms compared to the Indian firms (Chauhan, Kumar, & Chaturvedula, 2016).

Cheuk, Fan and So (2006) claimed that the result of the studies conducted in the developed market might not apply to the Asian or emerging market because of the difference between the two markets regarding rules and regulation, market transparency, and the ownership structure. Bhattacharya and Daouk (2002) reported that shareholder's right is weaker in India as compared to the developed market. Beny (2005) reported that insider trading regulations in India are not stringent as in the developed market. Therefore, it can be argued that insiders are more motivated to trade on private information because of the concentrated ownership in the hands of promoters and family, weaker investor protection, and lack of stringent insider rules. Thus, the unique capital market condition for insider trading along with complex ownership structure and poor investor protection provides us strong motivation to study the signaling content of insider trading before share repurchase in India.

Based on the above discussion, this study aims to validate the signaling hypothesis through insider trading in the Indian context. The broad objective of this study is to test whether insider trading in India complements or mitigates the signaling hypothesis conveyed by share repurchase. This study is further divided into four sub-objectives. First, both net insider selling and buying as a motivation behind share repurchase decisions are examined. Second, the impact of insider trading on the three days (−1, +1) announcement return is investigated. Third,

actual share repurchase and program completion are tested as a derived indicator of signaling through insider trading. And finally, the association between one-year long-term return after buyback announcement with insider trading are examined.

## INSIDER TRADING REGULATION IN INDIA

In India, Security Exchange Board of India (SEBI) first time introduced insider trading law by passing a resolution and prior approval of the Government of India named as "Prohibition of insider trading regulation, 1992." However, this regulation suffers from many loopholes and limitations. Therefore, to tighten the gaps and to cope with the changing business equation, SEBI introduced a new insider trading law "Prohibition of insider trading regulation, 2015," on 15 May 2015 that repeals the existing law in insider trading. The new law in insider trading is more pragmatic and encouraging to the investors and is in synchronisation with the global standard. It also has the provisions for better compliance and enforcement. First, the most important change in the new insider act is the introduction of a compliance officer, who will be the sole person in-charge of compliance with policies, procedures, and maintenance of records. He is also the person in-charge of the preservation of unpublished price sensitive information and monitoring of insider trades in the company. Second, the scope of connected person and deemed to be connected person is widened. Third, the definition of price sensitive information includes both the company and its securities; whereas earlier it only addressed the company information. Fourth, insiders, who are liable to possess price sensitive information throughout the year including chief executive officer (CEO), chief financial officer (CFO), and senior management, have the option of trading by formulating pre-scheduled trading plans and getting the plan approved by the compliance officer and trade accordingly. Fifth, the penalty and punishment for insider trading remains the same as the old law. The person accused of violating insider trading rules is liable to imprisonment for up to 10 years or pay a fine of Rs. 25 crores or pay thrice the amount of profit made out of the trading activity. Sixth, the new rules specifically define insider trading and prescribe a more structured disclosure policy. And finally, the new law not only restricts trading while in possession of unpublished price sensitive information but also refrains from communicating or procuring the information without any legitimate purpose.

From the above discussion, it is very much clear that before Prohibition of insider trading regulation 2015, insiders are free to trade prior to the announcement of price-sensitive information. SEBI (Buy back of securities) regulations, 1998, allow promoters to tender their share for a tender method of the buyback. However, the offer document must publish the information regarding

the quantum of shares tendered by the promoters and detail of their transactions of last six months before passing the resolution, such as shares acquired, price, and date of acquisition. However, in open market, share repurchase promoters and persons in control of the company are prohibited from offering their share for sale. Hence, they are not required to disclose their trading activity in the offer document.

Irrespective of the background of insiders' rules, regulations, and buyback environment, it is imperative to study the insider trading pattern before the announcement of open market buyback to validate the signaling of undervaluation in India. In emerging countries like India, the ownership pattern of companies is different from that of the developed countries. In India, major corporate houses are family owned, and the concept of widely held ownership is a rarity unlike the developed countries (Shleifer & Vishny, 1986; Holderness & Sheehan, 1988; Anderson & Reeb, 2003). The average promoters holding of the sample company in our study is 50.26%. In developed countries, insiders mainly consist of a CEO, a CFO, and the directors of the company, whereas in the case of India, the majority shareholding lies with promoters and substantial shareholders. The directors in India are required to hold qualifications shares as per the law; however, they may hold more shares, as there is no restriction on it. Another problem of emerging countries like India is the interlocked board of the firm. In this case, one executive or director of one company is the director of another company. As a consequence, the board loses its independence, and it helps insiders in exploiting private information through insider trading.

## REVIEW OF LITERATURE AND HYPOTHESIS DEVELOPMENT

Share repurchase activity has been widely studied in the finance literature, after it gained popularity in the 1980s. Previous studies identify many theories and incentives that influence the share repurchase decisions of the firms. In the literature, share repurchase has been tested on the basis of substitution hypothesis (Grullon & Michaely, 2002; Jagannathan, Stephens, & Weisbach, 2000; Skinner, 2008), signaling hypothesis (Vermaelen, 1981; Dann, 1981; Comment & Jarrel, 1991; Bartov, 1991; Ikenberry et al., 1995; Dittmar, 2000; Yarram, 2014), free cash flow hypothesis (Jensen, 1986; Vafeas & Joy,1995; Nohel & Tarhan, 1998; Stephens & Weisbach, 1998; Dittmar, 2000; Boudry, Kallberg, & Liu, 2013), leverage hypothesis (Bagwell & Shoven, 1988; Hovakimian, Opler, & Titman, 2001; Hovakimian, 2004; Oded, 2005; Bonaimé, Öztekin, & Warr, 2014), stock option hypothesis (Fenn & Liang, 2001; Kahle, 2002; Bens, Nagar, Skinner, & Wong, 2003), takeover hypothesis (Sinha, 1991; Bagwell, 1991; Billet & Xue, 2007), and liquidity hypothesis (Brockman, Howe, & Mortal, 2008).

The theories of share repurchase discussed in the above paragraph are validated by different studies in different countries depending on their share buyback environment. However, theory related to signaling hypothesis is common and relevant in all countries, so it holds the center stage for further research. Signaling hypothesis argues that share repurchase announcement of the company is an indication to the investors about the undervaluation of shares. So, it is believed that firms are more likely to buy their shares when it is perceived that their shares are undervalued. The credibility of this hypothesis is questioned on the ground of earnings management before share repurchase. Sometimes managers deliberately manage their earnings down to give false signals of undervaluation, which entices the investors to sell their shares at a less price (Gong, Louis, & Sun, 2008). For this reason, investors need a concrete proof about the credibility and trustworthiness of the signal, as it will encourage investors to believe on the signal and act accordingly. So, insider trading on their account is studied to give an additional proof of undervaluation as both share repurchase and insider trading decisions emanate from the same set of persons. Investors will only find the signal to be more credible if the share repurchase and insider trading convey the same signal of undervaluation, and this is only possible when the insiders trading is in harmony with the undervaluation principle.

As both share repurchase and insider trading can convey undervaluation signal to the market, it is necessary to study both these aspects simultaneously for evaluating the intensity of the signal conveyed. There may be two types of a situation such as firm and insiders trade in the same direction or firms and insiders trade in the opposite direction. Lee, Mikkelson and Partch (1992) examined the insider trading pattern before the announcement of the tender offer in the U.S. market and observed that managers buy more shares and sell fewer shares before the tender offer, and insider trading returns to the normal level after the tender offer is over. Louis, Sun and White (2010) observed that insiders sell more just after the announcement of fixed price and Dutch-auction tender offer. Babenko, Tserlukevich and Vedrashko (2012) found that more insider buying than selling takes place prior to the one year of open market share repurchase announcement. They also found a positive relationship between actual share repurchase and program completion and net insider buying. Chan, Ikenberry, Lee and Wang (2012) examined the interaction of insider trading and share repurchase through focus on the firm value, when market price deviates from fair value. They even observed that insider trading provides a strong complement to the repurchase signal where perceived mispricing is an important factor. Bonaime and Ryngaert (2013) reported an abnormal relationship between insider trading and share repurchase and observed that share repurchase follows net insider selling rather than net insider buying. They provided a plausible argument that firms do share

repurchase to support the share price and avoid dilution and are less likely to give undervaluation signal. They also found that insider trading either validates or mitigates the undervaluation signal.

Based on the above literature review, two types of thoughts regarding the signaling content of insider trading are perceived. One argues that insider buying complements the undervaluation signal conveyed by share repurchase; and the other argues that share repurchase follows insider selling to support the share price. Both the thoughts are contradictory. So, to validate any of the above thoughts in the Indian context, the following hypotheses are developed. First, insider trading is an incentive or motive for share repurchase decisions in India. Second, if insider trading confirms the undervaluation signal proclaiming the share repurchase announcement, then insiders must buy more stocks before share repurchase announcement. Third, the correlation between the announcement return and insider buying increases if the firm announces share repurchase to signal undervaluation and vice versa. The presence of information asymmetry between insiders and investors gives rise to abnormal announcement return. The more the information asymmetry, the higher the return and vice versa. Fourth, it is assumed that firms are likely to repurchase more shares and the probability of program completion increases, if insiders buy more shares before share repurchase announcement. Last, a positive relationship exists between insider buying and long-term abnormal return, if insider buying confirms the same undervaluation signal like share repurchase.

## DATA AND SAMPLE SELECTION

Studies related to emerging market are constrained by the availability of data. In this study, we are limited by the availability of insider data of all companies that have undertaken buyback earlier. We have used two main sources for data. First, insider data is collected from Bloomberg database. Insider data on the Indian context is available in the Bloomberg database from 2007; however, as we require insider data for the year prior to share repurchase, we have taken the samples from 2008 onwards. Therefore, our study period is restricted to the period from 2008–2009 to 2014–2015. Second, firm-specific parameters are collected from ProwessIQ, a database maintained by the Center for Monitoring Indian Economy (CMIE).

The sample consists of companies that undertook buyback from 2008–2009 to 2014–2015 and were listed in either Bombay Stock Exchange (BSE) or National Stock Exchange (NSE) in India. The period is considered owing to the unavailability of insider data before 2007. During this time, 95 Indian companies

announced buybacks. However, we have excluded five buybacks of the financial industry, as they are regulated by a different set of rules and regulation. For this study, we have ignored multiple buybacks by the same company over the year to avoid data overlapping problem. This study only considers open market share repurchase, so the sample set is restricted to 78 companies after deducting 12 tender offers.

By following Babenko et al. (2012), we have selected the best matching firms for our 78 buybacks. Non-repurchasing samples from the same population are selected by two phases of filtering procedure, i.e., industry wise, market value, and market to book ratio. First, we segregated companies into different industry groups based on a two-digit National Industrial Classification (NIC) code of industry categorisation as given by the Ministry of Statistics and Programme Implementation. Subsequently, we matched the firms as a reference to market value and market to book ratio. Finally, a firm is selected as a control firm if the firm falls into the same industry category and market value and market to book ratio are within ±10% of the sample firm. If no firm fits the criteria, then one-digit NIC code is followed. Another important criterion is to choose those firms within the group that have the smallest sum of absolute deviation from the market value and market to book ratio of the sample firms.

## UNIVARIATE ANALYSIS

According to the availability of insiders trading data, we segregate the data into four different catogories such as insider trading by directors, officers, promoters, and substantial shareholders. The shareholdings of these four catogories are mutually eclusive because of the Insider trading regulation Act of India which clearly distinguishes the four catogories of insiders of a company. Companies Act 2013, cleary defines director, officer, promoters and substantial shareholders and Secrities and Exchange Board of India (Prohibition of insider trading) reguations,1992 take these definitions from Companies Act. The summary statistics of insiders buying and selling are reported in Table 1.

The mean of insider buying and insider selling is 0.02. The mean insider buying and selling by directors is close to zero; this means that in India, director trade very less prior to the open market share repurchase announcement. Another insight from the table is that promoters and substantial share holders trade more before the open market share repurchase announcement. For better understanding of the trading pattern of the insiders, we need to compare it with the control firms as well as with the repurchase announcement of the subsequent year.

Table 1
*Summary statistics (number of firms = 78)*

| | Mean | Median | Minimum | Maximum | Std. Dev. | 5% | 95% |
|---|---|---|---|---|---|---|---|
| Ins_buy | 0.002 | 0.010 | 0.000 | 0.128 | 0.029 | 0.001 | 0.100 |
| Ins_Buy director | 0.001 | 0.000 | 0.000 | 0.028 | 0.008 | 0.000 | 0.078 |
| Ins_Buy officer | 0.006 | 0.000 | 0.000 | 0.127 | 0.018 | 0.000 | 0.046 |
| Ins_Buy promoter | 0.014 | 0.000 | 0.000 | 0.179 | 0.039 | 0.000 | 0.100 |
| Ins_Buy sub shareholders | 0.008 | 0.000 | 0.000 | 0.310 | 0.036 | 0.000 | 0.047 |
| Ins_sel | 0.018 | 0.000 | 0.000 | 0.388 | 0.057 | 0.000 | 0.147 |
| Ins_Sel director | 0.002 | 0.000 | 0.000 | 0.086 | 0.007 | 0.000 | 0.010 |
| Ins Sel officer | 0.003 | 0.000 | 0.000 | 0.128 | 0.016 | 0.000 | 0.018 |
| Ins_Sel promoter | 0.011 | 0.000 | 0.000 | 0.177 | 0.027 | 0.000 | 0.076 |
| Ins_Sel sub shareholders | 0.011 | 0.000 | 0.000 | 0.390 | 0.048 | 0.000 | 0.087 |

*Notes:*
Ins_buy: Total buying of shares minus total selling of shares by insiders before one year of public announcement normalised by the total share outstanding in the previous year.
Ins_Buy director: Buying of securities by directors minus selling of securities before one year of public announcement divided the share outstanding in the previous year.
Ins_Buy officer: Buying of securities by officers minus selling of securities before one year of public announcement divided the share outstanding in the previous year.
Ins_Buy promoter: Buying of securities by promoters minus selling of securities before one year of public announcement divided the share outstanding in the previous year.
Ins_Buy sub shareholders: Buying of securities by substantial shareholders minus selling of securities before one year of public announcement divided the share outstanding in the previous year
Ins_sel: Total selling of shares minus total buying of shares by insiders before one year of public announcement normalised by the total share outstanding in the previous year.
Ins_Sel director: Selling of securities by directors minus buying of securities before one year of public announcement divided the share outstanding in the previous year.
Ins_Sel officer: Selling of securities by officers minus buying of securities before one year of public announcement divided the share outstanding in the previous year.
Ins_Sel promoter: Selling of securities by promoters minus buyimg of securities before one year of public announcement divided the share outstanding in the previous year.
Ins_Sel sub shareholders: Selling of securities by substantial shareholders minus buying of securities before one year of public announcement divided the share outstanding in the previous year.

For the preliminary analysis, the insider trading of sample firm in the previous year of share repurchase announcement is compared with that of the following year of share repurchase announcement. We have further analysed the insider trading pattern of matching firms selected depending on industry, market value, and market to book ratio. The insider trading of sample firm before and after one year of the public announcement of share repurchase is compared with the matching firms. The *t*-test and Wilcoxon rank sum test are used to compare the insider trading within the sample and with matching firms, the results of which are reported in Tables 2 and 3.

Table 2 shows the result of insider buying and selling within the sample before and after the buyback announcement and depicts that there is no significant difference in insider sales before and after the buyback announcement of sample firms. Both mean and median of the net insider buying are significantly more in the previous year than in the following year of buyback announcement. It means insiders buy more shares before the buyback announcement.

Table 2
*Univariate analysis of share repurchases firms (within sample) (number of firms = 78)*

| Within Sample | Mean | Median | *t*- test | Wilcoxon Rank Sum test |
|---|---|---|---|---|
| Net insider sales (before buyback) | −0.024 | 0.000 | 0.34 | 0.74 |
| Net insider sales (after buyback) | −0.027 | 0.000 | | |
| Net insider buy (before buyback) | 0.032 | 0.003 | 1.98** | 2.58*** |
| Net insider buy (after buyback) | 0.019 | 0.000 | | |

*Notes:* ***, ** and * is significant at 1%, 5% and 10% level.
Sample firms are those firms announced share repurchase during 2008–2009 to 2013–2014. Net sales equal to number of shares bought minus number of shares sold normalised by the number of shares outstanding. Net buying equal to number of shares bought minus number of shares sold normalised by the number of shares outstanding. Before buyback means prior to one year of public announcement. After buyback means one year after buyback announcement.

Table 3 shows the result (insider buying and selling) of sample and control firms before and after buyback announcement and depicts that the mean and median of the insider selling and insider buying of the sample firms are more than control firms before the buyback. However, a significant difference in insider buying before buyback announcement between sample and matching firms is observed. From the above result, it can be concluded that insider trading of sample firms abnormally increase before buyback announcement as compared to the control firms. The mean and median of insider selling and insider buying of sample firms are more than that of the control firms both before and after the buyback announcement. However, we only find a significant difference in insider buying before and after buyback announcement between sample and matching firms. Therefore, we can conclude that insider trading of sample firms is more than the control firms both before and after one year of share repurchase announcement.

To summarise, the univariate analysis presented in Tables 2 and 3 show that insiders of share repurchasing firms trade more around share repurchase event compared to that of the matching firms. An insider purchases more shares one year before share repurchase announcement than the following year of announcement. This is consistent with our hypothesis that the insider will buy

more only if the share is undervalued. An insider of share repurchasing firms buys more shares than the matching firms both before and after one year of share repurchase announcement. Buying of shares before announcement shows that insiders believe that shares are undervalued. Buying of shares after announcement shows that insiders predict an improvement in the operating performance that leads to higher stock return (Chen, Chen, Huang, & Schatzberg, 2014).

Table 3
*Univariate analysis between sample firms and control firms (number of firms = 78)*

| Variable | Sample firm | | *t*-test | Control firm | | Wilcoxon rank sum test |
|---|---|---|---|---|---|---|
| | Mean | Median | | Mean | Median | |
| Net insider sales (before buyback) | −0.024 | 0.000 | −0.84 | −0.022 | 0.000 | −0.74 |
| Net insider buy (before buyback) | 0.032 | 0.003 | 1.96** | 0.018 | 0.000 | 3.76*** |
| Net insider sales (after buyback) | −0.027 | 0.000 | −0.67 | −0.025 | 0.000 | −0.58 |
| Net insider buy (after buyback) | 0.019 | 0.000 | 2.34** | 0.010 | 0.000 | 1.98** |

*Notes*: ***, ** and * is significant at 1%, 5% and 10% level.
Sample firms are those firms announced share repurchase during 2008–2009 to 2013–2014. Net sales equal to number of shares bought minus number of shares sold normalised by the number of shares outstanding. Net buying equal to number of shares bought minus number of shares sold normalised by the number of shares outstanding. Before buyback means prior to one year of public announcement. After buyback means one year after buyback announcement. The matching firm do not make repurchase, and are matched on industry, market capitalisation and market to book ratio.

In our study we have taken control firms to examine that the insider trading activity around the announcement of buyback is normal or something unusual by comparing with control firms. We find that the sample firms do more insiders trading as compared to control firms around announcement of share buyback and then all our analysis below is based on the sample firms only (Babenko et al., 2012).

## INSIDER BUYING AS A FACTOR OF SHARE REPURCHASE DECISIONS

This section of the study examines insider trading as a determinant of share repurchase decisions in India. Very few studies focus on the relationship between insider trading and the decisions to repurchase shares. On the basis of the earlier literature, Lee et al. (1992), Firth, Leung and Rui (2010), and Babenko et al. (2012) reported that share repurchase follows heavy insider buying. However, Bonaime and Ryngaert (2013) observed that share repurchase follows heavy insider selling. The reason behind share repurchase follows insider buying is that insider buying conveys signals of undervaluation. If share repurchase is conducted to support the share price and avoid dilution effect, it must follow insider selling.

In India, no study examines this kind of relationship between insider trading and share repurchase decision. Therefore, we have tried to examine the potential of insider trading for influencing share repurchase decisions.We have used the Tobit model in this study to know the influence of insiders trading on share repurchase decisions. The positive relation between insider buying and share repurchase will prove that insider buying confirms the undervaluation signal conveyed by share repurchase announcement. The positive relationship between insider selling and share repurchase states that instead of signalling undervaluation, firms announce share repurchase to support the share price and avoid dilution effect. In case, there is no relationship between insider trading and share repurchase, then it will be clear that in the Indian context, insider activity does not convey any information to the investors. By following the studies by Dittmar (2000) and Firth et al. (2010), we have used the Tobit model, and the only additional factor added to the model is insider activity. The hypotheses considered in the Tobit model are explained below.

**Excess Cash Flow Hypothesis**

A firm with more cash than investment opportunities can either retain or distribute the excess cash to the shareholders (Easterbrook, 1984; Jensen, 1986). Dittmar (2000), Mitchell and Dharmawan (2007), Boudry et al. (2013), and Lee and Suh (2011) found a positive relationship between excess cash holding and the incentive to the repurchase of shares. In India, the Companies Act (2013) prescribes that repurchase must be done either from the reserves or from undistributed profit. Therefore, companies before repurchase must have ample cash reserves on their balance sheet. In India, no share repurchase can be made out of the borrowed fund. We have measured cash by considering total available cash of the previous year in the balance sheet of share repurchase to the total assets (Cash).

**Leverage Hypothesis**

Leverage hypothesis posits that companies are more likely to do repurchase if their actual debt equity ratio (D/E ratio) is less than the target ratio (Bagwell & Shoven, 1988; Dittmar, 2000; Mitchell & Dharmawan, 2007). Hovakimian et al. (2001) documented that firms adjust their capital structure by moving toward an optimum capital structure by doing a share repurchase. The gap between the actual and the target D/E ratio plays a major role in repurchase decisions. In India, buyback regulation specifies that the debt should not be more than two times of the paid-up capital and free reserves after the execution of buyback, so in India the standard debt to paid-up capital and free reserve is 2:1. Unlike other developed countries, Indian companies are not permitted to use borrowed fund to

buyback shares. We have taken the gap between the standard (2) and actual DE ratio as a control variable. The actual D/E ratio is calculated as total debt divided by paid-up capital and free reserves.

**Substitution Hypothesis**

Substitution hypothesis refers to the preference for share buyback as a payout method to shareholders over the dividend. The primary cause for substitution hypothesis is the taxable nature of income from the dividend paid and buyback in the hands of shareholders. The income from buyback is taxed as capital gain, and the dividend income is charged as normal income. As capital gain tax is much lower than the dividend, share repurchase is more tax efficient and valuable to shareholders (Grullon & Michaely, 2000). In India, from 2003, the dividend paid by the Indian companies has been tax-free in the hands of investors. However, the profit arising out of buyback receipt is taxed as long term and short term capital gain in the hands of shareholders depending on the duration of the holding of the securities before tendering these as part of the buyback. In India, if the holding period exceeds 12 months, then it is taxed as a long-term capital gain, and if it is less than 12 months, then it is considered as a short-term capital gain. The positive and negative relationships between share repurchase and dividend paid determine the complement and substitution effect, respectively. The amount of dividend paid is measured by taking dividend payout (DP) ratio. DP is calculated as the total dividend paid to profit after paying tax.

**Signaling of Undervaluation**

Undervaluation hypothesis is based on the premise that owing to information asymmetry between insider and outside investors, the share price is misvalued. The signaling hypothesis assigns an informative role to share buyback and posits that firms will repurchase their shares while passing private information to the investors and maintaining information symmetry in the market. Under-pricing signaling hypothesis suggests that the firm is motivated to repurchase their shares as a self-investment technique through undervaluation of the shares (Liang, Chan, Lai, & Wang, 2013). Therefore, the company undertakes share repurchase at a higher price than the market price (Asquith & Mullins, 1986). Dittmar (2000) used firm size as a proxy for information asymmetry and stated that information asymmetry is low for large firms compared to small firms because many analysts monitor the performance of large firms. He also considered market value to book value (MB) as an indicator of undervaluation. Market to book value is calculated as the market value of equity plus debt to total book value of the asset. The same proxy is used for holding investment proxy constant.

**Insider Trading Activity**

Besides using firm size and MKBK as proxies for undervaluation, this study employs insider buying as another proxy for undervaluation for examining the impact of insider trading on share repurchase decisions. We have further included insider selling to determine the impact of it on share repurchase decisions, as Bonaime and Ryngaert (2013) are of the view that sometimes firms announce share repurchase to support share price and avoid dilution effect. If the firm does share repurchase to take advantage of undervaluation, then the insiders should also make use of this information and buy shares before share repurchase announcement. It will act as a confirmation of the undervaluation motive conveyed by the firm.

The hypotheses discussed above are tested with the following Tobit model estimated for each sample using cross-sectional data:

$$\begin{aligned} Share\_rep_{it} &= \alpha_{it} + \beta_1 Cash_{i(t-1)} + \beta_2 DP_{i(t-1)} + \beta_3 MB_{i(t-1)} + \beta_4 DE_{i(t-1)} \\ &\quad + \beta_5 Ins\_sel_{i(t-1)} + \beta_6 Ins\_buy_{i(t-1)} + \beta_7 Firmsize_{i(t-1)} \end{aligned} \quad (1)$$

*Share_Rep* is the dependent variable calculated as the actual value of share purchase scaled by market capitalisation of the company. *Cash* is the total available cash of the previous year in the balance sheet of share repurchase scaled by the total asset. *DP* is the dividend payout ratio calculated as a total dividend paid divided by profit after tax. *DE* is the debt equity ratio calculated as the total liability to total capital. However, in this model, we have taken *DE* as the gap between the actual and the standard set by Indian buyback laws. Two new variables are added to the model, i.e., insider buying and insider selling. Insider buying is net insider buying, which is calculated as total shares bought by insiders less the total shares sold by insiders to total shares outstanding. Insider selling is net insider selling, which is calculated as total shares bought by insiders less the total shares sold by insiders to total shares outstanding. All the control variables for this model have been explained previously on the basis of Indian buyback environment. No data regarding takeover deterrence and management incentives hypotheses were available in the Indian context, so these two hypotheses are not considered for the study. Table 4 presents the correlation matrix of all the variables used in the Tobit model.

All the correlations calculated are of low magnitude, and therefore, all variables are considered for multivariate analysis. To examine multicollinearity among the independent variables, we have carried out a variance inflation factor (VIF) test and found these values to be approximately one. Hence, we have concluded that variables are not correlated and can be used for multivariate analysis. Table 5 presents the results of the Tobit model.

Table 4
*Correlation matrix (Pearson) (number of firms = 78)*

| | Share_rep | Cash | DP | MB | DE | Ins_sel | Ins_buy | Firm size | VIF test |
|---|---|---|---|---|---|---|---|---|---|
| Share_rep | 1 | 0.11 | 0.01 | −0.18 | 0.19 | −0.09 | 0.14 | −0.16 | 1.03 |
| Cash | | 1 | 0.08 | −0.06 | 0.13 | 0.05 | −0.03 | −0.01 | 1.01 |
| DP | | | 1 | 0.03 | 0.04 | −0.02 | 0.06 | 0.05 | 1.07 |
| MB | | | | 1 | 0.13 | −0.02 | −0.01 | 0.19 | 1.12 |
| DE | | | | | 1 | −0.07 | −0.02 | −0.20 | 1.19 |
| Ins_sel | | | | | | 1 | −0.35 | −0.13 | 1.17 |
| Ins_buy | | | | | | | 1 | −0.08 | 1.15 |
| Firmsize | | | | | | | | 1 | |

*Notes:* Share_rep = Value of actual share repurchase divided by the market capitalisation of companies.
DP = Dividend paid in the previous year of share repurchase divided by profit after tax.
MB = Market to book ratio, calculated by sum of market value of equity and total debt divided by book value of asset.
DE = Debt to equity ratio, it is calculated as excess gap between the standard and actual debt equity ratio. Standard is 2 as prescribed by Indian companies Act 1956.
Ins_sel = Number of shares bought by insiders minus number of shares sold to total number of shares outstanding in the previous year.
Ins_buy = Number of shares bought by insiders minus number of shares sold to total number of shares outstanding in the previous year.
Firm size = Log value of total asset.

Table 5
*Tobit model (number of firms 78)*

| Variable | Model (I) | | Model (II) | |
|---|---|---|---|---|
| | coefficient | *p*-value | coefficient | *p*-value |
| Intercept | −0.06 | 0.36 | −0.07 | 0.25 |
| Cash | 0.23 | 0.09* | 0.22 | 0.10* |
| DP | 0.00 | 0.75 | 0.00 | 0.75 |
| MB | −0.02 | 0.02** | −0.02 | 0.02** |
| DE | 0.05 | 0.00*** | 0.05 | 0.00*** |
| Ins_sel | −0.22 | 0.25 | | |
| Ins_buy | 0.33 | 0.05** | 0.41 | 0.01** |
| Firmsize | 0.00 | 0.84 | 0.00 | 0.97 |
| Chi-square | 26.84 | 0.00 | 25.55 | 0.00 |
| Log-likelihood | 19.99 | | 19.32 | |

***, **, *: Significant at 1%, 5% and 10% level.
*Note*: All the variables in the above model is explained in Table 4.

The result shows that MB is significant, but the coefficient is negative. It means firms repurchase their share when they are potentially undervalued. Insider buying is also considered as a proxy for undervaluation, which is found to be positive and significant in the presence of insider selling. It means the higher the insider buying before share repurchase, the higher the probability of doing a share repurchase. Insider buying confirms the undervaluation signal conveyed by the share repurchase announcement. There is a negative and insignificant relationship of insider selling with share repurchase. By eliminating insider selling from the model, it is seen that insider buying has a positive and significant relationship with share repurchase decisions. Cash/TA is positive and significant in both the models; it shows that cash is a prerequisite for share repurchase. DE ratio is significant in both the models at 1% significant level. It means the more the gap between the standard and actual D/E ratio, it is more likely for the firms to do share repurchase in India.

## ANNOUNCEMENT RETURNS AND INSIDER TRADING

The signaling power of share repurchase is tested by finding abnormal announcement return around share repurchase decision (Dann, 1981; Vermaelen, 1981; Comment & Jarrel, 1991; Ikenberry et al., 1995; Li & McNally, 2007; Reddy, Nangia, & Agrawal, 2013). So, in this section, we have tested our second hypothesis, which states that whether market considers insider trading at the time of repurchase announcement. This hypothesis holds true in the Indian context if positive and significant announcement return around share repurchase is related to insider buying and negative announcement return is related to insider selling.

Following the study by Babenko et al. (2012), we have regressed three days buy hold abnormal return (BHAR) around an announcement on past insider trading and controlling of important determinants. In India, share repurchase is announced in three parts. First, it is declared in the Board of Directors meeting. Second, a public announcement about share repurchase is made along with declaration of an offer document, which contains detailed information about the offer. Third, with the initiation of actual share repurchase, three days BHAR has been calculated around all the three phases of the announcement of share repurchase. We have regressed the BHAR around Board of Directors approval and BHAR around the opening of buyback with insider trading; however, no significant result is obtained. During Board approval, there is no surety that the firm will undertake buyback in future, so investors could not react to such decisions. Again during the opening of the buyback, the information is already absorbed the market at the time of the public announcement. Public announcement of share

repurchase is considered as a formal intimation of the event. So, we have finally considered public announcement BHAR for the regression. The regression model is given below in Equation (2).

$$\begin{aligned} BHAR(3\ days)_{it} = \ & \alpha_{it} + \beta_1 Tobin'sQ_{it} + \beta_2 Firmsize_{it} \\ & + \beta_3 Repur\_Psize_{it} + \beta_4 CashFlow_{it} \\ & + \beta_5 Stockprice\_Runup_{it} + \beta_6 Ins\_sel_{it} \\ & + \beta_7 Ins\_buy_{it} \end{aligned} \tag{2}$$

The summary stastics of all the variables used in this model are reported in Table 6.

Table 6
*Summary statistics (number of firms = 78)*

| | Mean | Median | Minimum | Maximum | Std. Dev. | 5% | 95% |
|---|---|---|---|---|---|---|---|
| BHAR (3 days) | 0.03 | 0.02 | −0.15 | 0.28 | 0.08 | −0.10 | 0.19 |
| Tobin's Q | 1.26 | 0.86 | 0.10 | 6.44 | 1.24 | 0.35 | 5.08 |
| Firmsize | 3.92 | 3.84 | 2.39 | 6.45 | 0.76 | 2.81 | 5.38 |
| Repur_Psize | 0.10 | 0.08 | 0.00 | 0.43 | 0.09 | 0.01 | 0.32 |
| Cash_flow | 0.09 | 0.08 | −0.24 | 0.74 | 0.13 | −0.12 | 0.30 |
| Stock price_Runup | −0.04 | −0.03 | −0.89 | 0.92 | 0.33 | −0.41 | 0.69 |
| BHAR (1 Year) | 0.00 | 0.08 | −2.74 | 5.19 | 1.09 | −2.17 | 1.61 |
| Return_Vol | 0.03 | 0.03 | 0.01 | 0.07 | 0.01 | 0.02 | 0.05 |
| Cash | 0.09 | 0.08 | 0.24 | 0.74 | 0.13 | 0.12 | 0.30 |
| Dividend_Payer | 0.88 | 1.00 | 0.00 | 1.00 | 0.32 | 0.00 | 1.00 |
| R&D_Exp | 0.00 | 0.00 | 0.00 | 0.10 | 0.01 | 0.00 | 0.04 |

*Notes:*
BHAR (3 days) = 3 days buy hold abnormal stock return of sample firm from −1 to trading day +1 relative to public announcement for buyback, minus the buy-hold return of the matching firm. The matching firm do not make repurchase, and are matched on industry, market capitalisation and market to book ratio.
Tobin *Q* = It is the ratio of market to book value to asset.
Firm size = Is the log of the book value of asset.
Repur_Psize = It is the target value the firm plans to repurchase as listed in the offer document divided the market value.
Cash_flow = Operating income before depreciation divided by book value of asset.
Stock price_Runup = Is the abnormal stock price return from the market model from trading day −43 to trading day −4, where parameters of the market model are estimated over a period from trading day −252 to trading day −44.
BHAR (1 Year) = Is the buy hold return of the sample firm from trading day +2 to trading day +252, minus buy hold return of the matching firm.
Return_Vol = Volatility of stock return measured over one year prior to public announcement.
Cash = Cash and cash equivalent divided by book value of asset.
Dividend_Payer = Is a dummy variable, equal to one if firms pay dividend in the last year.
R&D_Exp = Research and development expenses divided by market value of asset.

The mean *BHAR* for three days around public announcement is 0.03. The average firm size is 3.92, and the average repurchase size is 10% of the market capitalisation. The mean Tobin's *Q* is 1.26, which shows that the firm has more investment opportunity. The mean cash flow is 9% of the total assets and the mean cumulative abnormal return is –0.04. Insider buying and insider selling are already explained in Table 1.

We have included firm size in this model as a control variable because small firms experience more abnormal return than big firms owing to more information asymmetry (Vermaelen, 1981; Comment & Jarrel, 1991). Cash flow is also included as a control variable because the distribution of excess cash reduces the agency cost, which allows firms to get more abnormal return (Jensen, 1986; Lie, 2000). By following Lang and Litzenberger (1989), we have included Tobin's *Q* for investment opportunities; investor reacts positively to share repurchase if the firm has no investment opportunity and vice versa. Because of the unavailability of data, we have not included managerial entrenchment in this model. Following Kahle (2002), we have included the abnormal return of the last 40 days before share repurchase calculated from the market model to control the possibility of the wrong timing of share repurchase. The parameters of the market model are calculated for one year. Schultz (2003) argued that the timing of a corporate event affects the abnormal return calculated in event studies. If manager announces share repurchase following the poor stock performance, then there will be high abnormal return after the share repurchase. We further consider programme size, because the literature suggests that the large program size is greeted favourably by the investors. Regression results are reported in Table 7.

Table 7 reports the results of six regression models, where three days BHAR around public announcement of share repurchase is the dependent variable. In Model 1, total insider buying and selling are considered. From Models 2 to 5, each model incorporates different insiders trading from directors, officers, promoters and substantial directors, respectively. Model 6 includes all the insiders in one model to know the combined effect of insiders trading on announcement return. In all the models, firm size has a negative and significant relationship with the announcement return. In Model 1, we have found that insider purchase is associated with the positive announcement return. Subsequently, we have divided the insider purchase data into four categories depending on the availability of data. In India, insider data are available in different forms such as directors, promoters, officers, and substantial shareholders. The Companies Act 2013 defines substantial shareholder as the person who holds more than 5% of aggregate or nominal voting rights of the company. From Models 2 to 5, the insider buying by different insiders has a positive impact on announcement return. However, the purchase by

Table 7
*Announcement return and insiders purchase (number of firms = 78)*

| Variable | Model (I) | | Model (II) | | Model (III) | | Model (IV) | | Model (V) | | Model (VI) | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Coeff. | *t*-stat | Coeff. | *t*-stat | Coeff. | *t*-stat | Coeff. | *t*-stat | Coeff. | *t*-stat | Coeff. | *t*-stat |
| Intercept | 0.10 | 1.74* | 0.12 | 2.22** | 0.14 | 2.46** | 0.11 | 2.00** | 0.12 | 2.14** | 0.14 | 2.60*** |
| Tobin's *Q* | −0.01 | −0.89 | −0.01 | −0.78 | −0.01 | −0.66 | −0.00 | −0.52 | −0.01 | −0.66 | −0.01 | −0.64 |
| Firmsize | −0.02 | −1.78* | −0.02 | −2.04** | −0.03 | −2.10** | −0.02 | −1.76** | −0.02 | −1.87* | −0.03 | −2.34** |
| Repur_Psize | 0.10 | 0.89 | 0.05 | 0.49 | 0.09 | 0.80 | 0.12 | 1.00 | 0.11 | 0.95 | 0.03 | 0.27 |
| Cash_Flow | −0.03 | −0.43 | −0.02 | −0.32 | −0.06 | −0.84 | −0.04 | −0.50 | −0.04 | −0.62 | −0.04 | −0.53 |
| Stock price_Runup | −0.02 | −0.68 | −0.01 | −0.44 | −0.01 | −0.38 | −0.01 | −0.28 | −0.01 | −0.22 | −0.01 | −0.45 |
| Ins_sel | −0.36 | −2.50** | −0.32 | −2.31** | −0.34 | −2.33** | −0.37 | −2.38** | −0.31 | −2.05** | −0.31 | −2.05** |
| Ins_buy | 0.65 | 2.18** | | | | | | | | | | |
| Ins_Buy director | | | 5.44 | 1.35 | | | | | | | 0.02 | 0.09 |
| Ins_Buy officer | | | | | 0.77 | 1.49 | | | | | 5.39 | 1.45 |
| Ins_Buy promoter | | | | | | | 0.21 | 2.01** | | | 0.77 | 1.96** |
| Ins_Buy sub shareholders | | | | | | | | | 0.12 | 2.47** | 0.14 | 1.98** |
| R-squared | 0.21 | | 0.28 | | 0.19 | | 0.17 | | 0.16 | | 0.31 | |

*Notes*: ***, **, *: Significant at 1%, 5% and 10% level.
BHAR (−1, +1) around share repurchase announcement is the dependent variable. All the variables in the above model is explained in Table 1.

promoters and substantial shareholder of the company has a positive and significant relationship with announcement return. Insider buying by directors and officers has only positive but insignificant relationship with the announcement return. In Model 6, after inclusion of all the insiders, only promoters and substantial shareholder buying before share repurchase have a significant and positive impact on the return around the announcement. In India, the ownership structure of companies is less complex than in the developed country. Here, maximum share holding is vested with family or promoters of the company; subsequent to which a large part remains with the substantial shareholders. Directors and officers are the employees of the company. Directors are only required to hold minimum qualification shares as per the Companies Act. If a person is a promoter and also a director of the same company, insider trading by the person will come under promoters not directors. As more shareholding is vested with promoters and substantial shareholders, maximum loss will be incurred by them if a firm buys overvalued shares. So, purchasing before share repurchase announcement, it confirms the undervaluation signal and investor reacts favourably to their insider trading. In all the models, insider selling is negatively and significantly related to announcement return. It means the investors react negatively if insiders sale took place before share repurchase announcement. Insider selling before share repurchase announcement is in contrast with the undervaluation hypothesis. If insiders are selling before share repurchase announcement, it shows that shares are overvalued than undervalued. Announcement return suffers because of the inconsistent signal given by the firms and insiders. *Cash flow*, *Tobin's Q*, and *Stock price_Runup* have insignificant relationship with the announcement return as predicted by the literature. Repurchase size also has insignificant relationship with the announcement returns.

Chauhan et al. (2016) reported that in the Indian context, the information content of insider trading is lower for group companies than a standalone firm. By following them, we divided our sample into two parts such as group affiliated companies and standalone firms to examine the information content of insider trading of these subgroups. Total sample (78) is divided in to group-affiliated firms (49) and standalone firms (29). The regression results of these two subgroups are reported in Table 8.

The results shown in Table 8 demonstrate that in group-affiliated firms, insider trading has no relationship with announcement return. Insider selling indicates a negative but insignificant relationship with announcement return. Insider buying has a positive but insignificant relationship with announcement return. The results for the standalone firm are exactly opposite from the group firms. In the case of a standalone firm, insider buying has a positive and

significant relationship with announcement return. It further communicates the same undervaluation signal conveyed by share repurchase. Insider selling has a negative and significant relationship with announcement return. Selling of the insiders' share before share repurchase announcement, it sends a contrasting signal other than undervaluation.

Table 8
*Announcement return and insiders purchase (business group firm vs. standalone firm) (number of firms = 78)*

| Variable | Business Group | | Standalone | |
|---|---|---|---|---|
| | coefficient | *t*-stat | coefficient | *t*-stat |
| Intercept | 0.12 | 1.48 | 0.13 | 1.33 |
| Tobin's *Q* | −0.01 | −1.17 | −0.01 | −0.46 |
| Firmsize | −0.03 | −1.61 | −0.03 | −1.02 |
| Repur_Psize | 0.24 | 1.56 | 0.04 | 0.22 |
| Cash Flow | −0.14 | −1.46 | −0.14 | −1.28 |
| Stock price_Runup | −0.00 | −0.06 | −0.01 | −0.22 |
| Ins_sel | −0.18 | −1.02 | −0.97 | −3.10*** |
| Ins_buy | 0.11 | 0.31 | 0.81 | 1.98** |
| R-squared | 0.22 | | 0.46 | |

*Notes:* ***, **, *: Significant at 1%, 5% and 10% level.
BHAR (−1, +1) around share repurchase announcement is the dependent variable. All the variables in the above model is explained in Table 1.

## PROGRAM COMPLETION RATES AND INSIDER TRADING

Share repurchase gained momentum during the 1990s in the U.S., and for the first time in 1998, the total value of share repurchases exceeded the value of dividends (Grullon & Michaely, 2002). Stephens and Weisbach (1998) reported that in the U.S. market, at least 57% of the firms purchase the number of shares originally announced over three years, 10% of the firms purchase less than 5% of the shares announced, and a significant number of firms repurchase very few or no shares. They also suggested that the actual repurchase depends on the perceived degree of undervaluation.

The announcement of open market repurchase program is just an intention to do repurchase without any obligation, and firms are not liable to buy even a single share after the announcement. Sometimes, share repurchase announcement is used for a small adjustment in the share price with no intention of actually buying

the shares, because market reacts positively to the announcement. Therefore, it is very difficult to determine the actual share repurchase and the extent of program completion from the mere public announcement of open market share repurchase. In this paper, our focus is on insider trading to predict whether actual share repurchase will be carried out by the firm after the announcement or not. If the insiders buy shares in their account before share repurchase announcement, then it shows that the firm will have actual share repurchase after the announcement. Insiders purchase of shares before announcement indicates that the shares are undervalued. This action of insiders convinces the investors that the shares are undervalued, and management is more serious about doing actual share repurchase and completing the program instead of only announcing the repurchase. As many firms only announce share repurchase with no intention of actual share purchase to mislead the investors, the investors have lost faith on the share repurchase announcement. The insiders trading gives an additional proof to the investors' belief that the shares are undervalued, and the firm is going to do actual share repurchase.

In India, share repurchase started on 31 October 1998, by the Amendment of Companies Act 1956 and the introduction of SEBI (Buyback of Securities) Regulations 1998. From 1998 to March 2015, 219 companies have undertaken 305 share buybacks. India occupies15th rank among the most active nations in share buyback globally (Reddy et al., 2013). Since the inception of buyback activity in 1998 till 2015, these 219 companies have spent Rs. 21,312 million on share repurchase. Out of 305 share buybacks in India, in 10 buybacks companies did not purchase a single share. As the total number of the buybacks is less than the developed countries in the span of 14 years, very few number of companies only announced but not purchase a single share. Hence, the actual purchase of shares depends fully on the management discretion, as there is no specific guideline for it. However, to restrict the companies from such fraudulent activities, SEBI passed an amendment in August 2013. The amendment made it mandatory that at least 50% of the funds approved by buyback resolution must be utilised in repurchasing the shares. This amendment restricts companies from only announcing buyback and not executing it. Our study deals with the data before the 2013 amendment, when there was no minimum limit of actual share repurchase. Thus, it is required to examine the relationship between insider trading and actual share repurchase in India. If undervaluation signal is to be true and insiders convey the same signal, then there should be a positive relationship between actual share repurchase and insider trading. However, if insider trading does not convey any signal of undervaluation, then there will be no relationship between insider trading and actual share repurchase. To test the relationship between actual share repurchase and insider trading, the following model is tested.

$$\begin{aligned} Actual\_Rep_{it} = {} & \alpha_{it} + \beta_1 Repur\_Psize_{it} + \beta_2 BHAR_{it} \\ & + \beta_3 Return\_Vol_{it} + \beta_4 Tobin"sQ_{it} + \beta_5 Firmsize_{it} \\ & + \beta_6 Cash\_flow_{it} + \beta_7 Cash_{it} + \beta_8 Dividen\_payer_{it} \\ & + \beta_9 R\&D\_Exp_{it} + \beta_{10} Ins\_Buy_{it} \end{aligned} \quad (3)$$

The actual repurchase is the dependent variable, and it is defined as the actual shares purchased during one year from the opening of buyback divided by the number of shares outstanding before the share repurchase announcement. Table 6 presents all other variables used in the above models. We have controlled the other standard determinant of actual share repurchase to find the relationship between insider repurchase and actual share repurchase. First, cash and cash flow are controlled because the literature suggests that firms make more repurchase if they have enough cash reserves and less investment opportunity (Dittmar, 2000; Mitchell & Dharmawan, 2007; Boudry et al., 2013; Lee & Suh, 2011). In India, both cash and cash flow occupy the most important position because of the restriction of the Indian Companies Act 2013 to use the undistributed profit and reserve for buyback. Second, the return volatility in the previous year of share repurchase and the stock return of the following year of announcement is controlled. Third, the dividend paid by the company in the previous year of share repurchase determines the actual repurchase depending on the substitution and complement relationship between dividend and share repurchase. Fourth, the investment opportunity is controlled because firms having enough cash will not go for share repurchase if it has a lot of investment opportunity (Boudry et al., 2013). Fifth, firm size is controlled, as small firms are more likely to be undervalued because of asymmetry information (Vermaelen, 1981). Sixth, the investment by the firm in research and for development expenses is controlled, but capital expenditure data is not available in the Indian context. The results of the above model are presented in Table 9.

Table 9 reports two models; the first model takes insider buying as a whole in one variable, and the second model segregates the insider trading into different insiders. Program size is positively and significantly related to actual share repurchase in both models. Tobin's *Q* as a proxy of investment opportunities is negatively and significantly related to the actual share repurchase. It is obvious that firms having more investment opportunity will purchase less and vice versa. Firm size is negatively and significantly related to actual share purchase in both the models. As discussed in the above paragraph, small firms are more likely to be undervalued than big firms such that they will purchase more. Cash and cash flow are positively related to actual share repurchase. However, cash is positively and significantly related to actual share repurchase, which is less if the company has no cash to pay to the shareholders in return for their shares.

Table 9
*Actual share repurchases and insiders trading (number of firms = 78)*

| Variable | Model (I) | | Model (II) | |
|---|---|---|---|---|
| | coefficient | *t*-stat | coefficient | *t*-stat |
| Intercept | 0.10 | 3.24*** | 0.09 | 2.95*** |
| Repur_Psize | 0.10 | 2.00** | 0.14 | 2.77*** |
| Bhar | 0.00 | 0.13 | 0.00 | 0.48 |
| Return_Vol | −0.61 | −1.63* | −0.28 | −0.75 |
| Tobin's *Q* | −0.01 | −2.05** | −0.00 | −2.42** |
| Firmsize | −0.01 | −2.40** | −0.01 | −2.72*** |
| Cash_flow | 0.00 | 0.14 | 0.01 | 0.45 |
| Cash | 0.14 | 3.03*** | 0.14 | 3.06*** |
| Dividend_Payer | 0.00 | 0.32 | 0.01 | 0.72 |
| R&D_Exp | −0.18 | −0.67 | −0.06 | −0.23 |
| Ins_buy | 0.10 | 2.06** | | |
| Ins_Buy director | | | 1.73 | 2.47** |
| Ins_Buy officer | | | 0.11 | 0.22 |
| Ins_Buy promoter | | | 0.25 | 2.27** |
| Ins_Buy sub shareholders | | | 0.04 | 0.41 |
| R-squared | 0.40 | | 0.47 | |

***, **, *: Significant at 1%, 5% and 10% level.
*Note*: Actual share repurchase is defined as the number of shares purchased over one year divided by the number of shares outstanding. Rest all the variables in the above model is explained in Table 1.

Apart from the control variables discussed in the above paragraph, Table 9 also indicates the relationship between insider trading and actual share repurchase. The results are consistent with our hypothesis, which states that insider trading conveys the signal of undervaluation more firmly. Hence, actual share purchase depends on the transaction made by insider in their account before the share repurchase announcement. In the first model, insider buying is positively and significantly related to actual share repurchase. It means that the more the insider buys shares before the announcement of share repurchase; it is more likely that the firms purchase more shares. In the second model, insider buying is segregated into different insiders as per the availability of data in the Indian context, and the results show that insider buying by directors and promoters has a positive and significant relationship with actual share repurchase. In India, 95% of the big corporate houses are family owned (Sir Adrian Committee report), where the average promoters holding of our sample companies is more than 50.26%.

Therefore, promoters purchase of share before share repurchase announcement demonstrates that the shares are undervalued.

The relationship between program completion and insiders trading is tested in the following model explained as below.

$$\begin{aligned}\text{Program\_Completion}_{it} &= \alpha_{it} + \beta_1 BHAR_{it} + \beta_2 Return\_Vol_{it} \\ &\quad + \beta_3 \text{Tobin's} Q_{it} + \beta_4 Firmsize_{it} \\ &\quad + \beta_5 Cash\_Flow_{it} + \beta_6 Cash_{it} \\ &\quad + \beta_7 Dividen\_Payer_{it} + \beta_8 R\&D\_Exp_{it} \\ &\quad + \beta_9 Ins\_buy_{it}\end{aligned} \tag{4}$$

Program completion is a dependent variable, and it is defined as the actual shares purchased during one year from the opening of buyback, which is divided by the number of shares announce to be purchased in the offer document. All the other variables used in the model are already explained in Equation (3).

Table 10
*Program completion and insiders trading (number of firms = 78)*

| Variable | Model (I) | | Model (II) | |
|---|---|---|---|---|
| | coefficient | *t*-stat | coefficient | *t*-stat |
| Intercept | 1.49 | 3.19*** | 1.54 | 3.24*** |
| Bhar | −0.01 | −0.19 | −0.00 | −0.09 |
| Return_Vol | −7.13 | −1.24 | −8.17 | −1.39 |
| Tobin's *Q* | −0.01 | 2.45** | −0.00 | −1.96** |
| Firmsize | −0.10 | −1.19 | −0.11 | −1.32 |
| Cash_flow | 0.09 | 0.20 | 0.09 | 0.20 |
| Cash | 0.41 | 2.69*** | 0.57 | 2.76*** |
| Dividend_Payer | 0.15 | 0.84 | 0.13 | 0.70 |
| R&D_Exp | −0.15 | −0.04 | 0.55 | 0.13 |
| Ins_buy | 1.81 | 2.84*** | | |
| Ins_Buy director | | | 9.11 | 0.86 |
| Ins_Buy officer | | | 0.74 | 0.26 |
| Ins_Buy promoter | | | 2.97 | 2.96*** |
| Ins_Buy sub shareholders | | | 0.89 | 0.61 |
| R-squared | 0.10 | | 0.13 | |

*Notes:* ***, **, *: Significant at 1%, 5% and 10% level.
Program completion rate is defined as the number of shares purchased over one year divided by the number of shares to be purchased prescribed by the offer document in India. Rest all the variables in the above model is explained in Table 1.

The results are reported in Table 10. There are two models in Table 10; the first model takes insider buying as a whole in one variable, and the second model segregates the insider trading into different insiders. Following the same argument behind the relationship between insider buying and actual share repurchase, we have assumed that there should be a positive relationship between insider trading and program completion. This model also considers the standard control variables that influence the program completion of the firm. In model 1, insider buying is positively and significantly related to program completion because of the undervaluation of the signal conveyed by insider trading. In model 2, promoter buying before repurchase announcement is positively and significantly related to program completion.

## LONG-TERM RETURNS AFTER BUYBACK AND INSIDER TRADING BEFORE BUYBACK ANNOUNCEMENT

In this section, we have explored the relationship between insider trading and long-term return. The existing literature in this regard posits that firms experience long-term abnormal return after open market share repurchase announcement. Ikenberry et al. (1995) reported that on average the repurchasing firms enjoy abnormal return up to four years as compared to their counter parts. Peyer and Vermaelen (2009) also reported that firms earn abnormal return up to 48 months after the open market share repurchase announcement. In India, earlier studies relating to long-term return after share repurchase have very contrasting results compared to developed countries. Rajagopalan and Shankar (2012) found positive abnormal return just after the announcement, but the returns disappear gradually. Hyderabad (2009) observed that the abnormal announcement return is only temporary and not sustained for long term. Reddy et al. (2013) found no significant abnormal stock returns after the announcement, and the buybacks only showed lower stock returns after the announcement. The above studies in India have found that abnormal return after announcement does not last for a long time. Therefore, it is required to examine the impact of insider trading on long-term return after buyback announcement. If the insider trading gives a strong signal of undervaluation, there will be a positive relation between insiders trading and long-term return. The regression model for insider trading and long-term abnormal return is given in the following equation:

$$\begin{aligned} BHAR(1\ year)_{it} &= \alpha_{it} + \beta_1 Repur\_Psize_{it} + \beta_2 Ins\_sel_{it} \\ &\quad + \beta_3 Tobin'sQ_{it} + \beta_4 Cashflow_{it} + \beta_5 Firmsize_{it} \\ &\quad + \beta_6 Stock\ price\_Runup_{it} + \beta_7 Ins\_buy_{it} \end{aligned} \tag{5}$$

One-year BHAR is a dependent variable in the model. It is calculated as trading day (+1, +252), and control firms are treated as the standard against which abnormal return is derived. All other variables used in the above model are explained in Table 6. The results of the above model are reported in Table 11.

Table 11 shows the results of the two models; the first model takes insider buying as one variable, whereas the second model segregates the insider trading into different insiders. The results indicate that insider buying has a positive and significant relationship with the one-year long-term return. It means that the undervaluation signal conveyed by insider buying persists one year and investors react very positively to insiders buying. In the second model, the substantial purchase of shares by shareholders before repurchase announcement has a positive and significant relationship on one-year long-term return. A substantial shareholder holds more than 5% shares in the company, and is the second largest stakeholder in the company after promoters. Substantial shareholders only buy shares before the announcement of share repurchase, if the shares are undervalued. Buying overvalued shares before the announcement incurs a great loss of their wealth. So, while purchasing shares through investor's account before share repurchase, investors take it very seriously and react to it positively.

Table 11
*Long-term post announcement return and insiders buying (number of firms = 78)*

| Variable | Model (I) | | Model (II) | |
|---|---|---|---|---|
| | coefficient | *t*-stat | coefficient | *t*-stat |
| Intercept | −0.65 | −1.18 | −0.69 | −1.24 |
| Repur_Psize | −0.04 | −0.04 | −0.02 | −0.02 |
| Ins_sel | −2.12 | −1.42 | −2.02 | −1.32 |
| Tobin's *Q* | −0.09 | −1.16 | −0.06 | −0.76 |
| Cash_flow | 0.57 | 0.84 | 0.43 | 0.64 |
| Firmsize | −0.17 | −1.33 | −0.18 | −1.39 |
| Stock price_Runup | −0.53 | −1.89* | −0.46 | −1.65* |
| Ins_buy | 3.25 | 1.96** | | |
| Ins_Buy director | | | 12.31 | 0.74 |
| Ins_Buy officer | | | 2.18 | 0.49 |
| Ins_Buy promoter | | | 0.05 | 0.02 |
| Ins_Buy sub shareholders | | | 6.02 | 2.58*** |
| R-squared | 0.15 | | 0.20 | |

*Notes:* ***, **, *: Significant at 1%, 5% and 10% level.
All the variables in the above model is explained in Table 1.

## CONCLUSION

In this paper, we have extended insiders trading literature by examining insider data around the share repurchase period to find the informational content in the context of India. This paper investigates the private information conveyed by insider trading with regard to share repurchase and undervaluation. Our empirical results support that insider trading in India conveys an undervaluation signal to the investors, who act accordingly. A detailed analysis of insider trading around share repurchase event is performed to investigate its intensity within the sample firm in the previous year as well as the subsequent year of share repurchase. We have observed that insider trading (buying and selling) of sample firms is more around share repurchase compared to matching firms. Sample firms buy more shares in the previous year of share repurchase than the following year of share repurchase. However, Tobit's model shows that insider buying before share repurchase announcement has a positive influence on share repurchase decisions. The higher the insider buying, the higher is the undervaluation, and the firms are more likely to do repurchase.

We found that insider buying has a positive and significant relationship with announcement return, whereas insider selling has a negative and significant relationship with announcement return. The result is consistent with Babenko et al. (2012) and Firth et al. (2010). The paper also segregates the total sample into two; one is group-affiliated firms and the other is standalone firms to examine the information content on the ground of different ownerships. We have found that in India insider trading of standalone firms conveys more private information than group-affiliated firms and this finding is consistent with Chauhan et al. (2016).

We found that insider buying has a positive and significant relationship with actual share repurchase and program completion. The more the insider purchase before the announcement, the more likely the firm is to do actual share repurchase and complete the program. We also found that insider trading has a positive and significant relationship with long-term return, which means that the firms enjoy the benefit of the undervaluation signal conveyed by insider trading up to one year.

Our results support the view that insider trading conveys the undervaluation signal in an emerging country like India, where insider rules and regulation are not stringent as in a developed country. We further supported the view that ownership structure influences the information content of insider trading in India and extended the literature of insider trading to share repurchase in India for the first time to know the undervaluation signal associated with it. The future work

can be extended to analyse the profit accrued to the insiders by possessing the price-sensitive information before share repurchase. Insider trading after share repurchase announcement can be linked to firm performance in India, although it has been studied in the context of a developed country.

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## REFERENCES

Anderson, R. C., & Reeb, D. M. (2003). Founding-family ownership and firm performance: evidence from the S&P 500. *The Journal of Finance*, *58*(3), 1301–1328. https://doi.org/10.1111/1540-6261.00567

Asquith, P., & Mullins Jr, D. W. (1986). Signalling with dividends, stock repurchases, and equity issues. *Financial Management*, *15*(3), 27–44. https://doi.org/10.2307/3664842

Babenko, I., Tserlukevich, Y., & Vedrashko, A. (2012). The credibility of open market share repurchase signaling. *Journal of Financial and Quantitative Analysis*, *47*(05), 1059–1088. https://doi.org/10.1017/S0022109012000312

Bagwell, L. S. (1991). Share repurchase and takeover deterrence. *The RAND Journal of Economics*, *22*(1), 72–88. https://doi.org/10.2307/2601008

Bagwell, L. S., & Shoven, J. B. (1988). Share repurchases and acquisitions: An analysis of which firms participate. In *Corporate takeovers: Causes and consequences* (pp. 191–220). Chicago: University of Chicago Press.

Bartov, E. (1991). Open-market stock repurchases as signals for earnings and risk changes. *Journal of Accounting and Economics*, *14*(3), 275–294. https://doi.org/10.1016/0165-4101(91)90015-G

Beny, L. N. (2005). Do insider trading laws matter? Some preliminary comparative evidence. *American Law and Economics Review*, *7*(1), 144–183. https://doi.org/10.1093/aler/ahi002

Bens, D. A., Nagar, V., Skinner, D. J., & Wong, M. F. (2003). Employee stock options, EPS dilution, and stock repurchases. *Journal of Accounting and Economics*, *36*(1), 51–90. https://doi.org/10.1016/j.jacceco.2003.10.006

Bhattacharya, U., & Daouk, H. (2002). The world price of insider trading. *The Journal of Finance*, *57*(1), 75–108. https://doi.org/10.1111/1540-6261.00416

Billett, M. T., & Xue, H. (2007). The takeover deterrent effect of open market share repurchases. *The Journal of Finance*, *62*(4), 1827–1850. https://doi.org/10.1111/j.1540-6261.2007.01258.x

Bonaime, A. A., & Ryngaert, M. D. (2013). Insider trading and share repurchases: Do insiders and firms trade in the same direction? *Journal of Corporate Finance*, *22*, 35–53. https://doi.org/10.1016/j.jcorpfin.2013.03.003

Bonaimé, A. A., Öztekin, Ö., & Warr, R. S. (2014). Capital structure, equity mispricing, and stock repurchases. *Journal of Corporate Finance*, *26*, 182–200. https://doi.org/10.1016/j.jcorpfin.2014.03.007

Boudry, W. I., Kallberg, J. G., & Liu, C. H. (2013). Investment opportunities and share repurchases. *Journal of Corporate Finance*, *23*, 23–38. https://doi.org/10.1016/j.jcorpfin.2013.07.006

Brockman, P., Howe, J. S., & Mortal, S. (2008). Stock market liquidity and the decision to repurchase. *Journal of Corporate Finance*, *14*(4), 446–459. https://doi.org/10.1016/j.jcorpfin.2008.06.001

Carlton, D. W., & Fischel, D. R. (1983). The regulation of insider trading. *Stanford Law Review*, 857–895. https://doi.org/10.2307/1228706

Chan, K., Ikenberry, D. L., Lee, I., & Wang, Y. A. (2012). Informed traders: Linking legal insider trading and share repurchases. *Financial Analysts Journal*, *68*(1), 60. https://doi.org/10.2469/faj.v68.n1.3

Chauhan, Y., Kumar, K. K., & Chaturvedula, C. (2016). Information asymmetry and the information content of insider trades: Evidence from the Indian stock market. *Journal of Multinational Financial Management*, *34*, 65–79. https://doi.org/10.1016/j.mulfin.2015.12.003

Chen, H. C., Chen, S. S., Huang, C. W., & Schatzberg, J. D. (2014). Insider trading and firm performance following open market share repurchase announcements. *Journal of Business Finance & Accounting*, *41*(1–2), 156–184. https://doi.org/10.1111/jbfa.12059

Cheuk, M. Y., Fan, D. K., & So, R. W. (2006). Insider trading in Hong Kong: Some stylized facts. *Pacific-Basin Finance Journal*, *14*(1), 73–90. https://doi.org/10.1016/j.pacfin.2005.06.002

Comment, R., & Jarrell, G. A. (1991). The relative signalling power of Dutch-auction and fixed-price self-tender offers and open-market share repurchases. *The Journal of Finance*, *46*(4), 1243–1271. https://doi.org/10.1111/j.1540-6261.1991.tb04617.x

Dann, L. Y. (1981). Common stock repurchases: An analysis of returns to bondholders and stockholders. *Journal of Financial Economics*, *9*(2), 113–138. https://doi.org/10.1016/0304-405X(81)90010-6

Dittmar, A. K. (2000). Why do firms repurchase stock. *The Journal of Business*, *73*(3), 331–355. https://doi.org/10.1086/209646

Easterbrook, F. H. (1984). Two agency-cost explanations of dividends. *The American Economic Review*, *74*(4), 650–659.

Fenn, G. W., & Liang, N. (2001). Corporate payout policy and managerial stock incentives. *Journal of Financial Economics*, *60*(1), 45–72. https://doi.org/10.1016/S0304-405X(01)00039-3

Fernandes, N., & Ferreira, M. A. (2009). Insider trading laws and stock price informativeness. *Review of Financial Studies*, *22*(5), 1845–1887. https://doi.org/10.1093/rfs/hhn066

Firth, M., Leung, T. Y., & Rui, O. M. (2010). Double signals or single signal? An investigation of insider trading around share repurchases. *Journal of International Financial Markets, Institutions and Money*, *20*(4), 376–388. https://doi.org/10.1016/j.intfin.2010.05.002

Gong, G., Louis, H., & Sun, A. X. (2008). Earnings management and firm performance following open-market repurchases. *The Journal of Finance*, *63*(2), 947–986. https://doi.org/10.1111/j.1540-6261.2008.01336.x

Grullon, G., & Michaely, R. (2002). Dividends, share repurchases, and the substitution hypothesis. *The Journal of Finance*, *57*(4), 1649–1684. https://doi.org/10.1111/1540-6261.00474

Holderness, C. G., & Sheehan, D. P. (1988). The role of majority shareholders in publicly held corporations: An exploratory analysis. *Journal of Financial Economics*, *20*, 317–346. https://doi.org/10.1016/0304-405X(88)90049-9

Hovakimian, A. (2004). The role of target leverage in security issues and repurchases. *The Journal of Business*, *77*(4), 1041–1072. https://doi.org/10.1086/422442

Hovakimian, A., Opler, T., & Titman, S. (2001). The debt-equity choice. *Journal of Financial and Quantitative Analysis*, *36*(1), 1–24.

Hyderabad, R. L. (2009). Price performance following share buyback announcement in India. *Vision*, *13*(1), 59–78. https://doi.org/10.1177/097226290901300105

Ikenberry, D., Lakonishok, J., &Vermaelen, T. (1995). Market underreaction to open market share repurchases. *Journal of Financial Economics*, *39*(2), 181–208. https://doi.org/10.1016/0304-405X(95)00826-Z

Jagannathan, M., Stephens, C. P., & Weisbach, M. S. (2000). Financial flexibility and the choice between dividends and stock repurchases. *Journal of Financial Economics*, *57*(3), 355–384. https://doi.org/10.1016/S0304-405X(00)00061-1

Jensen, M. C. (1986). Agency cost of free cash flow, corporate finance, and takeovers. *Corporate Finance and Takeovers. American Economic Review*, *76*(2), 323–329.

John, K., & Mishra, B. (1990). Information content of insider trading around corporate announcements: The case of capital expenditures. *The Journal of Finance*, *45*(3), 835–855. https://doi.org/10.1111/j.1540-6261.1990.tb05108.x

Kahle, K. M. (2002). When a buyback isn't a buyback: Open market repurchases and employee options. *Journal of Financial Economics*, *63*(2), 235–261. https://doi.org/10.1016/S0304-405X(01)00095-2

Lang, L. H., & Litzenberger, R. H. (1989). Dividend announcements: Cash flow signalling vs. free cash flow hypothesis? J*ournal of Financial Economics*, *24*(1), 181–191.

Lee, B. S., & Suh, J. (2011). Cash holdings and share repurchases: International evidence. *Journal of Corporate Finance*, *17*(5), 1306–1329. https://doi.org/10.1016/j.jcorpfin.2011.06.006

Lee, D. S., Mikkelson, W. H., & Partch, M. M. (1992). Managers' trading around stock repurchases. *The Journal of Finance*, *47*(5), 1947–1962. https://doi.org/10.1111/j.1540-6261.1992.tb04690.x

Leland, H. E., & Pyle, D. H. (1977). Informational asymmetries, financial structure, and financial intermediation. *The journal of Finance*, *32*(2), 371–387. https://doi.org/10.2307/2326770

Li, K., & McNally, W. (2007). The information content of Canadian open market repurchase announcements. *Managerial Finance*, *33*(1), 65–80. https://doi.org/10.1108/03074350710715818

Liang, W. L., Chan, K., Lai, W. H., & Wang, Y. (2013). Motivation for repurchases: A life cycle explanation. *Journal of Financial Services Research*, *43*(2), 221–242. https://doi.org/10.1007/s10693-011-0126-7

Lie, E. (2000). Excess funds and agency problems: An empirical study of incremental cash disbursements. *Review of Financial Studies*, *13*(1), 219–248. https://doi.org/10.1093/rfs/13.1.219

Louis, H., Sun, A. X., & White, H. (2010). Insider trading after repurchase tender offer announcements: Timing versus informed trading. *Financial Management*, *39*(1), 301–322. https://doi.org/10.1111/j.1755-053X.2010.01074.x

Mitchell, J. D., & Dharmawan, G. V. (2007). Incentives for on-market buy-backs: Evidence from a transparent buy-back regime. *Journal of Corporate Finance*, *13*(1), 146–169. https://doi.org/10.1016/j.jcorpfin.2006.12.002

Nohel, T., & Tarhan, V. (1998). Share repurchases and firm performance: New evidence on the agency costs of free cash flow. *Journal of Financial Economics*, *49*(2), 187–222. https://doi.org/10.1016/S0304-405X(98)00022-1

Oded, J. (2005). Why do firms announce open-market repurchase programs? *Review of Financial Studies*, *18*(1), 271–300. https://doi.org/10.1093/rfs/hhh004

Peyer, U., & Vermaelen, T. (2009). The nature and persistence of buyback anomalies. *Review of Financial Studies*, *22*(4), 1693–1745. https://doi.org/10.1093/rfs/hhn024

Rajagopalan, N. V. R., & Shankar, H. (2012). Stock market behaviour around buyback announcements in India: An empirical justification for preferring the open market repurchase mode. *Indian Journal of Finance*, *6*, 43–52. https://doi.org/10.17010/ijf/2012/v6i12/72364

Reddy, K. S., Nangia, V. K., & Agrawal, R. (2013). Share repurchases, signalling effect and implications for corporate governance: Evidence from India. *Asia-Pacific Journal of Management Research and Innovation*, *9*(1), 107–124. https://doi.org/10.1177/2319510X13483518

Schultz, P. (2003). Pseudo market timing and the long-run underperformance of IPOs. *The Journal of Finance*, *58*(2), 483–518. https://doi.org/10.1111/1540-6261.00535

Seyhun, H. N. (1986). Insiders' profits, costs of trading, and market efficiency. *Journal of Financial Economics*, *16*(2), 189–212. https://doi.org/10.1016/0304-405X(86)90060-7

Shleifer, A., & Vishny, R. W. (1986). Large shareholders and corporate control. *Journal of Political Economy*, *94*(3, Part 1), 461–488. https://doi.org/10.1086/261385

Sinha, S. (1991). Share repurchase as a takeover defense. *Journal of Financial and Quantitative Analysis*, *26*(02), 233–244. https://doi.org/10.2307/2331267

Skinner, D. J. (2008). The evolving relation between earnings, dividends, and stock repurchases. *Journal of Financial Economics*, *87*(3), 582–609. https://doi.org/10.1016/j.jfineco.2007.05.003

Stephens, C. P., &Weisbach, M. S. (1998). Actual share reacquisitions in open-market repurchase programs. *The Journal of Finance*, *53*(1), 313–333. https://doi.org/10.1111/0022-1082.115194

Vafeas, N., & Joy, O. M. (1995). Open market share repurchases and the free cash flow hypothesis G35. *Economics Letters*, *48*(3), 405–410. https://doi.org/10.1016/0165-1765(94)00631-B

Vermaelen, T. (1981). Common stock repurchases and market signalling: An empirical study. *Journal of Financial Economics*, *9*(2), 139–183. https://doi.org/10.1016/0304-405X(81)90011-8

Yarram, S. R. (2014). Factors influencing on-market share repurchase decisions in Australia. *Studies in Economics and Finance*, *31*(3), 255–271. https://doi.org/10.1108/SEF-02-2013-0021