An Examination of Free Cash Flow Hypothesis in Indian Repurchase Decisions

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Abstract: Repurchase of shares by Indian firms are on the rise in recent years. What motivates Indian firms to repurchase their own shares? Signalling and free cash flow hypotheses are two competitive and popular explanations identified in empirical research in US and other countries. Do Indian firms buy back their shares to correct market misvaluations or to return excess funds? In the present paper an effort is made to decipher the motives behind repurchase decisions of Indian firms. Since there are positive returns only on announcement day and not in post-announcement days the signalling hypothesis cannot be an explanation for positive overall CAR in Indian announcements. The study hypothesizes that Indian firms use repurchases as a part of overall corporate restructuring mechanism of distributing excess funds and build promoters' stake holding. The evidence shows that low-q firms with higher free cash flow ratio earn higher abnormal returns than other firms. The cross-sectional analysis generates positive coefficient for low-q firms with higher cash flow and promoters' control.

Keywords: Abnormal returns, control, excess funds, signaling, Tobin's - q ratio

INTRODUCTION

Signalling or undervaluation hypothesis has been the popular explanation for share repurchase decisions of companies (Dann, 1981; Vermaelen, 1981; Comment and Jarrell, 1991; Ikenberry *et al*., 1995). According to this hypothesis, a firm announces repurchases to signal market undervaluation and/or manager's confidence of robust financial health of the firm. In recent years, doubts have been expressed on the applicability of signalling hypothesis. Schmidt (2006) views repurchases as costless mechanisms of market signalling. Chan *et al*. (2006) echoes similarly and argues that the managers have all the motivations to signal falsely especially in open market repurchases (OMRs). OMRs are non-committal in nature and carry weak signals to the market. Since OMRs predominate over other methods of buyback and constitute almost 90% of total announcements in US (Grullon and Ikenberry, 2000) signalling explanation has lost some of its credibility. A firm may withdraw OMRs at any time and, on average, take three years to complete (Jagannathan and Stephens, 2003). Grullon and Michaely (2004) did not find any evidence of post-buyback improvement in firm's operating performance.

Free cash flow or excess funds hypothesis is provided as an alternative explanation for positive returns by Jensen (1986), Grullon and Michaely (2002), Chan *et al*. (2004), Jagannathan *et al*. (2003) and others. Excess funds or free cash flows are defined as cash flows available in excess of firm's internal requirements. Jensen (1986) defines such flows as available after financing all capital projects with positive NPVs. An agency problem might arise between managers and shareholders over the use of such excess cash flows. The managers of firms have all the incentives to retain or overinvest such funds. Managers have both pecuniary and non-pecuniary incentives to overinvest in the firm by using its free cash flows to accept negative NPV projects, rather than distributing free cash flow to shareholders (Lie, 2000).

The Tobin's *q*-ratio is employed as a proxy measure of availability of profitable investment opportunities. A firm with a *q*-ratio greater than unity adds value through its investment opportunities than a firm with lower than unity *q*-ratio. Firms with *q*-ratio above unity are characterized as efficiently investing firms and are thereby viewed as having low agency costs (Clifford, 2005). Firms with *q*-ratio less than one would be characterized as over-investing. It is the inappropriate investment decisions of low-*q* managers that create the agency conflict. The costs that are created due to the agency conflict lower the value of the firms. Jensen's model predicts that when low-*q* firms decide to return cash to their shareholders, a higher event day return would be expected. Such an action of the management indicates its intention to lower the "high" agency costs incurred by shareholders. By contrast, high-*q* firms would have a lower event day return given their current "low" levels of agency costs and their inability to substantially reduce the agency costs further through a payout.

Therefore, a firm characterised by low-*q* ratio should disburse a greater part of its excess cash amongst the shareholders either in the form of special dividends, share

repurchases or regular increases in dividends. Such disbursements mitigate the agency problems between managers and shareholders by reducing the amount of cash available in the hands of managers. In view of this, share repurchase should be seen as a greater part of agency conflict than signalling mechanism. In other words, firms repurchase shares to reduce the agency conflict than to correct market mispricing.

Lang and Litzenberger (1989) find higher abnormal returns around the announcements of regular dividend increases and such returns are positively related to a firm's potential to overinvest, as measured by Tobin's-q and interpret this evidence in support of excess funds hypothesis. However, Howe *et al*. (1992) find contrary evidence in support of excess fund hypothesis in a study of special dividends and share repurchases. They find no significant difference in excess returns on announcements between high and low q-ratio firms. Clifford (2005) extends the results of Howe *et al*. (1992) to a larger data set in an attempt to solve empirical puzzle relating to Jensen's free cash flow theory and finds some support to free cash flow theory when the firm announces one-time cash payouts to shareholders in the form of tender repurchases than in the form of special dividends.

The q-ratio need not predict the whole story and determine the extent of announcement returns. A firm with low q-ratio cannot overinvest in negative NPV projects in the absence of liquid resources. Therefore, levels of cash flows can also significantly influence the firm's decision to announce repurchases. Do all firms with low q-ratios and high levels of liquid ratio distribute cash flows? Lie (2000) examine excess funds hypothesis in the context of special dividends, regular dividend increases and self-tender offers. While special dividends and self-tender offers are largely one-time cash disbursements, regular dividend increases typically lead to a permanently higher dividend level. This difference has important implications. Firms that have experienced a non-recurring accumulation of excess cash, for example, due to asset sales, pay out this through a special dividend or a self-tender offer rather than through an increase in the regular dividend, since the latter would commit the firm to pay higher future dividends. Conversely, firms that generate excess cash flow from normal operations can more effectively curb current and future investment by increasing the regular dividend than by paying a one-time a special dividend or conducting a self-tender offer.

A further doubt may arise as far as manager's motivation level also. Do all firms with low q-ratios and high cash resources employ repurchases? What is the manager's incentive in distributing such cash flows? The promoters or managers' percent of stake holding in the firm can be used as a proxy measure of managerial incentive levels. A promoter or manager with higher stake holding in the firm would avoid over-investing surplus

cash flows and would redistribute the same among the equity holders. Jensen and Meckling (1976) argue that the agency problem is less severe when managers hold a large fraction of the outstanding shares in the company. If managers hold a small fraction, they work less vigorously or consume perquisites because they bear a relatively small portion of the resulting costs.

It is not always right to conclude that governance problems would be high if manager's stake holding is low. There are other controlling mechanisms which could be initiated when managers overinvest. An effective board, presence of outsiders on the board, outside block holders, etc., can oversee the behaviour of such managers and can redirect their actions towards value maximisation. It is hypothesized, therefore, that a manager with little stake in the firm would overinvest when q-ratio is low and when there are high levels of liquid cash resources. Firms with higher promoters or manager's stake, low q-ratio and high levels of liquid resources would determine their payout ratio in the form of dividend or share repurchases. The announcement return is high not only for firms with low q-ratio, higher promoters control and high liquid resources but is also influenced by the interaction of these three variables.

Which hypothesis better explains for positive announcement returns of Indian buybacks-signalling or free cash flow? Do Indian firms improve market valuations after announcement of buyback decisions? What are the characteristics of firms in India announcing repurchase decision? The present paper aims to find answers to some of these questions.

LITERATURE REVIEW

Jensen (1986) reviews exhaustively the pitfalls involved in holding excess funds by managers and poor governance structures. He argues that managers have incentives to expand the corporation beyond its optimal size because

- This increases the resources under managerial control
- Executive compensation is positively related to firm size.

Consequently, if the corporation has substantial excess funds, managers will often invest in negative-NPV projects. This overinvestment problem can be mitigated by reducing excess funds. Lang and Litzenberger (1989) examine dividend announcements to determine whether the free cash flow hypothesis as propounded by Jensen (1986) has any explanatory power. They find evidence in support of the excess funds theory. The return is significantly higher for low-q (overinvesting) firms announcing dividend increases than for high-q (value maximising) firms. Wang *et al*. (2008) follow Lang and

Litzenberger (1989) method for UK's share repurchase announcements. Taking a sample of 5,500 announcements of September 1997 to July 2003 period, they find results in support of free cash flow hypothesis that the market reacts more positively to repurchase announcements of firms with overinvestment problem as measured by q-ratio and is not related to signalling costs as measured by the size of the repurchase.

Using data from U.K., where disclosure regulations make it possible to directly measure the volume and value of shares reacquired, Oswald and Young (2008) find that repurchase activity clusters in cash generative industries where investment opportunities are scarce. Holding investment opportunities constant at the firm level, they find that abnormally high cash flows from operating and (to a lesser extent) investing activities drive both the probability of a repurchase and the amount spent in reacquiring shares. Li and McNally (1999) employing conditional event study methodology for Canadian repurchases find that the repurchasing firms in Canada are small, are more closely held and have greater free cash flow than their non-repurchasing counterparts. They conclude that these results support the agency conflict hypothesis.

Nohel and Tarhan (1998) examine the post-announcement industry-adjusted performance of repurchasing firms, where performance is measured as a ratio of cash flow to market value of the assets that generate cash flow. The results show that there is a significant improvement in the performance of repurchasing firms relative to a set of control firms following the repurchase. Further, the improvement in performance is coming entirely from low-growth firms, and stems from a more efficient deployment of repurchasing firms' existing assets rather than from new investment opportunities. The study finds asset sales before and during the repurchase period and capital expenditures not increasing significantly during or following the repurchase. Collectively, the results suggest that a firm's repurchase of stock is part of a restructuring programme, rather than being an end unto itself and in support of free cash flow hypothesis over information signalling hypothesis.

In contrast, Howe *et al*. (1992) extend the result of Lang and Litzenberger (1989) to a broader set of cash transactions, one in which the cash distribution is not expected to be repeated. The transactions chosen were tender offer share repurchases and specially designated dividends and further into low-q (overinvesting) and high-q (value-maximizing) firms. In contrast to the Jensen argument, the study finds no significant difference in excess returns on announcement between high-q and low-q firms. To test further whether low-q firms with higher free cash flows have larger announcement returns, they include a measure of cash flows in their cross-sectional regressions. The cash flow measure adds little to the explanation of these returns. These results were found to be inconsistent with Jensen's free cash-flow theory, but consistent with the information-signalling model. Perfect *et al*. (1995) suggest that Howe *et al*. (1992) use a flawed measure of Tobin's q, namely, the average q-ratio over the three years preceding the repurchase. Perfect *et al*. (1995) demonstrate that low-q firms do in fact show a stronger stock market reaction to the announced repurchase if Tobin's q is measured in the year immediately preceding the repurchase and conclude that the free cash flow hypothesis better explains the motivation behind repurchases.

Denis *et al*. (1994) examine the relation between announcement returns for dividend paying firms with different Tobin's-q and cash flow characteristics and observe negative relation between q-ratio and dividend yield. The negative relation between q-ratio and stock price reaction to dividend changes is viewed as a by-product of a negative relation between dividend yield and q-ratio. The evidence was in support of free cash flows hypothesis rather than the magnitude of q-ratio, a measure of overinvestment and underinvestment by managers. A more refined test of the overinvestment hypothesis using the interaction of q-ratio with a measure of undistributed cash flow also fails to support the overinvestment hypothesis. Yoon and Starks (1995) find similar results. After controlling for the size of the dividend change, the anticipated dividend yield, and the market value of the firm, they find no difference in the magnitude of stock price reactions to dividend announcements across firms with different investment opportunities measured by Tobin's q-ratio.

Lehn and McConnell (1989) find evidence for free cash flow hypothesis in going private transactions. Employing a sample of 263 going private transactions of 1980-1987 period, the study indicates a significant relation between undistributed cash flow and a firm's decision to go private. In other words, a firm with higher free cash flow is a potential target for takeovers. The firm fends off such takeover threats by announcing high-premium going private transactions. The premiums paid to shareholders in going private transactions were found to be positively and significantly related to undistributed cash flow.

Lie (2000) employs a sample of 570 special dividends, 7,417 regular dividend increases and 207 self-tender offers to test the free cash flow hypothesis. Besides finding a positive announcement returns on the announcements of all these three forms of cash disbursements, the study observes in all these firms higher levels of undistributed cash flow prior to the events than their respective industry medians. The market reacts favourably to announcements of special dividends and self-tender offers by firms who have potentially large

agency problems, as indicated by substantial cash levels but poor investment opportunities that could be mitigated by a reduction of cash levels. However, no evidence was found to indicate that the market is less concerned about excess cash levels if the firm has effective control mechanisms in place. Clifford (2005) uses Howe *et al.* (1992) results to a larger data set and finds free cash flow theory explaining partially the firms' decision to return cash to shareholders. The low-q firms generate 12.09% announcement returns compared to 8.51% in high-*q* firms for repurchases. However, no significant difference in announcement returns is found in special dividends for both low and high-*q* firms.

Thus, the empirical research yields a contrasting evidence for Jensen (1986) free cash flow hypothesis. Lang and Litzenberger (1989) find evidence in support of free cash flow hypothesis while Howe *et al.* (1992) find no significant difference between announcement returns between low and high *q*-ratio firms. Lie (2000) and Clifford (2005) find mixed results for different forms of cash disbursements.

Several empirical studies have been done on repurchase decisions of Corporate India and most of them concentrate on abnormal returns on account of announcement of buybacks. Mohanty (2002), Kaur and Singh (2003), Mishra (2005) and Gupta (2006) examine announcement returns of Indian buybacks. Mohanty (2002) finds an announcement day CAR of 3.86% for 12 sample announcements; Kaur and Singh (2003) 1.5% for 77 announcements and Gupta (2006) 11.82% for 46 announcements. Mishra (2005) concludes that buyback gains in India are only temporary and the market falls to pre-offer level after 3 months. Hyderabad (2009) documents 2.77% announcement day return and an overall CAR of 7.24% for 70 buyback announcements of 1999-2007 period for 41-day event window. Sectoral analysis of excess returns in buyback announcements is carried out by Hyderabad (2008) and the author finds hotels and resorts, health care, etc., sectors reporting greater announcement returns than units of pharma, garments and engineering sectors.

Objectives and hypothesis: The amount of the free cash flow available to management is an important consideration in the agency cost explanation. One might expect that the low-*q* firm with high free cash flows to be the most likely candidate for overinvestment and thus to have the largest abnormal returns (Howe *et al.*, 1992). However, an appropriate governance mechanism is required to induce managers to act in the best interest of shareholders. The study uses the percent of stake holding of a manager or a promoter as an appropriate motivating tool. Jensen and Meckling (1976) also view that a manager who holds a significant percent of shares in the firm acts in the best interest of shareholders than a

manager who holds an insignificant percent. Similarly, Comment and Jarrell (1991) and Chan *et al.* (2006) view that the share repurchase announcement has greater signalling ability only when a greater percent of manager's wealth is stake. Hsieh and Wang *et al.* (2008) investigate the association between corporate payout policy and promoter or manager share holdings and their tax preferences and find that firms with higher promoter or management ownership are more likely to utilize share repurchases than dividends as a means of disbursing cash.

Therefore, our main premise is that the share repurchases are announced to resolve agency conflict than to signal market undervaluation. The announcement returns are determined by the firm's low-q ratio, significant levels of cash position and promoters or managerial stake holding. The study hypothesizes that announcement returns of share repurchase decisions would be high for firms which are likely to overinvest (low-*q* firms) excess funds (high cash ratio) in negative NPV projects having greater promoters' control.

METHODOLOGY

Sample size: The applicability of free cash flow hypothesis to Indian buyback announcements is tested by selecting a sample 78 buyback announcements of Indian firms for the period 1998-2008. Though the Securities and Exchange Board of India (SEBI), market regulator in India, Status Report on Buybacks for the period ending March 31, 2008 reveals 148 announcements, the study selects only 78 announcements using availability of announcement dates and the price data for trading days of estimation and window periods as criteria. The abnormal returns are computed for 41-day and 3-day windows. The required adjusted closing price data is accessed from Centre for Monitoring Indian Economy (CMIE) Prowess Database.

Market model: The following stationary one-factor model is assumed to present the return generating process (Lie, 2000).

$$R_{it} = \alpha + \beta_i R_{mt} + \epsilon_{it} \tag{1}$$

where R_{it} is the return on security i at time t, R_{mt} is the return on the market index at time t and ϵ_{it} is a random error term. The parameters of the market model are estimated over 200 trading days ending before the selected event window period and uses BSE-500 daily index as a proxy market index. The abnormal stock return for security i on day t is defined as

$$AR_{it} = R_{it} - (\hat{\alpha}_i + \hat{\beta}_i R_{mt}) \tag{2}$$

Where $\hat{\alpha}$ and $\hat{\beta}$ are the ordinary least square estimates of security i 's market model parameters.

$$AAR_t = \frac{\sum_{t=1}^{n} AR_{it}}{N} \qquad (3)$$

where N is the number of sample buyback announcements

The daily average abnormal returns are cumulated over event period for computing the CAR as shown below:

$$CAR = \sum_{t=-d}^{d} AAR_{it} \qquad (4)$$

where -d; d represent the event or window period.

The study computes t-test and p-values (non-parametric) to test the null hypothesis that event returns are equal to zero using the following formulae:

$$t = \frac{CAR}{\hat{S}(CAR_t)} = \frac{\overline{CAR_t}}{\sqrt{N} \sum_{t=-1}^{n} \hat{S}(CAR_t)} \qquad (5)$$

Where $\overline{CAR_t} = \frac{\sum_{t=-d}^{d} CAR_t}{N}$ and $\hat{S}(CAR_t) = \sqrt{\sum_{t=-d}^{d} \left(CAR_t - \overline{CAR_t}\right)^2}$

In addition to testing the significance of CAR, the study employs t-test and z-test values for judging the significance of daily average returns in 41-day window period. For this purpose, the study employs the approach used by Gupta (2006, 2008). The standard deviation of abnormal returns for the estimation period -220 days to -21 days, in case of 41-day window, has been computed. The Standardised Abnormal Returns (SAR) for each company is estimated by dividing abnormal returns of the event period, i.e., -20 to +20 by the standard deviation obtained. For the event day t, the Z-statistic for the AARs on N securities is calculated as:

$$Z_t = \frac{\sum_{i=1}^{N} SAR_{it}}{\sqrt{N}} \qquad (6)$$

The SAR is the rate of abnormal return for stock 'i' within the event window and is computed as shown below:

$$SAR_i = \frac{AR_t}{\sqrt{\left[\frac{1}{199} \sum_{t=-220}^{-21} \left(AR_t - \overline{AR}\right)^2\right]}}$$

Where mean abnormal return is:

$$\overline{AR} = \frac{1}{200} \sum_{t=-220}^{-21} AR_t$$

Multivariate model: The study employs the following regression model for the purpose of estimating correlation coefficients of announcement returns.

$$CAR_{-did} = \propto + \beta_1 q - ratio + \beta_2 \, control + \beta_3 cash \, ratio + \beta_4 \, low - q \, x \, HCR + \beta_5 low\text{-}q \, x \, HCR \, x \, low \, C + \beta_6 \, low - q \, x \, HCR \, x \, high \, C + \epsilon_{it} \qquad (7)$$

where $\propto$ is intercept; β_1, β_2, ..., β_n are regression coefficients; ϵ_{it} is statistical error term which equals to zero; control is the percent of shares held by manager or promoting class in a year prior to the year of announcement; q-ratio is Tobin's q-ratio as measured by market value of equity and book value of debt by book value of assets. Perfect *et al.* (1995) demonstrate that low-q firms do in fact show a stronger stock market reaction to the announced repurchase if Tobin's q is measured in the year immediately preceding the repurchase. The free cash flow is defined as the amount of cash balance outstanding at the beginning of the year of announcement and is cash flow available after adjusting for operating, financing and investment flows. This amount would represent the unspent balance available for repurchase of shares. The cash ratio is measured by dividing such cash balance by total assets. HCR stands for high cash ratio while C indicates percent of shares held by manager or promoters. Information necessary for computing all these variables is obtained from CMIE Prowess Database for all sample 78 announcements (Appendix A). Appendix B gives the definition of the variables employed in the study.

Descriptive statistics: The descriptive statistics of the variables used in the model is given in Table 1.

The mean Tobin's q ratio is 1.23 with a minimum value of 0.12 and a maximum of 9.07. The mean of 1.23

Table 1: Descriptive statistics

	Mean	Max	Min	S.D	Variance
CAR (-20;+20)	7.41	111.90	- 70.54	27.10	734.64
Tobin's-Q	1.23	9.07	0.12	1.33	1.77
Cash ratio	7.03	43.76	- 0.00	8.99	80.81
Control	46.77	84.95	5.36	16.60	275.64
Low-q x high cash ratio	3.39	42.65	0.00	7.29	53.21
Low-q x HCR x low control	1.75	23.92	0.00	4.73	22.39
Low-q x HCR x high control	1.64	42.65	0.00	6.05	36.65

S.D: Standard deviation; Var: Variance

indicates that Indian firms are fairly valued and are less likely to buyback the shares due to undervaluation reason. The average cash ratio, measured by the year-end cash balance to total assets outstanding, is 7.03% with a maximum value of 43.76% and negative minimum value. We conclude that Indian firms are, on average, low-cash firms. The percent of promoters' control in Indian firms is 46.77%, relatively a higher percentage and indicates greater promoters' control. The maximum value of control is 85%. Since low-q firms with higher cash ratio and higher managerial control are hypothesized to earn a higher return through repurchase announcement, the values of such variables are also found. The product of low-q and high cash ratio is 3.39 while the product of low-q, high cash ratio and low control is 1.75. The mean value decreases to 1.64 if high control percent is multiplied by the product of low-q and high cash ratio.

RESULTS AND DISCUSSION

Abnormal returns: The announcement returns of 78 sample announcements for 41-day window-period along with t-test values are shown in Table 2:

The announcement day AAR for 78 Indian buybacks is 2.75%, significant at 1% level. The results are similar to findings for other markets and time periods by Vermaelen (1981), Dann (1981), Comment and Jarrell (1991), Ikenberry *et al.* (1995), etc. The announcement day CAR is 7.04% while the overall CAR for 41-day window is 5.87%, significant at 1% level. The positive AAR and CAR on the announcement day could mean positive market reaction to buyback announcements in India. However, these returns fail to sustain on long-term basis and the overall CAR decreases by 1.17% in post-announcement period. This indicates that all positive announcement returns are realized in pre-offer period than in post-offer period. This behaviour of market prices contravenes the assumptions of signalling or undervaluation hypothesis. According to this hypothesis, firms announce buybacks to reverse negative trend in market prices in pre-offer period. In other words, there are returns after announcement than before announcement as hypothesized by signalling hypothesis. The contradictory results are a constraint in accepting undervaluation hypothesis as a motive for share buybacks. Further, Table 2 shows that positive AAR is not widely distributed across all announcements. The announcement day AAR is positive for only 72% of announcing firms on the announcement date. Had the undervaluation been the motive for all repurchases, the AAR would have been positive across all announcements.

The positive returns are also a pointer at Indian capital markets being less than efficient. An efficient market yields no excess returns as every information is fully reflected in the existing prices. The positive AAR

Table 2: AAR and CAR for overall sample buybacks

Days	AAR (%)	t-test	No. of +AARs	CAR (%)
	78 buyback CAR%			
- 20	0.23	0.903	0 (51.72)	0.23
- 19	0.14	0.76	26 (44.83)	0.37
- 18	- 0.36	-4.30	25 (43.10)	0.01
- 17	0.37	0.87	33 (56.89)	0.38
- 16	- 0.18	-0.51	24 (41.38)	0.19
- 15	- 0.16	0.14	23 (39.66)	0.04
- 14	- 0.18	-0.71	23 (39.66)	- 0.14
- 13	0.38	0.90	29 (50.00)	0.24
- 12	0.13	0.79	24 (41.38)	0.37
- 11	- 0.51	-0.97	23 (39.66)	- 0.14
- 10	0.55	0.94	25 (43.10)	0.41
- 9	0.34	0.96	25 (43.10)	0.75
- 8	0.94	1.17	25 (43.10)	1.67
- 7	0.57	1.23	28 (48.28)	2.26
- 6	- 0.03	-0.69	28 (48.28)	2.23
- 5	1.13	2.19**	28 (48.28)	3.36
- 4	- 0.45	-0.24	32 (55.17)	2.91
- 3	0.33	0.61	32 (55.17)	3.24
- 2	0.64	1.10	27 (46.55)	3.88
- 1	0.41	0.45	30 (51.72)	4.29
0	2.75	6.28*	42 (72.41)	7.04
1	- 0.17	-0.83	27 (46.55)	6.88
2	- 0.84	-1.12	24 (41.38)	6.03
3	0.40	1.02	26 (44.83)	6.44
4	0.62	1.11	33 (56.90)	7.06
5	- 0.24	-0.37	22 (37.93)	6.81
6	0.87	1.32	32 (55.17)	7.68
7	- 0.75	-0.38	21 (36.21)	6.92
8	- 0.11	-0.17	27 (46.55)	6.82
9	- 0.91	-1.13	18 (31.03)	5.91
10	0.58	1.01	37 (63.79)	6.49
11	- 0.43	-0.28	30 (51.72)	6.06
12	0.14	-0.19	27 (46.55)	6.20
13	0.30	0.06	23 (39.66)	6.50
14	- 0.36	-0.50	23 (39.66)	6.14
15	- 0.14	-0.20	30 (51.72)	5.99
16	- 0.59	-1.11	28 (48.28)	5.41
17	- 0.10	-0.27	26 (44.83)	5.31
18	0.64	1.37	31 (53.45)	5.95
19	- 0.67	-1.70	22 (37.93)	5.28
20	0.60	1.223	0 (51.72)	5.87
Avg	0.14	0.36		3.89
Std dev	0.66	1.30		2.77
sqrt	0.10	0.20		0.43
t-test	1.40	1.75***		8.99*

**: significant at 10%; *: significant at 1%; Figures in parenthesis are percentages of companies with +AAR

and CAR points at the existence of blockades in the free flow of information. The positive movement in prices even before buyback announcement could mean the prevalence of insider trading. In an under developed capital market like India this tendency cannot be ruled out. Strangely, the listing rules in India mandate listed firms to inform the date and agenda of the proposed boards meeting where buyback decision would be made to the concerned stock exchange. This could take the sheen out of buyback announcement and might negate the very purpose of resorting to such announcements.

Univariate analysis: Table 3 depicts information relating to 41-day and 3-day CAR for different variables used in

Table 3: Univariate analysis

	-20 to +20					-1 to +1				
	CAR AD	Overall CAR	t-test	No. of Co's	No. of BB	CAR AD	Overall CAR	t-test	No. of Co's	No. of BB
1. Overall sample	7.04	5.87	8.99*	58	78	3.01	2.90	2.43**	58	78
2. Low Q firms	9.25	7.84	8.55**	38	49	3.99	3.96	2.74**	38	49
3. High Q firms	3.31	2.56	10.44*	21	29	1.38	1.12	1.36	21	29
4. Low control	8.29	7.68	7.05*	31	39	3.32	3.23	2.59**	31	39
5. High control	5.79	4.05	3.49*	29	39	2.70	2.58	1.83***	29	39
6. Low cash ratio firms	5.13	4.13	12.37*	33	39	0.58	-0.25	-0.24	33	39
7. High cash ratio firms	8.95	7.61	7.18*	33	39	5.45	6.06	2.86*	33	39
8. Low Q x high cash ratio	9.83	8.70	5.00*	23	26	6.03	6.99	2.76**	23	26
9. Low Q x high cash x low control	12.48	12.35	5.13*	13	16	6.41	6.42	2.63**	13	16
10. Low Q x high cash ratio x high control	5.86	3.56	5.12*	10	10	5.66	8.14	2.94*	10	10

***: significant at 10%; **: significant at 5%; *: significant at 1%; AD: Announcement Day

the study. The sample announcements are sub-grouped into low-q and high-q firms, low control and high control firms and low cash ratio and high cash ratio firms. The low-q firms are further sub-divided into high and low cash ratio firms and into high and low insider control firms.

The 41-day CAR is 5.87%, significant at 1% level while 3-day CAR is 2.90%, significant at 5% level. For both the windows, the announcement day CAR is higher than the overall CAR. However, the fall is steep in 41-day window than in 3-day window. There are 49 low-*q* and 29 high-*q* firms in the sample and low-*q* firms generate greater returns in short-window than in long-window. The CAR is 4% for low-*q* firms compared to 1.38% for high-*q* firms in 3-day window.

A positive association between CAR and percent of managers' stake has been found by several empirical works in US (Vermaelen, 1981; Comment and Jarrell, 1991; Chan *et al*. 2006). The greater the manager wealth at stake, higher would be announcement returns. There are an equal number of both low and high control firms, classified on median value and CAR is significant for low-control than for high-control firms in both the windows. The contradictory evidence might be attributed to market apprehension regarding the real motive for buybacks by high-control firms. Gupta (2005) echoes similar scepticism for buybacks in India and finds promoters' holding increasing, on an average, from 3 to 4% after every buyback. He also concludes that buybacks have helped managements to increase their control substantially, in some cases, by 10 to 15%.

The high cash ratio firms generate significant higher announcement and overall CAR in both the windows, a result in consonance with the free cash flow hypothesis. The product of low-*q* and high cash ratio is used to identify the nature of firms announcing repurchases and sample includes 26 announcements with these characteristics. This is based on the premise that low-*q* firms employ buybacks only when they have higher free cash flows and market would appreciate such announcements. Announcement day CAR is significant and positive for such firms in both the windows. Besides
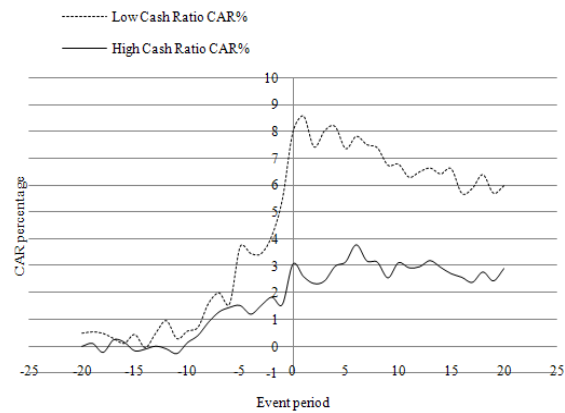

Fig. 1: Movement of low cash ratio and high cash ratio
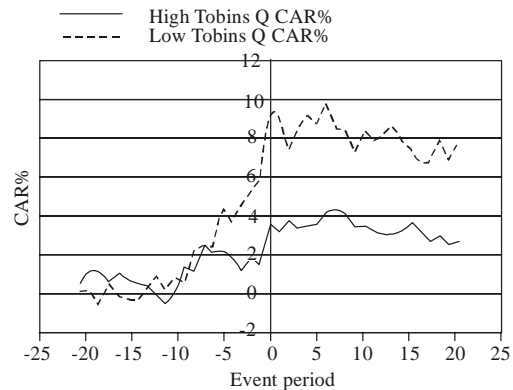

Fig. 2: Movement of CAR for low Q and high Q firms

higher cash ratio manager would not waste resources if his wealth is also at stake. The 26 low-q and higher cash ratio firms include 16 high and 10 low-control firms. We find low-control firms earning a greater announcement day return in both the windows than high-control firms. The 3-day overall CAR is higher in case of low-q firms with high cash ratio and higher management control.

Fig. 1 to 4 give a pictorial depiction of the movement of CAR for sub-samples employed by the study.

Table 4: Regression analysis of announcement returns

Independent variables	Model-1 (-20; +20)		Model-2 (-1; +1)	
	Coefficients	t-test	Coefficients	t-test
Constant	11.93	1.10	2.87	0.67
Tobin's-q ratio	-2.26	-0.03	-0.66	-0.68
Cash ratio	-0.15	-0.34	0.03	0.16
Control	-0.02	-0.10	0.005	0.06
Low-q x high cash ratio x low control	0.66	0.85	0.39	1.25
Low-q x high cash ratio x high control	-0.49	-0.74	-0.29	-1.14
R^2	0.05		0.07	
Adj-R^2	-0.02		0.002	
F-value	0.73		1.03	

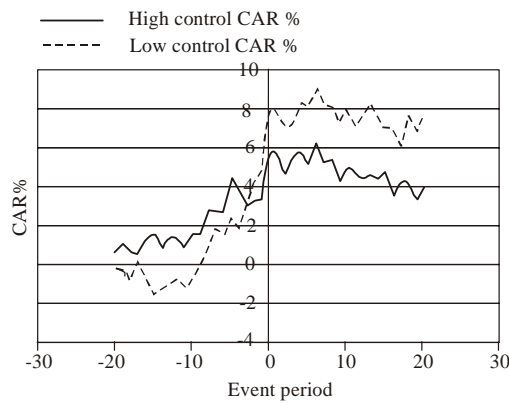***: significant at 10%; **: significance at 5%

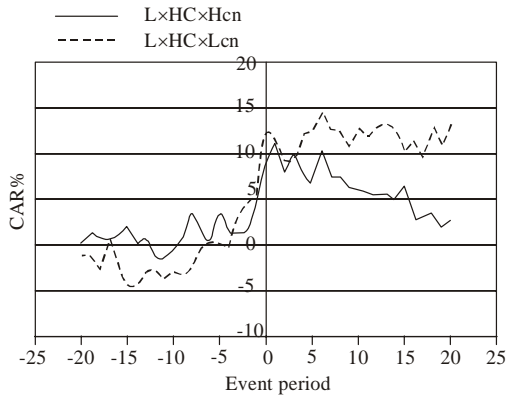Fig. 3: Movement of CAR high control and low control CAR %

Fig. 4: CAR of low-q, high cash and high control firms and low-q, high cash and low control firms

It can be discerned from Fig.1 that the announcement day and overall CARs are higher for high cash ratio firms than for low cash ratio firms. The CAR increases significantly in post-announcement period for high cash ratio firms. Fig. 2 reveals similar movements in CAR for low-q and high-1 firms; the latter reporting greater announcement day and overall CAR. Fig. 3 is used to depict the movement in CAR for low control and high

Table 5: Collinearity of independent variables

Variables	Tolerance	VIF
Tobin's-q	0.921	1.086
Cash ratio	0.606	1.649
Control	0.808	1.238
Low-q x HCR x LC	0.711	1.406
Low-q x HCR x HC	0.612	1.633

control firms. The movement in CAR is against the proposition that high control firms earn higher CAR than low control firms. Fig. 4 depicts the movement of CAR of low-q and high cash ratio firms sub-divided into low control and high control firms. The movement in CAR is more favourable for low control firms than for high control firms.

Multivariate analysis: This part of the analysis aims to provide an explanation to the major determinants for announcement returns in Indian repurchase decisions. Table 4 provides the results of the model developed in the study:

The coefficient for the product of low-q, high cash ratio and low control variable is positive and for all other variables it is negative in 41-day window. On the other hand, cash ratio, control and the product of low-q, high cash ratio and low control variables have positive relationship with the CAR in 3-day window. The other variables have negative coefficients.

Since coefficient for q ratio is negative in both the windows, the low-q firms realise a greater return than high-q firms. These results are similar to Lang and Litzenberger (1989) conclusion that higher return is explained by perceived risk of overinvesting by low-q firms. In other words, the existence of excess cash flow is the reason for low-q firms to use buybacks to return surplus funds than to signal market undervaluation. The cash ratio shows negative coefficient in 41-day window and positive coefficient in 3-day window. Gregory *et al.* (2001) in their study on mergers employ a 3-day window and conclude that short windows test better the value creating abilities than longer event windows. Using 3-day window, the study finds that higher CAR is earned by high cash ratio firms than low-cash ratio firms. Similarly, firms with higher managerial stake report higher wealth gains on buyback announcement than firms lower managerial stake.

Table 6: Correlation matrix

	CAR	Tobin's-q ratio	Control	Cash ratio	Low-q x HCR	Low-q x HCR x low control	Low-q x HCR x high control
CAR	1.000						
Tobin's q ratio	- 0.116	1.000					
Cash ratio	- 0.063	- 0.072	1.000				
Control	- 0.100	0.125	0.031	1.000			
Low-q x HCR	- 0.023	- 0.236	0.621	0.00	1.000		
Low-q x HCR x Low control	0.137	- 0.187	0.306	- 0.352	0.564	1.000	
Low-q x HCR x High control	- 0.135	- 0.138	0.509	0.276	0.764	- 0.102	1.000

HCR: High Cash Ratio

The coefficient is positive in both the windows for the product of low-q, high cash ratio and low control firms and negative for the product of low-q, high cash ratio and high control firms. In other words, firms which would overinvest excess funds with lower promoters'stake generate greater CAR than firms with higher promoters' stake. The contradictory result might be attributed to market fear regarding the use of buybacks by firms in India to use buybacks to pile up promoters' holding at company cost.

Several statistical variables are employed to test the usefulness of the results reported in the study. The R^2 value is greater than 0 in both the windows while F-value is 1.03 in 3-day window. Tolerance and variable inflation factor (VIF) are used for testing the robustness of the results. These are the measures employed for the purpose of testing the existence of multicollinearity among the independent variables. The absence of multicollinearity is the test of reliability of the model. A tolerance of less than 0.20 and a VIF value above 5 suggests the existence of multicollinearity problem. Table 5 provides values of all these variables:

The tolerance value is higher than 0.20 and VIF value is lower than 5 for all independent variables indicating the absence of multicollinearity and hence the robustness of the models. Pearson Correlation Matrix is also used to cross check these results and Table 6 provides the details:

A significant association is found between cash ratio and CAR in the study which implies that free cash flow is an important determinant of share buyback decision. Similarly, there are significant relationships between q-ratio and control, low-q and high cash ratio and the product of low-q, high cash ratio and low control. All this clearly shows that a low-q firm can reap the full advantages of announcement of repurchase only when it has high cash resources and lower promoters' control. The cash ratio has significant relationship in low-q firms having higher cash ratio and promoters' control.

SUMMARY AND CONCLUSION

There are several explanations given for positive repurchase announcement returns. Among them signalling and free cash flow are basic proponents. According to signalling premise managers use repurchase to signal their displeasure regarding existing market valuations by announcing high-priced repurchases. The market regards such announcements strongly and there is an upward revaluation of shares. On the other hand, managers resolve agency conflict over the deployment of excess funds through the announcements of repurchases argues the free cash flow hypothesis. Market rewards such investor friendly behaviour of managers. The present study aims to identify the applicability of these hypotheses to Indian repurchases. There is inadequate evidence for signalling hypothesis as returns tend to be temporary and are generated in pre than in post-announcement period.

On the other hand, adequate evidence is available regarding the applicability of free cash flow explanation for Indian repurchases. The announcement day return and overall CAR are higher for low-q firms than for high-q firms. The cross-sectional analysis also yields results in support of free cash flow hypothesis. All low-q firms do not overinvest unless they possess significant excess funds. Univariate analysis shows that high cash ratio firms earn significant returns in short and long windows compared to low-cash ratio firms. Percent of managerial wealth at stake can also reveal whether managers waste the resources or not. Managers are not swindlers if there is greater personal wealth at stake. Greater association is found between CAR and percent of managerial wealth at stake.

The multi-variate model generates results as hypothesized by the study, i.e., a higher return is generated individually by low-q firms, high cash ratio firms and high control ratio firms. However, for firms with the characteristics of low-q, high cash ratio and high control the coefficient tends to be negative. We attribute such contradictory result to the market apprehensions in India as to the real motives for repurchases. These results for Indian repurchases are similar to Li and McNally (1999) for Canadian repurchases, Oswald and Young (2008) for UK repurchases and Nohel and Tarhan (1998) for US announcements.

All firms and all announcements cannot generate equal announcement returns. Firms with lower investment opportunities and greater degree of agency conflict can employ repurchases to resolve agency problem arising out of deployment of excess funds in low-yielding assets. A low-q firm can mitigate market apprehensions regarding its capability to add value by selling unprofitable assets and using the cash for repurchase announcement. Further, higher managerial stake is also required as an incentive to managers not to squander resources. Capital markets are appreciative of

Appendix A: Media/public announcement dates of 78 sample companies

S. No.	Name of the Company	Media /Public	S. No.	Name of the Company	Media/Public
1	Aarti Drugs	09.12.2002	40	Indian Resorts Hotels Ltd	29.01.2002
2	Abbott India Ltd 1st BB	18.04.2002	41	Jay Shree Tea Ltd 2nd BB	24.05.2001
3	Abbott India Ltd 2nd BB	26.08.2006	42	John Fowler (I) Ltd 2nd BB	22.10.2001
4	ACE Software Ltd	01.10.2003	43	Kesoram Industries Ltd 2nd BB	28.04.2000
5	Addi Industries Ltd	14.11.2002	44	M/s GSK Pharmaceutical Ltd	15.03.2005
6	Advani-Oerlikon Ltd	23.01.2002	45	Madura Coats Ltd	24.01.2001
7	Apollo Finance Ltd	27.12.2004	46	Manugraph Industries Ltd	15.10.2001
8	Avery India Ltd 1st BB	09.03.2004	47	Mastek Ltd	20.05.2004
9	Avery India Ltd 2nd BB	10.06.2004	48	MICO Ltd 2nd BB0	4.11.2000
10	Bhagyanagar M Ltd 3rd BB	29.08.2001	49	MICO Ltd 3rd BB	07.12.2001
11	Blue Star Ltd	05.02.2002	50	Natco Pharma Ltd	06.09.2006
12	Bombay Dye MFT Co. Ltd 1st BB	29.08.2001	51	OCL (I) Ltd 1st BB	26.09.2001
13	Bombay Dye MFT Co. Ltd 2nd BB	28.10.2002	52	OCL (I) Ltd 2nd BB	20.01.2003
14	Britannia Industries Ltd 1st BB	28.08.2001	53	Prime Securities Ltd 2nd BB	30.06.2005
15	Britannia Industries Ltd 2nd BB	26.08.2002	54	Punjab Communication Ltd	22.10.2003
16	Britannia Industries Ltd 3rd BB	09.06.2004	55	Raymond Ltd	06.01.2001
17	Chordia Food Products Ltd	02.09.2002	56	Reliance Industries Ltd 3rd BB	27.12.2004
18	DIL Ltd	19.03.2005	57	Revathi Equipment Ltd	29.06.2006
19	Exide Industries Ltd	26.12.2001	58	Selan Exploration Tech Ltd 2nd BB	26.03.2001
20	FDC Ltd	26.12.2001	59	Selan Exploration Tech Ltd 3rd BB	01.04.2002
21	Fineline Circuits Ltd 1st BB	17.05.2003	60	Selan Exploration Tech Ltd 4th BB	11.05.2003
22	Fineline Circuits Ltd 2nd BB	30.08.2004	61	Siemens (I) Ltd	18.06.2001
23	Finolex Cables Ltd 3rd BB	24.04.2002	62	Solitaire Machine Tools Ltd 1st BB	01.08.2002
24	Finolex Industries Ltd 1st BB	11.04.2001	63	SRF Ltd	28.06.2006
25	Finolex Industries Ltd 2nd BB	31.07.2002	64	Sun Pharmaceutical Ltd 1st BB	31.12.2002
26	G G Dandekar Machine Works Ltd	18.01.2002	65	Sun Pharmaceutical Ltd 2nd BB	22.04.2004
27	GCPL 2nd BB	05.08.2002	66	Titanor Company Ltd	02.05.2003
28	GCPL 3rd BB	16.01.2003	67	Tube Investment of India Ltd	09.10.2002
29	GCPL 4th BB	23.10.2003	68	Venky's (India) Ltd	11.09.2002
30	GCPL 5th BB	27.04.2004	69	Winsome Yarns Ltd 1st BB	30.06.2001
31	GCPL 6th BB	16.10.2004	70	Winsome Yarns Ltd 2nd BB	18.04.2002
32	GE Shipping Co. Ltd 1st BB	01.11.2000	71	Gujarat Ambuja Exports Ltd	05.04.2007
33	GE Shipping Co. Ltd 2nd BB	11.08.2001	72	Ace Software Exports Ltd 2nd BB	21.04.2007
34	GSK Healthcare Ltd	02.12.2004	73	MRO-TEK Ltd	05.04.2007
35	Heritage Foods (I) Ltd	16.01.2002	74	ICI India Ltd 2nd BB	26.7.2007
36	Hindalco Industries Ltd	30.01.2002	75	GTL Ltd	10.8.2007
37	ICI India Ltd	18.07.2006	76	Hindustan Unilever Ltd	29.7.2007
38	Indiabulls Ltd	28.10.2005	77	Madras Cements Ltd	11.02.2008
39	Indian Hume-Pipe Co Ltd	20.08.2002	78	Reliance Energy Ltd 2nd BB	05.03.2008

Appendix B: Definition of variables

Name of the variable	Definition
Cash flow	Amount of cash balance outstanding at the beginning of the year of repurchase announcement
Tobin's Q ratio	A ratioof market value of equity and book value of total debt to book value of total assets at the beginning of the year of the announcement. The market value of equity is the product of adjusted closing price at the beginning of the year and number of equity shares outstanding as on the same date.
Control	% of promoters or managers stake holding, obtained from latest year- end financial statements before the date of buyback announcement
Total assets/size of the firm	Defined as aggregate of total assets outstanding at the beginning of the year of announcement.
Cash ratio	A ratio of closing cash to book value of assets at the beginning of the year of the announcement of repurchase. Year taken is financial year.

firms whose managers or promoters hold higher stake and return excess funds to shareholders in the form of share buybacks. Repurchase of shares should be viewed as a broader part of corporate restructuring strategy than as a mere method of correcting perceived market undervaluation.

Firms can employ alternative means to distribute surplus cash. Special dividends and increase in normal dividends are other means of distributing cash flows. There is a strong need to analyse, for Indian firms, market reaction to all these announcements to further reinforce the applicability of free cash flow explanation. The present study considers only repurchase announcements. Further, empirical research in US shows higher CAR for fixed price tender offers than for open market repurchases. Between these two, the latter method is widely used. Nohel and Tarhan (1998) opine that if the investor reaction to repurchases can be explained by the free cash flow hypothesis, then tender offer repurchases have more promise to uncover this relation. A research into these aspects for Indian announcements would strengthen the free cash flow explanation.

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