WORKING PAPER 61/2011

Evidence on Changes in Time Varying Volatility around Bonus and Rights Issue Announcements

Dr. Madhuri Malhotra
Dr. M. Thenmozhi
Dr. Arun Kumar Gopalaswamy

MADRAS SCHOOL OF ECONOMICS
Gandhi Mandapam Road
Chennai 600 025
India

September 2011

Evidence on Changes in Time Varying Volatility around Bonus and Rights Issue Announcements

Madhuri Malhotra *
Assistant Professor, Madras School of Economics
madhurimalhotra@mse.ac.in

M. Thenmozhi
Professor, Indian Institute of Technology
mtm@iitm.ac.in

and

Arun Kumar Gopalaswamy
Associate Professor, Indian Institute of Technology
garun@iitm.ac.in

* Corresponding Author

WORKING PAPER 61/2011

September 2011

Price : Rs. 35

MADRAS SCHOOL OF ECONOMICS
Gandhi Mandapam Road
Chennai 600 025
India

Phone: 2230 0304/2230 0307/2235 2157
Fax : 2235 4847/2235 2155
Email : info@mse.ac.in
Website: www.mse.ac.in

Evidence on Changes in Time Varying Volatility around Bonus and Rights Issue Announcements

Madhuri Malhotra, M. Thenmozhi and Arun Kumar Gopalaswamy

Abstract

The short term and long term stock price volatility changes around bonus and rights issue announcements have been examined using historical volatility estimation and time varying volatility approach. The results show that the historical volatility has increased after bonus and rights issue announcements. Volatility persistence and unconditional volatility have also increased after the bonus and rights issue announcements. The results support the finding of Medeiros and Matsumoto (2006) but are contrary to the results of Li and Engle (1998), Connoly and Stivers (2005), and Boyd et al. (2005), who report decrease in volatility following the event announcements. This evidence, extendable to any other type of issue announcement, is consistent with theories stating that volatility increases after the seasoned capital issue announcements.

Keywords: *Bonus issue, rights Issue, volatility, ARCH, GARCH (1, 1), Indian stock market*

JEL Codes: *G14; G15 and D82*

Acknowledgement

An earlier version of this paper was presented at the International Conference on Practice and Research in Management, 18 – 20 February, 2011 at the Management Department, Faculty of Social Sciences, Dayalbagh Educational Institute (Deemed University), Agra. The authors would like to thank the conference participants for their useful comments.

INTRODUCTION

The arrival and new information releases are generally associated with increased trading volume, significant abnormal returns, increased security returns variability, and changes in systematic risk. Many authors have examined the speed with which announcement-induced effects first appear and the interval required for their eventual dissipation (Schwert, 1989; Woodruff and Senchack, 1988). At the firm level, the most common conclusion is that firm-specific news release dates are characterized by significant abnormal returns, increase in trading volume, significant shift in systematic risk, and temporarily above average stock price variability. Most of the studies seem to agree that markets are fairly efficient in the sense that prices adjust very quickly to public news disclosure (Woodruff and Senchack, 1988). The public release of information, in lieu of private dissemination through analysts and institutional channels, could lead to exacerbated price swings as diverse investors struggle to interpret the news (Kim and Verrecchia, 1991). Moreover, heightened volatility after seasoned capital issue announcement could impose potential contracting and trading costs on the disclosing firms. Volatility can adversely affect the efficiency of the firm's contracting activities (Baiman and Verrecchia, 1996). Volatility is a manifestation of underlying investor uncertainty, or risk, about future outcomes. Although an announcement reduces information asymmetry, it may also reveal information that increases uncertainty about future payoffs. This incremental uncertainty could lead to a short-term increase in stock price volatility.

Research on market reactions to seasoned capital issue announcements developed theories explaining the changes in volatility behavior around equity issue announcements, thus contributing to a better understanding of the phenomena of capital markets. Several hypotheses have been proposed to explain market reactions to public equity offerings. Bonus and rights issue announcements (seasoned

capital issue announcements) cause a large mispricing on the announcement day and the prices are likely to be volatile for many days thereafter. Medeiros and Matsumoto (2006) in their study presented the evidence of the presence of ARCH processes in the regression residuals. They also found the presence of GARCH effect around the announcement days.

The Indian Companies Act (1956) and the Securities Exchange Board of India (SEBI) provide guidelines for issue of bonus and rights in India. Bonus shares in India can be issued only out of free reserves built out of the genuine profits or share premium collected in cash only. Companies cannot issue bonus shares in lieu of dividend or if it had come out with any public / rights issue in the past 12 months. Bonus issue cannot be made on partly paid up existing shares and it should be ensured that the company has not defaulted in payment of interest or principal in respect of fixed deposits and debentures and in the payment of statutory dues of the employees. The Memorandum and Articles of Association are required to be altered if they do not provide the provision of bonus issue in respect of authorized share capital or capitalization of reserves. The companies are required to implement the bonus proposal within a period of 6 months from the date of approval at the meeting of board of directors, and the new shares are to rank *pari-passu* with the existing shares.

Rights issue refers to issue of fresh securities by a listed company to its existing shareholders as on a record date. The rights are normally offered in a particular ratio to the number of securities held prior to the issue. SEBI has laid down eligibility norms for entities accessing the primary market through public issues but there is no eligibility norm for a listed company making a rights issue as it is an offer made to the existing shareholders who already know the company. However, rights issues have to be kept open for at least 30 days and not more than 60 days.

In this paper, an attempt has been made to address the following questions: Does the stock return volatility change over time? Is there a persistence in volatility around bonus and rights issue announcements? Is there any change in unconditional volatility around bonus and rights issue announcements? Specifically, it attempts to fill the gap in the literature by empirically examining the change in short and long term volatility before and after bonus and rights issue announcements. The change in volatility persistence and unconditional volatility before and after the announcement are also examined.

IT and financial services industry from the services sector and chemical and textile industries from the manufacturing sector have been chosen for the purpose of the study as they are the main industries in the respective sectors. Services sector in India are closely followed by the analysts and the investors. They form a major portion of India's top companies' list. Hence, a study examining volatility around announcements in these four sectors is important and meaningful.

The paper is organized as follows. The next section explains the literature review. The subsequent section explains the data and methodology used in the study. Then, the results of historical volatility estimation and time varying volatility approach used for estimating volatility around bonus and rights issue announcements are explained. The findings are summarized and implications of the study are brought out in the last section.

LITERATURE REVIEW

The review of existing literature shows that event announcements induce changes in stock price volatility. Various events' announcement such as forward ban (Goyal, 1995), political news announcements (Brooks and Graham, 2005), ADR listing (Jiang *et al.*, 2002; Kutan and Zhou, 2006), treasury bond issue announcement (Jones *et. al.,* 1998), management

forecast (Piotroski, 2000), and earnings announcement (Mohammed and Yadav, 2002) have been examined to understand the volatility dynamics in the financial market.

There are mixed results for volatility changes around different event announcements. Most of the studies in U.S show an increased volatility after the event announcement (Kamara and Koski, 2000; Goeji and Marquering, 2004; Flannery and Protopapadakis, 2002; Piotroski, 2000; Mohammad and Yadav, 2002; Jiang *et al.*, 2002; Bomfim, 2003; Bredin *et al.,* 2005; Bauwen *et al.*, 2005). Some U.S studies report no significant change in the volatility around event announcement (Jones *et al.,* 1998). Li and Engle (1998), Connoly and Stivers (2005), Boyd *et al.* (2005), Medeiros and Matsumoto (2006) find evidence of decrease in volatility after the announcement of an event.

The relationship between stock returns and volatility has been found to be positive by some studies (Baillie and DeGennaro, 1990; Bohl and Henke, 2003; Marisetty and Alayur, 2002) and a few studies examined stock price volatility pattern over a large number of years (Roy and Kamakar, 1995; Marisetty and Alayur, 2002; Aggarwal *et al.,* 1999). Although the variance has been taken as an explanatory variable affecting abnormal returns around event announcement (Dierkens, 1991; Tsangarakis, 1996; Tan *et al.,* 2002; Lukose and Rao, 2003), no attempt has been made to examine the changes in volatility around bonus issue announcement.

In the case of industry wise impact on stock return volatility, Lee and Chang (2011) employ the financial econometric models to examine the asymmetric volatility of equity returns in response to monetary policy announcements in the Taiwanese stock market. The asymmetric generalized autoregressive conditional heteroskedasticity (GARCH) model and the smooth transition autoregression with GARCH model are used to measure the equity returns' asymmetric volatility. They documented the

presence of asymmetric volatility in their returns series and the leverage effect of stock price changes for most industry equity returns in Taiwan.

In the Indian context, many authors have tried to estimate the volatility over large number of years (Roy and Kamakar, 1995; Marisetty and Alayur, 2002). There is an evidence of decline in stock price volatility after events such as introduction of futures which has been examined using standard deviation methodology (Thenmozhi, 2002) and time varying volatility (Thenmozhi and Thomas, 2004). In the case of rights issue, volatility has been examined around the rights issue announcement (Masulis, 1983; Dierkens, 1991; Kothare, 1997; Marsden, 2000; and Tan *et al.*, 2002), using variance of daily stock returns to estimate volatility around rights issue announcement.

Subrahmanyam *et al.*, (2010) analyzed the private placements in India. They extended Myers and Majluf (1984) model by analyzing a sample of 164 preferential allotments (private placements) issued in the Indian capital markets during 2001-2009 and concluded that the announcement period returns for private placements are positive, depending on the regulatory constraints that determine the issue price, and positively related to the volatility.

Steve and Robert (2011) find evidence that stock split announcements have a greater wealth effect when the market volatility is low. This effect is driven primarily by small firms. These results support the hypothesis that when market volatility is high, signals sent by small firms are more likely to be obscured by noise than when market volatility is low.

In the case of bonus issues, no author has studied the volatility patterns around the bonus issue announcement and there is no empirical evidence to document the volatility clustering and unconditional volatility patterns around the announcement of bonus or rights issues. Hence, this

study examines the changes in time varying volatility using ARCH / GARCH model, to capture the effect of bonus and rights issue announcements.

Most of the studies capture volatility for long event windows but there is no existing study available to examine the impact of bonus issue announcement on stock price volatility for short and long run periods of time. If the volatility effects of event announcement are short-lived, prior long-window studies (Leuz and Verrecchia, 2000) would not have the power to document the link between event announcement and short-term changes in price volatility. Hence, this study complements the prior research by refining the methodology by capturing the historical volatility for 20 days and 100 days around the announcement.

Although there is much discussion of "event induced variance" in the event study literature (Brown and Warner, 1985), a few studies take the step of characterizing the variance of returns as a GARCH process. We expect that the time varying nature of the market volatility will change from the pre and post-announcement of bonus issue / rights issue announcement periods. More particularly, we expect the behavior of conditional volatility after the announcement to be more, given the fact that once the news comes to the market, the trading activity will rise and hence the volatility will increase. This theory emanates from the financial literature, where an agent or trader predicts the stock price variance by forming a weighted average of a long term average (the constant), the forecasted variance from last period (the GARCH term), and information about volatility observed in the current period (the ARCH term). Combining all the three stated above, a trader gets an estimate about the future period volatility.

DATA AND METHODOLOGY

a. Data

The data on the bonus and rights issue announcement has been collected through desk research from the Centre for Monitoring Indian Economy (CMIE), PROWESS 3 database. The initial search was done for the manufacturing and service sectors companies which announced bonus and rights issues during 2000 to 2008. The firms that meet the following criteria have been identified:

1. Reporting bonus and rights issues in any of the leading financial dailies, and the announcement dates are available in the database;
2. No concurrent issue is announced with the current announcement of the issue under study; The number of securities offered can be identified;
3. If there are multiple announcements, only the latest is included in the *sample*. That is, a firm is included in the sample only once. This rules out the possibility of company specific bias while taking a sample from a particular industry;
4. The bonus/rights issue must not have been issued in part or whole as a consideration in a merger or acquisition;
5. The data for a firm which issued bonus and rights issues should be available from 150 trading days before to 150 trading days after the announcement has been made; and
6. Extreme cases, where bonus ratio is greater than 5:1 or the insignificant issues where the ratio is less than 1:4 are excluded.

After the above considerations, we have included 45 chemical firms, 24 textile firms, 24 IT firms and 18 financial services sector firms which announced bonus issues.

We have also included 16 firms from chemical sector, 10 firms from textile sector, 12 firms from IT sector and 18 firms from financial services sector who announced the rights issue. Thus, the final sample

consists of 111 firms in total which have announced either the bonus or the rights issue announcements.

b. Methodology

This study employs the historical volatility and ARCH / GARCH modeling approaches to analyze the possible shift in volatility.

The standard deviation of the daily abnormal returns as a measure of historical volatility, is considered to be appropriate to capture information asymmetry of a firm, because it is assumed that the market fluctuations are only information shared by the managers of the firm and the market.[1] The daily standard deviations for each stock are calculated over periods of 100 days and 20 days surrounding the bonus issue and rights issue announcement days. Standard deviation of daily stock returns over the 20 day period preceding (t_{-20}, t_{-1}) and following (t_{+1}, t_{+20}) the announcement and 100 days preceding (t_{-100}, t_{-1}) and following (t_{+1}, t_{+100}) have been calculated. The difference between the preannouncement standard deviation and post announcement standard deviation for bonus and rights issue announcements are calculated. The change in standard deviation is captured by:

$$\Delta STDEV = STDEV_{post} - STDEV_{pre} \quad (1)$$

where, $STDEV_{pre}$ captures the volatility before the bonus / rights issue announcement, and $STDEV_{post}$ captures the volatility after the bonus / rights issue announcement.

The ARCH model is presented as:

[1] The uncertainty about industry developments may be included in the volatility changes of a firm, but is likely to be shared by the managers of the firm and by the market.

$$y_t = m_t + \varepsilon_t \qquad (2)$$
$$\varepsilon_t \sim N(0, h_t) \quad \text{and} \quad h_t = \alpha_0 + \alpha_1 \varepsilon^2_{t-1}$$

Here ε^2_{t-1} is the lagged squared error term. h_t is the current value of the variance of the errors that depend upon previous squared error terms.

The GARCH (1, 1) model is specified as:

$$y_t = m_t + \varepsilon_r$$
$$\varepsilon_t \sim N(0, h_t) \quad \text{and} \quad h_t = \alpha_0 + \alpha_1 \varepsilon^2_{t-1} + \beta_1 h_{t-1} \qquad (3)$$

where h_{t-1} represents previous period variance. In (2) and (3), since h_t is the conditional variance, all parameters are restricted to be non-negative.

In the GARCH model, the sum of coefficients on the lagged squared error and lagged conditional variance is very close to unity. This implies that shocks to the conditional variance will be highly persistent and the presence of quite long memory but being less than unity it is still mean reverting. In other words, although volatility takes a long time, it ultimately returns to the mean level of volatility. It implies that current information has no effect on long run forecast. A large sum of these coefficients will imply that a large positive or a large negative return will lead future forecasts of the variance to be high for a protracted period.

The GARCH (1, 1) model has been found to provide a good description of the variance of daily stock returns. It captures the conditional and unconditional volatility which is important, because the current period volatility can be affected by the previous period volatility, as volatility is time varying. The current period variance is based on the weighted average of the long term average (a constant term), the forecast variance from the last period (the GARCH term), and the information about the volatility observed in the previous period (ARCH

term). This explains volatility clustering, where changes in the stock price volatility is likely to be followed by further large changes. The literature also supports examining time varying volatility in the case of event studies (Bomfin, 2003). The GARCH model has been applied to the pre announcement and post announcement data separately and results are compared for pre-announcement and post-announcement periods.

EMPIRICAL RESULTS

a. Changes in Historical Volatility around Bonus and Rights Issue Announcements

Given the changes in the news arrival process and based on theoretical considerations, the post announcement volatility should be significantly higher for bonus issue / rights issue announcement. Tables A1 and A2 in Appendix show the firm wise changes in the historical volatility before and after the bonus and the rights issue announcements.

A comparison of standard deviations before and after the bonus issue announcement shows that from 59 out of 111 firms, the historical volatility increased for 20 days period. In case of 100 days, historical volatility increased for 63 firms out of 111 firms. The historical volatility increased for 30 and 27 firms respectively around 20 and 100 days of the rights issue announcement (Table 1).

Table 1: Historical Volatility Pattern for Bonus and Rights Issue Announcements

A. Bonus Issue Announcement		
No. of Days	No. of Firms	
	Increase	Decrease
20 Days	59	52
100 Days	63	48
B. Rights Issue Announcement		
	No. of Firms	
	Increase	Decrease
20 Days	30	24
100 Days	27	27

In a nutshell, one can conclude that the historical volatility increased in post bonus and rights issue announcement which is consistent with Kamara and Koski (2000), and Jiang *et al.* (2002). However, the substantial empirical evidence shows that the volatility is not constant but varies over time. Further, there is a tendency for volatility clustering in financial data. Therefore, we examine the time varying volatility around the bonus and the rights issue announcements below.

b. *Changes in Time Varying Volatility around Bonus and Rights Issue Announcement*

The firms are grouped on the basis of presence of significant ARCH / GARCH effect before and after the announcement period in to four categories: Presence of ARCH / GARCH effect *only in the pre-announcement period*, presence of ARCH / GARCH effect in *both pre and post announcement period*, presence of ARCH / GARCH effect *only in post announcement period* and *no ARCH / GARCH effect* either before or after announcement, separately for bonus and rights issue announcements (Table 2). It can be observed that a maximum number

of firms are having significant ARCH and GARCH (1, 1) effect before and after the bonus issue and rights issue announcement periods.

Table 2: Presence of ARCH / GARCH (1, 1) Effect

A. Bonus Issue Announcement all Sectors Combined				
	Before		After	
	ARCH	GARCH (1, 1)	ARCH	GARCH (1, 1)
Before Announcement	14	13	-	-
Before and After	50	59	65	45
After Announcement	-	-	10	9
B. Rights Issue Announcement All Sectors Combined				
Before Announcement	3	5	-	-
Before and After	29	9	27	30
After	-	-	7	7

The change in volatility before and after bonus and rights issue announcements considering all firms together has been examined in terms of ARCH effect, unconditional volatility and persistence of volatility. The significance of change in volatility ARCH effect, unconditional volatility and persistence of volatility before and after the announcement has been tested for statistical significance (Table 3).

Table 3 shows the changes in time varying volatility around the bonus and rights issue announcements. The time varying volatility has been examined in terms of change in unconditional volatility measured as (ARCH 0 / 1 – (ARCH 1 + GARCH 1)), persistence of volatility measured by (ARCH 1 + GARCH 1) and the presence and the significance of ARCH / GARCH before and after the bonus and the rights issue announcements.

The mean changes in ARCH (1) before and after bonus and rights issue announcements have been shown in Table 3. ARCH and GARCH (1, 1) model is estimated for each firm separately in the sample.

In case of Bonus issue announcement there are 111 a firm for which model has been estimated. In the case of Rights issue announcement, ARCH and GARCH (1, 1) model is estimated for 54 firms. The summary of the results is presented in Table 3. The changes in volatility persistence and unconditional volatility have been analyzed using difference in the mean values before and after bonus and rights issue announcements separately.

Volatility persistence explains about nature of volatility, whether current period volatility is driven by past period volatility and to what extent. Persistence of volatility implies that today's volatility due to information arrived today will affect tomorrow's volatility and volatility of days to come. The information efficiency can also be examined through volatility persistence if the past information is affecting the current information. The ARCH effect indicates the effect of any news or new information that has come to the market. Hence, a significant change in ARCH effect indicates the effect of bonus or rights issue announcements in the stock market. The ARCH effect has increased in the post bonus issue announcement period and there is a significant change in ARCH effect before and after bonus issue announcement which is significant at 0.10 level. The results show that the past news in the stock market has an impact on the stock prices today. Volatility persistence and unconditional volatility have increased in the post bonus issue announcement period, indicating that once the stock market experiences volatility, it remains there in the market for some time and gradually fades away.

The increase in volatility after the bonus issue announcement period confirms that the market reacted to the bonus issue announcement and there is increased trading activity among the investors. Information dissemination plays a vital role in improving stock market efficiency.

Table 3 : Change in Volatility Persistence and Unconditional Volatility Before and After the Bonus and Rights Issue Announcements

BONUS ISSUE									
	ARCH 1			Volatility Persistence			Unconditional Volatility		
Mean	Before	After	Difference (Post-Pre)	Before	After	Difference (Post-Pre)	Before	After	Difference (Post-Pre)
	0.1757	0.2499	0.0742*	0.6501	0.7218	0.0717	5.2006	8.3691	3.1685*
RIGHTS ISSUE									
	ARCH 1			Volatility Persistence			Unconditional Volatility		
Mean	Before	After	Difference (Post-Pre)	Before	After	Difference (Post-Pre)	Before	After	Difference (Post-Pre)
	0.2896	0.2448	-0.0448	0.7437	0.7645	0.0208	31.0152	39.3906	8.3754

Note: *, **, *** indicates significance at 10 %, 5% and 1% respectively.

In the case of Rights issue the ARCH effect has decreased post rights issue announcement but it is not significant. Volatility persistence has increased post rights issue announcement period which implies that the effect of increased volatility in the stock prices gradually goes away. A heightened volatility impact affects the stock prices of the firms who intend to issue shares through the allotment of rights issue. Unconditional volatility increased post rights issue announcement but it is not significant.

The reasons behind heightened volatility in the market post rights issue announcements could be attributed to the fact that rights issue is used as a mechanism to raise funds from the current investors' base, as against raising funds from the open market. Investors' assumption that the firm facing problem in financing its needs and hence requiring more funds from the current investor base, affects investors' sentiments and hence there is a heightened volatility in the stock prices.

CONCLUSIONS

This paper sets out to establish whether there were systematic patterns in volatility associated with bonus and rights issue announcement, whether the historic and time varying volatility increased or decreased or remained same, and whether these results resembled the patterns observed around bonus and rights issue announcements around the world. This paper contributes to the literature by examining conditional volatility along with the historical volatility around bonus and rights issue announcements.

According to the results of the study, historical volatility around bonus and rights issue has increased around 20 and 100 days of announcement. According to time varying volatility approach, the maximum number of firms has shown a significant ARCH and GARCH (1, 1) effect before and after the bonus issue and rights issue announcement period.

The ARCH effect has increased in the post bonus issue announcement period which is significant. However the increase in ARCH effect post rights issue announcement is not significant. Unconditional variance has increased post bonus and rights issue announcement period though it is significant only for bonus issue. Hence, one can conclude that the mean change in volatility, volatility persistence and unconditional volatility has increased after the bonus and rights issue announcements.

Volatility persistence is observed to be higher in the post bonus and rights issue announcement periods, which implies that the volatility shock of today influences future volatility and it remains for some more time in the market before it reverts back to the mean level.

The results also suggest that there is a "calm before the storm" effect in the data series, as there is sudden shift in historical volatility

after the bonus issue announcement. This phenomenon describes that the prices fluctuation is less before the announcement but more in post announcement period for the whole sample. Moreover, financial theory provides several explanations for the volatility shift, which include relatively higher number of trades following the announcement. Higher numbers of trades occur as a result of the event announcement having an impact on the investors' sentiments. Market activity increases, which causes price fluctuations and hence the volatility increases. This also implies that the stock market is semi strong form efficient as the news is immediately captured by the investors and hence more activity starts in the market. There is a profit opportunity for the investors as there are fluctuations in the market around announcements.

Financial economists have long considered the effects of releases of financial news on the volatility of asset markets by examining what happens to market volatility on news arrival dates. Several papers in the finance literature have highlighted the weak connection between the volatility of stock prices and identifiable news releases, and a majority of studies in the financial economics literature has been unable to detect a statistically significant relationship between changes in stock prices volatility and news announcements. By assuming that the conditional volatility of stock returns is time invariant or by simply leaving its time-varying nature unspecified, financial economists have failed to consider a potentially significant effect of bonus and rights issue announcement news on the short-run and long run stock price volatility.

The results also suggest that there are leverage effects in the markets, which implies that the investors are not matured and they will be influenced by information (good or bad) very easily. Black (1976) noted that when the stock price drops, the volatility of its returns typically rises. Leverage provides at least a partial explanation: A leveraged firm becomes more leveraged when the value of its equity drops. Moreover, the trading and non trading days affect volatility (Fama

(1965)). The volatility on specific week days, for example on Mondays than on other days of the week, presumably because the movement of stock prices on Monday reflects information arriving after 72 hour period, while on most other trading days, price movements reflect information arriving over a 24 hour period.

From the investors' perspective, the time varying nature of volatility indicates that stock prices fluctuate as a result of bonus / right issue announcements. The investors can anticipate the same and design their investment strategies accordingly.

From the firm's perspective, the study highlights that firms can use bonus and rights issue announcements as a signaling device. Firms anticipate an increase in volatility after the announcements. The news in the market is captured in the stock prices immediately and hence, the firms should release the news carefully after observing the market sentiment. The expected increase in volatility should be considered by the firms before leaking out any significant financial information about the firm in the market. Signaling theory holds true in the case of Indian stock market.

This paper contributes to the evolving debate in the literature on market volatility in the periods surrounding public announcements. The findings reported in this paper raised important questions for future work. In particular, in analyzing the market's response to other seasoned capital issue announcements, such as equity issues, bond issues and global issues, a potentially interesting issue is whether the corresponding impulse response functions for volatility are significantly different for various issues. Other issues that also merit further consideration include a closer look at the relationship between volatility and liquidity around seasoned capital issue announcements. The finding of highly significant post announcement volatility effect in the stock market post bonus and

right issue announcement suggests a topic that deserves closer consideration by the market microstructure literature.

Our results do not support findings of Li and Engle (1998), Connoly and Stivers (2005), Boyd et al. (2005) and Medeiros and Matsumoto (2005), who report decrease in volatility following respective event announcements. The result of this study, extendable to any other type of seasoned capital issue announcement, is consistent with theories stating that volatility increases after the seasoned capital issue announcements.

REFERENCES

Aggarwal, R., Inclan, C., and Leal, R. (1999) 'Volatility in emerging stock markets', *Journal of Financial and Quantitative Analysis,* Vol. 34, pp. 213-224.

Baillie, R. T., and DeGennaro, R. P. (1990) 'Stock returns and volatility', *The Journal of Financial and Quantitative Analysis*, Vol. 25, pp. 203-214.

Baiman, S. and. Verrecchia, R. E. (1996) 'The relation among capital markets, financial disclosure, production efficiency, and insider trading', *Journal of Accounting Research*, Vol. 34, pp. 1-22.

Bauwens, L., W. B. Omrane, and P. Giot (2005) News announcements, market activity and volatility in the euro/dollar foreign exchange market. *Journal of International Money and Finance,* 24, 1108-1125.

Black, F. (1976) Studies of Stock Market Volatility Changes, *1976 Proceedings of the American Statistical Association, Business and Economics Statistics Section,* pp. 177-181.

Bohl, M., and H. Henke (2003) Trading volume and stock market volatility: The Polish case. *International Review of Financial Analysis*, 153, 1-13.

Bomfin, A. N. (2003) Pre-announcement effects, news effects, and volatility: monetary policy and the stock market. *Journal of Banking and Finance, 27*, 133 – 151.

Boyd, J. H., Jagannathan, R. and Hu, J. (2005) 'The stock market's reaction to unemployment news: why bad news is usually good for stocks', *Journal of Finance, Vol.* 60, pp. 649-672.

Bredin, C., Gavin, C. and Reilly, G. O. (2005) 'US monetary policy announcements and Irish stock market volatility', *Applied Financial Economics, Vol.* 15 (17), pp. 1243-1250.

Brooks, J., and Graham. E. (2005) 'Equity private placements, liquid assets, and firm value', *Journal of Economics and Finance*, Vol. 29(3), pp. 321-336.

Brown, S., and Warner, J. (1985) 'Using daily stock returns: The case of event studies', *Journal of Financial Economics*, Vol. 14, pp. 3-31.

Connolly, R., and Stivers, C. (2005) 'Macroeconomic news, stock turnover and volatility clustering in daily stock returns', *The Journal of Financial Research*, Vol. 28 (2), pp. 235-259.

Dierkens, N. (1991) 'Information asymmetry and equity issues', *Journal of Financial and Quantitative Analysis*, Vol. 26, pp. 181–198.

Fama, E. F. (1965) 'The behavior of stock market prices', *Journal of Business*, Vol. 38, pp. 34-105.

Flannery, M. J., and Protopapadakis, A. A. (2002) 'Macroeconomic factors do influence aggregate stock returns', *The Review of Financial Studies*, Vol. 15 (3), pp. 751-782.

Goyal, R. (1995) 'Volatility in stock market returns', *Reserve Bank of India Occasional Papers*, Vol. 16(3), pp. 175-195.

Jiang, C. X., Kim, J. C., and Wood, R. A. (2002) 'The change in trading activity on volatility and adverse selection component: evidence from ADR splits', *Journal of Multinational Financial Management,* Vol. 12(4-5), pp. 323-345.

Jones, C. M., Lamont, O. and Lumsdaine, R. L. (1998) 'Macroeconomic news and bond market volatility', *Journal of Financial Economics*, Vol. 47(3), pp. 315-337.

Kamara, A., and Koski, J. (2000) 'Volatility, autocorrelations, and trading activity after stock splits', *Journal of Financial Markets,* Vol. 4(2), pp. 163-184.

Kim, O., and Verrecchia, R. (1991) 'Market reaction to anticipated announcements', *Journal of Financial Economics*, Vol. 30, pp. 272–309.

Kothare, M. (1997) 'The effects of equity issues on ownership structure and stock liquidity: A comparison of rights and public offerings'*, Journal of Financial Economics*, Vol. 43 (1), pp. 131-148.

Kutan, A. M., and Zhou, H. (2006) 'Determinants of returns and volatility of Chinese ADRs at NYSE', *Journal of Multinational Financial Management*, Vol. 16, pp. 1-15.

Lee, C. W., and Chang, M. J. (2011) 'Announcement Effects and Asymmetric Volatility in Industry Stock Returns: Evidence from Taiwan', *Emerging Markets Finance and Trade,* Volume 47, Number 2. pp. 48-61.

Leuz, C., and Verrecchia, E. (2000) 'The economic consequences of increased disclosure', *Journal of Accounting Research*, Vol. 38, pp. 91-124.

Li L. and Engle, R. (1998) 'Macroeconomic announcements and volatility of treasury futures', *Discussion Paper,* University of California, San Diego.

Lukose, P. J. J., and Rao, S. N. (2003) 'Operating performance of the firms issuing equity through rights offer', *Vikalpa,* Vol. 28 (4), pp. 25-40.

Marisetty, V. B., and Alayur, V. (2002) 'Assymmetry in Indian stock returns An empirical investgation', *The ICFAI Journal of Applied Finance*, Vol. 8, pp. 3-14.

Marsden, A. (2000) 'Shareholder wealth effects of rights issues: evidence from the New Zealand capital market', *Pacific- Basin Finance Journal*, Vol. 8, pp. 419–442.

Masulis, R. W. (1983) 'The impact of capital structure change on firm value: Some estimates', *The Journal of Finance*, Vol. 38, pp. 107-128.

Medeiros, O. R. D., and Matsumoto, A. S. (2006) 'Market reaction to stock issues in Brazil: Insider trading, volatility effects and the new issues puzzle', *Investment Management and Financial Innovations,* Vol. 1, pp. 23-45.

Mohammed, R. Suleiman, and Yadav, P. K. (2002) 'Quality of information and volatility around earnings announcements', EFA 2002 Berlin Meetings Presented Paper. Available at http://ssrn.com/abstract=302934.

Myers, Stewart C. and Majluf, Nicholas S. (1984) 'Corporate Financing and Investment Decisions When Firms Have Information that Investors Do Not Have', *NBER Working Paper Series,* Vol. w1396. Available at SSRN: http://ssrn.com/abstract=274547.

Piotroski J. D. (2000) 'Value investing: The use of historical financial statement information to separate winners from losers', *Journal of Accounting Research*, Vol. 38, pp. 21-243.

Roy, M. K. and Karmakar, M. (1995) 'Stock market volatility: Roots and results', *Vikalpa*, Vol. 20 (1), pp. 37-48.

Schwert, W G. (1989) 'Why does stock market volatility change over time', *Journal of Finance*, Vol. 44(5), pp. 1115- 1151.

Steve, J., and Robert, S. (2011) 'News and noise: do investors react to stock split announcements differently during periods of high and low market volatility?', *Journal of Economics and Finance*, Volume 35, Number 1, pp. 71-78(8).

Tan, R. S. K., Chng, P. L. and Tong, Y. H. (2002) 'Private placements and rights issues in Singapore', *Pacific-Basin Finance Journal*, Vol. 10(1), pp. 29-54.

Thenmozhi M. and Thomas, M. S. (2004) 'Impact of index derivatives on S&P CNX Nifty volatility: Information efficiency and expiration effects', The ICFAI Journal of Applied Finance*, Vol. 10 (9), pp. 36-55.*

Thenmozhi, M. (2002) 'Futures trading, information and spot price volatility of NSE-50 index futures contract', *NSE Research Initiative,* Paper no. 18.

Thenmozhi, M., Malhotra, M. and Arun Kumar, G. (2007) 'Announcement Effect of Rights Issue on Stock Returns: A study of selected Indian Manufacturing Companies', *Journal of Services Research.* Vol. 7(1), pp. 215-231.

Tsangarakis, N.V. (1996) 'Shareholder wealth effects of equity issues in emerging markets: evidence from rights offerings in Greece', *Financial Management.* Vol. 25, pp. 21–32.

Woodruff, C. S., and. Senchack, A. J. (1988) 'Intradaily price-volume adjustments of NYSE stocks to unexpected earnings', *The Journal of Finance*, Vol. 43, pp. 467-491.

APPENDIX

TABLE A1

Historical Volatility Changes Before and After Bonus Issue Announcement: Firm Wise Details

S. No.	Company Name	Industry	Std Dev. -20	Std. Dev +20	Changes After - Before	Std. Dev -100	Std. Dev +100	Changes After - Before
1	Aarti Industries Ltd.	CHEM	2.500	3.100	0.500	2.900	2.300	-0.700
2	Alembic Ltd.	CHEM	4.500	5.600	1.100	2.900	4.000	1.200
3	Anuh Pharma Ltd.	CHEM	3.100	4.700	1.600	3.100	3.400	0.300
4	Arvind Remedies Ltd.	CHEM	3.200	2.200	-1.000	2.700	5.200	2.600
5	Asian Paints Ltd.	CHEM	3.000	0.900	-2.100	1.700	1.200	-0.500
6	AVT Natural Products	CHEM	3.300	2.100	-1.100	4.600	3.700	-0.900
7	Balkrishna Industries Ltd.	CHEM	2.000	2.700	0.700	2.400	3.400	1.100
8	Berger Paints India Ltd.	CHEM	1.400	1.400	0.100	2.100	1.500	-0.700
9	Bliss G V S Pharma Ltd.	CHEM	2.600	4.000	1.300	5.200	3.400	-1.800
10	Cadila Healthcare Ltd.	CHEM	2.200	1.100	-1.100	2.200	1.600	-0.600
11	Cipla Ltd.	CHEM	2.800	3.000	0.300	2.200	2.300	0.100
12	Cosmo Films Ltd.	CHEM	3.300	1.800	-1.500	2.300	2.800	0.500
13	Dabur India Ltd.	CHEM	2.700	1.900	-0.800	1.800	2.000	0.200
14	Emami Ltd.	CHEM	4.200	4.300	0.100	5.700	4.700	-1.000
15	F D C Ltd.	CHEM	3.700	1.500	-2.200	3.200	2.400	-0.700
16	Glenmark Pharmaceuticals	CHEM	4.300	3.500	-0.800	3.500	2.700	-0.800
17	Grauer & Weil (India) Ltd.	CHEM	3.600	2.600	-1.000	3.500	3.500	0.000
18	Hikal Ltd.	CHEM	4.700	4.000	-0.700	4.200	3.200	-1.000
19	Indian Oil Corpn. Ltd.	CHEM	2.400	2.900	0.400	2.300	2.600	0.300
20	Ipca Laboratories Ltd.	CHEM	1.500	1.000	-0.500	1.700	1.900	0.300
21	Jagsonpal Pharmaceuticals Ltd.	CHEM	5.100	8.900	3.800	3.500	5.300	1.800
22	Jayant Agro-Organics Ltd.	CHEM	3.300	1.600	-1.600	3.400	3.200	-0.200

(contd.. Table A1)

S. No.	Company Name	Industry	Std Dev. - 20	Std. Dev +20	Changes After - Before	Std. Dev - 100	Std. Dev +100	Changes After - Before
23	Jubilant Organosys Ltd.	CHEM	3.100	2.600	-0.500	2.300	2.100	-0.300
24	Kansai Nerolac Paints Ltd.	CHEM	3.300	2.800	-0.500	2.400	1.800	-0.600
25	Lupin Ltd.	CHEM	2.500	2.300	-0.100	2.400	1.800	-0.600
26	Machino Plastics Ltd.	CHEM	4.100	4.800	0.700	6.400	5.000	-1.400
27	Matrix Laboratories Ltd.	CHEM	2.500	5.300	2.800	2.500	3.700	1.200
28	Monsanto India Ltd.	CHEM	2.200	2.500	0.300	2.700	2.400	-0.300
29	National Peroxide Ltd.	CHEM	3.100	3.300	0.200	3.200	3.300	0.100
30	Pondy Oxides & Chemicals Ltd.	CHEM	2.400	1.600	-0.800	4.400	5.300	0.800
31	Procter & Gamble	CHEM	1.700	1.600	-0.200	2.100	1.800	-0.300
32	Promact Plastics Ltd.	CHEM	6.800	3.800	-3.000	8.300	4.200	-4.100
33	Punjab Chemicals	CHEM	2.800	1.900	-0.900	2.900	2.600	-0.300
34	Ranbaxy Laboratories Ltd.	CHEM	2.100	1.400	-0.700	2.000	1.400	-0.600
35	Sadhana Nitro Chem Ltd.	CHEM	4.300	4.300	0.100	6.900	5.200	-1.700
36	Sah Petroleums Ltd.	CHEM	4.000	1.600	-2.400	3.700	2.400	-1.300
37	Savita Chemicals Ltd.	CHEM	2.100	1.400	-0.700	2.600	1.800	-0.800
38	Sun Pharmaceutical Inds. Ltd.	CHEM	2.400	2.700	0.300	2.500	2.500	0.000
39	Supreme Industries Ltd.	CHEM	1.600	1.800	0.200	2.900	2.300	-0.600
40	Suven Life Sciences Ltd.	CHEM	1.900	2.100	0.200	2.900	2.100	-0.800
41	Torrent Pharmaceuticals Ltd.	CHEM	2.400	2.000	-0.400	2.400	3.300	0.900
42	Ultramarine & Pigments Ltd.	CHEM	3.300	3.500	0.100	2.900	2.400	-0.500
43	Unichem Laboratories Ltd.	CHEM	4.300	2.200	-2.100	2.800	3.200	0.300
44	Xpro India Ltd.	CHEM	4.100	3.900	-0.300	3.300	3.400	0.200
45	Zandu Pharmaceutical Works Ltd.	CHEM	2.900	1.500	-1.400	2.800	1.500	-1.300
46	Aeonian Investments Co. Ltd.	FINA	6.100	1.300	-4.700	30.200	1.600	-28.600

(contd.. Table A1)

S. No.	Company Name	Industry	Std Dev. -20	Std. Dev +20	Changes After - Before	Std. Dev -100	Std. Dev +100	Changes After - Before
47	Apollo Sindhoori	FINA	5.200	4.600	-0.600	3.000	7.800	4.700
48	Federal Bank Ltd.	FINA	1.600	1.700	0.100	2.800	10.900	8.100
49	Fortune Financial Services	FINA	2.300	14.700	12.400	5.500	7.700	2.200
50	Futures Securities Ltd.	FINA	1.500	7.500	5.900	1.700	40.500	38.800
51	Geojit Financial Services Ltd.	FINA	2.800	2.200	-0.700	2.400	3.400	1.000
52	Housing Development Finance	FINA	0.700	0.900	0.100	1.600	7.100	5.600
53	Indo-Pacific Software	FINA	3.100	4.200	1.100	4.700	4.100	-0.600
54	Karnataka Bank Ltd.	FINA	2.300	4.200	1.900	2.600	7.800	5.100
55	Karur Vysya Bank Ltd.	FINA	2.700	2.300	-0.400	1.600	8.200	6.600
56	Kotak Mahindra Bank Ltd.	FINA	2.000	3.200	1.300	2.000	2.700	0.700
57	Maharashtra Overseas Ltd.	FINA	0.300	0.400	0.100	0.400	9.800	9.500
58	Otco International Ltd.	FINA	3.200	4.500	1.300	3.600	6.300	2.800
59	Sharyans Resources Ltd.	FINA	8.700	1.900	-6.700	4.700	2.200	-2.600
60	Tata Investment Corpn. Ltd.	FINA	2.000	2.100	0.000	1.900	2.000	0.100
61	United Breweries	FINA	1.500	15.800	14.300	2.600	7.900	5.300
62	Vyapar Industries Ltd.	FINA	0.300	0.300	0.000	1.900	15.800	13.900
63	Yashraj Securities Ltd.	FINA	3.600	10.800	7.200	1.700	5.500	3.800
64	Aftek Ltd.	IT	0.000	0.000	0.000	0.000	0.000	0.000
65	Core Projects & Technologies Ltd.	IT	0.000	0.000	0.000	0.000	0.000	0.000
66	Geodesic Information Systems Ltd.	IT	0.000	0.000	0.000	0.000	0.000	0.000
67	Geometric Software Solutions Co	IT	0.000	0.000	0.000	0.000	0.000	0.000
68	Helios & Matheson Inf. Tech. Ltd	IT	0.000	0.000	0.000	0.000	0.000	0.000
69	I-Flex Solutions Ltd.	IT	0.100	0.000	-0.100	0.000	0.000	0.000
70	Infosys Technologies Ltd.	IT	0.000	0.000	0.000	0.000	0.000	0.000

(contd.. Table A1)

S. No.	Company Name	Industry	Std Dev. -20	Std. Dev +20	Changes After - Before	Std. Dev -100	Std. Dev +100	Changes After - Before
71	Infotech Enterprises Ltd.	IT	0.000	0.000	0.000	0.000	0.000	0.000
72	Jetking Infotrain Ltd.	IT	0.000	0.000	0.000	0.000	0.000	0.000
73	K L G Systel Ltd.	IT	0.000	0.000	0.000	0.000	0.000	0.000
74	Kaashyap Technologies Ltd.	IT	0.000	0.000	0.000	0.000	0.000	0.000
75	Mastek Ltd.	IT	0.000	0.100	0.100	0.000	0.000	0.000
76	Mphasis Ltd.	IT	0.000	0.000	0.000	0.000	0.000	0.000
77	Netlink Solutions (India) Ltd.	IT	0.000	0.000	0.000	0.000	0.000	0.000
78	Nucleus Software Exports Ltd.	IT	0.000	0.000	0.000	0.000	0.000	0.000
79	Ontrack Systems Ltd.	IT	0.000	0.000	0.000	0.000	0.100	0.100
80	Onward Technologies Ltd.	IT	0.000	0.000	0.000	0.000	0.000	0.000
81	Pentasoft Technologies Ltd.	IT	0.000	0.000	0.000	0.000	0.000	0.000
82	Polaris Software Lab Ltd.	IT	0.000	0.000	0.000	0.000	0.000	0.000
83	Satyam Computer Services Ltd.	IT	0.000	0.000	0.000	0.000	0.000	0.000
84	Subex Azure Ltd.	IT	0.000	0.000	0.000	0.000	0.000	0.000
85	T Spiritual World Ltd.	IT	0.000	0.000	0.000	0.000	0.000	0.000
86	Tata Consultancy Services Ltd.	IT	0.000	0.000	0.000	0.000	0.000	0.000
87	Wipro Ltd.	IT	0.000	0.100	0.100	0.000	0.000	0.000
88	Alps Industries Ltd.	TEXT	4.100	4.100	0.100	3.500	3.200	-0.300
89	Amit International Ltd.	TEXT	3.400	1.300	-2.100	4.000	4.600	0.600
90	Banswara Syntex Ltd.	TEXT	3.100	3.000	-0.100	4.200	2.600	-1.500
91	Cheviot Co. Ltd.	TEXT	4.400	1.400	-2.900	3.500	2.400	-1.100
92	Donear Industries Ltd.	TEXT	1.400	5.300	3.900	2.800	3.100	0.300
93	Faze Three Ltd.	TEXT	2.700	2.000	-0.700	4.600	4.100	-0.500
94	Gangotri Textiles Ltd.	TEXT	2.800	3.400	0.600	3.500	2.600	-0.900
95	Gravity (India) Ltd.	TEXT	5.700	5.500	-0.300	6.300	4.400	-1.900
96	Gupta Synthetics Ltd.	TEXT	2.900	3.700	0.800	4.400	4.000	-0.300

(contd.. Table A1)

S. No.	Company Name	Industry	Std Dev. -20	Std. Dev +20	Changes After - Before	Std. Dev -100	Std. Dev +100	Changes After - Before
97	Haria Exports Ltd.	TEXT	4.100	5.200	1.100	4.300	4.700	0.400
98	Himatsingka Seide Ltd.	TEXT	1.100	2.100	1.100	2.700	1.400	-1.300
99	Jaybharat Textiles & Real Estate	TEXT	0.200	1.500	1.300	0.300	2.200	1.900
100	Jindal Worldwide Ltd.	TEXT	2.600	4.200	1.600	4.000	3.800	-0.200
101	K S L Realty & Infrastructure Ltd.	TEXT	2.800	3.200	0.400	2.900	3.300	0.400
102	Maharaja Shree Umaid Mills Ltd.	TEXT	5.800	1.100	-4.700	4.400	2.600	-1.700
103	Marathon Nextgen Realty	TEXT	0.100	1.500	1.400	1.000	1.400	0.500
104	Nova Petrochemicals Ltd.	TEXT	2.300	2.300	0.000	2.900	3.500	0.600
105	Pioneer Embroideries Ltd.	TEXT	4.200	5.700	1.500	3.500	3.500	0.000
106	Siyaram Silk Mills Ltd.	TEXT	2.600	3.600	1.100	3.300	3.300	0.000
107	Sumeet Industries Ltd.	TEXT	2.200	2.100	-0.100	6.200	4.100	-2.100
108	Suryalakshmi Cotton Mills Ltd.	TEXT	3.900	3.800	-0.100	9.000	2.700	-6.300
109	Suryalata Spinning Mills Ltd.	TEXT	2.600	2.900	0.300	3.200	2.200	-1.100
110	Vijay Textiles Ltd.	TEXT	4.100	6.300	2.200	3.900	3.900	0.000
111	Zodiac Clothing Co. Ltd.	TEXT	3.800	2.100	-1.600	2.900	2.700	-0.200

TABLE A2

Historical Volatility Changes Before and After Rights Issue Announcement: Firm Wise Details

S. No.	Company Name	Industry	Std. Deviation (-20 days)	Std. Deviation (+20 days)	After - Before	Std. Deviation (-100)	Std. Deviation (+100)	After - Before
1	Alembic Ltd.	CHEM	4.000	2.900	-1.100	4.700	5.800	1.100
2	Borax Morarji Ltd.	CHEM	10.000	7.800	-2.300	10.900	8.800	-2.100
3	Ceat Ltd.	CHEM	4.000	2.800	-1.200	3.100	3.300	0.200
4	Deepak Nitrite Ltd.	CHEM	2.800	2.500	-0.200	4.100	3.300	-0.800
5	Dharamsi Morarji Chemical Co. Ltd.	CHEM	14.700	13.000	-1.700	13.500	10.500	-3.000
6	Goa Carbon Ltd.	CHEM	3.500	3.600	0.000	3.100	5.100	2.000
7	Gujarat Alkalies & Chemicals Ltd.	CHEM	4.600	8.200	3.700	5.200	6.300	1.200
8	Hester Pharmaceuticals Ltd.	CHEM	6.200	8.500	2.300	4.300	4.900	0.700
9	Kopran Ltd.	CHEM	7.300	4.200	-3.100	7.400	5.100	-2.300
10	Micro Inks Ltd.	CHEM	2.600	5.100	2.600	2.900	5.100	2.200
11	Navin Fluorine Intl. Ltd.	CHEM	7.300	12.600	5.300	10.700	11.900	1.200
12	Nicholas Piramal India Ltd.	CHEM	2.500	2.600	0.000	3.300	2.800	-0.500
13	Pondy Oxides & Chemicals Ltd.	CHEM	12.000	4.400	-7.700	8.100	5.000	-3.100
14	S I Group-India Ltd.	CHEM	5.800	3.000	-2.800	5.300	4.200	-1.200
15	Sunshield Chemicals Ltd.	CHEM	3.900	4.700	0.800	4.300	5.300	1.000
16	Uniproducts (India) Ltd.	CHEM	6.200	2.800	-3.400	5.200	9.300	4.100
17	Bajaj Auto Finance Ltd.	FIN	2.500	3.500	1.000	4.300	3.500	-0.800
18	Centurion Bank Of Punjab Ltd.	FIN	4.400	7.200	2.900	10.200	5.600	-4.600
19	Cholamandalam D B S Finance Ltd.	FIN	3.100	5.200	2.100	2.400	4.200	1.800
20	Comfort Intech Ltd.	FIN	5.400	7.000	1.600	4.500	5.800	1.300
21	Dewan Housing Finance Corpn. Ltd.	FIN	5.100	1.400	-3.700	3.500	2.900	-0.700
22	Dhanalakshmi Bank Ltd.	FIN	3.000	7.300	4.300	3.400	4.800	1.400

(contd.. Table A2)

S. No.	Company Name	Industry	Std. Deviation (-20 days)	Std. Deviation (+20 days)	After - Before	Std. Deviation (-100)	Std. Deviation (+100)	After - Before
23	G I C Housing Finance Ltd.	FIN	2.300	2.300	0.000	3.400	2.800	-0.700
24	Gruh Finance Ltd.	FIN	2.500	4.200	1.700	4.500	2.400	-2.100
25	I D B I Bank Ltd. [Merged]	FIN	3.200	8.100	4.900	3.300	5.500	2.100
26	I N G Vysya Bank Ltd.	FIN	2.100	2.600	0.500	3.700	3.300	-0.300
27	Karnataka Bank Ltd.	FIN	3.600	3.600	0.000	2.700	5.700	3.000
28	Karur Vysya Bank Ltd.	FIN	2.200	2.500	0.300	2.300	2.700	0.400
29	Maharashtra Overseas Ltd.	FIN	0.100	0.100	0.000	1.200	2.800	1.600
30	Shalimar Productions Ltd.	FIN	4.900	5.700	0.800	4.500	5.000	0.500
31	South Indian Bank Ltd.	FIN	6.900	3.700	-3.200	6.400	3.200	-3.200
32	United Western Bank Ltd. [Merged]	FIN	3.700	3.600	-0.100	3.200	4.700	1.500
33	Vama Industries Ltd.	FIN	3.600	5.800	2.200	3.800	5.800	2.000
34	California Software Co. Ltd.	IT	6.700	3.000	-3.800	4.400	5.500	1.100
35	Cybermate Infotek Ltd.	IT	4.100	14.000	9.900	8.600	11.100	2.600
36	I T People (India) Ltd.	IT	3.000	2.400	-0.600	3.900	3.800	0.000
37	Info-Drive Software Ltd.	IT	4.300	4.200	-0.100	4.200	4.000	-0.200
38	Megasoft Ltd.	IT	2.500	0.800	-1.700	5.500	4.700	-0.900
39	Mindteck (India) Ltd.	IT	5.400	4.700	-0.700	7.600	6.900	-0.700
40	Moschip Semiconductor Technology Ltd.	IT	5.800	8.800	3.000	6.400	5.600	-0.800
41	Pentagon Global Solutions Ltd.	IT	8.000	12.700	4.700	9.800	10.500	0.600
42	R S Software (India) Ltd.	IT	3.600	3.700	0.100	8.100	5.500	-2.600
43	Ramco Systems Ltd.	IT	2.900	1.600	-1.300	3.600	3.400	-0.200
44	S Q L Star International Ltd.	IT	9.400	9.400	0.000	8.400	8.900	0.500
45	Teledata Informatics Ltd.	IT	7.600	4.800	-2.800	5.800	5.200	-0.600

(contd.. Table A2)

S. No.	Company Name	Industry	Std. Deviation (-20 days)	Std. Deviation (+20 days)	After - Before	Std. Deviation (-100)	Std. Deviation (+100)	After - Before
46	Arvind Mills Ltd.	TEXT	5.300	2.900	-2.400	4.500	4.200	-0.300
47	Bengal Tea & Fabrics Ltd.	TEXT	4.000	3.400	-0.500	7.100	3.300	-3.800
48	Futura Polyesters	TEXT	5.400	6.000	0.700	5.000	5.700	0.700
49	Krishna Lifestyle Technologies Ltd.	TEXT	4.900	3.500	-1.400	5.400	5.200	-0.100
50	Mohit Industries	TEXT	4.500	5.000	0.500	4.700	5.400	0.700
51	Morarjee Textiles	TEXT	4.200	13.300	9.100	6.900	7.100	0.200
52	Priyadarshini Spinning Mills	TEXT	2.900	3.000	0.100	6.100	4.100	-1.900
53	Sangam (India) Ltd.	TEXT	4.700	5.300	0.500	4.800	5.000	0.200
54	TTK Ltd.	TEXT	2.900	2.100	-0.900	7.000	3.600	-3.500

MSE Monographs

* Monograph 1/2006
  A Tract on Reform of Federal Fiscal Relations in India
  Raja J. Chelliah

* Monograph 2/2006
  Employment and Growth
  C. Rangarajan

* Monograph 3/2006
  The Importance of Being Earnest about Fiscal Responsibility
  C. Rangarajan and Duvvuri Subbarao

* Monograph 4/2007
  The Reserve Bank and The State Governments: Partners in Progress
  Y.V.Reddy

* Monograph 5/2008
  India's Dilemmas: The Political Economy of Policy-Making in a Globalized World
  Kaushik Basu

* Monograph 6/2010 (For limited circulation)
  MDGS-based Poverty Reduction Strategy for Tamil Nadu
  D.K.Srivastava, K.R. Shanmugam and C.Bhujanga Rao

* Monograph 7/2010 (For limited circulation)
  Urban Poverty Alleviation Strategy: A Study of Six Cities
  D.K.Srivastava, C.Bhujanga Rao, Swarna S. Vepa and Brinda Viswanathan

* Monograph 8/2010
  Review of Trends in Fiscal Transfers in India
  D.K.Srivastava and C. Bhujanga Rao

* Monograph 9/2010
  Feasibility of Incentive Based Environmental Instruments in State and Central Taxation Regimes
  D.K.Srivastava and C. Bhujanga Rao

* Monograph 10/2010
  Economic Instruments for Environmental Management: International Best Practices and Applicability to India
  D.K.Srivastava Dr K.S. Kavikumar , and C.Bhujanga Rao
  With inputs from Dr Bodhisattva Sengupta, Dr Brijesh C. Purohit, Ms Asha Mariam Abraham, Ms Ishwarya

MSE Working Papers

Recent Issues

* Working Paper 51/2010
  The Value of Improved Public Services: An Application of the Choice Experiment Method to Estimate the Value of Improved Wastewater Treatment Infrastructure in India
  Ekin Birol and Sukanya Das

* Working Paper 52/2010
  Measuring Accuracy of Projections of Central Taxes by the Finance Commission
  D K Srivastava and C Bhujanga Rao

* Working Paper 53/2010
  Heterogeneous MNC Subsidiaries and Technological Spillovers: Explaining Positive and Negative Effects in India
  Anabel Marin and Subash Sasidharan

* Working Paper 54/2010
  Climate Variability and Agricultural Productivity: Case Study of Rice Yields in Northern India
  Ishwarya Balasubramanian and K.S. Kavi Kumar

* Working Paper 55/2010
  Valuing the Environment in Developing Countries: Modeling the Impact of Distrust in Public Authorities' Ability to Deliver on the Citizens' Willingness to Pay for Improved Environmental Quality
  Ekin Birol and Sukanya Das

* Working Paper 56/2010
  India's Low Carbon Inclusive Growth Strategy
  U. Sankar

* Working Paper 57/2011
  Shifting Preferences at the Fed: Evidence from Rolling Dynamic Multipliers and Impulse Response Analysis
  Matthew Greenwood-Nimmo and Yongcheol Shin

* Working Paper 58/2011
  Household Level Pollution in India: Patterns and Projections
  K.S. Kavi Kumar and Brinda Viswanathan

* Working Paper 59/2011
  Dependence of States on Central Transfers: Aggregate and State-Wise Analysis
  D K Srivastava and C Bhujanga Rao

* Working Paper 60/2011
  Discount Rate for Health Benefits and the Value of Life in India
  K.R. Shanmugam

---

* Working papers are downloadable from MSE website http://www.mse.ac.in
$ Restricted circulation