



EARNINGS ANNOUNCEMENT AND INTRADAY STOCK MARKET EFFICIENCY

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ABSTRACT

Corporate earnings announcement is represented through a range of accounting disclosures. This could be noticed as an over-reaction or under-reaction in stock prices due to deviation from rational expectations. Stock returns on earnings announcement date are found to be conditionally asymmetric in nature and have short run interdependence. Present study deals in investigating the impact of earnings announcement on stock returns and volatility using intraday data on announcement date. Volatility is found to be highly persistent on date of earnings announcement. However, conditional mean is found to be insignificant in most of the cases, except for a few companies. Intraday volatility on earnings announcement date was compared for two periods: pre/post announcement period. Pre-announcement period includes the time from market opening to quarterly result announcement time and post announcement period includes the period till market close for each company. It is found that there is the significant difference in volatility due to apparent over-reaction of information flow. It is assumed that volatility increases more after bad news than after the good ones, termed as Leverage Effect. The results of present analysis corroborates for leverage effect with respect to some companies while it contradicts leverage effect with some other companies.

Key Words: Accounting disclosures; Earnings announcement; Intraday data; *Leverage effect* and Volatility



INTRODUCTION

Information ambiguity concerning future growth of companies is a vital subject matter for financial practitioners worldwide. Corporate earnings announcement is represented through a range of accounting disclosures. This takes structure in the course of income statement, cash flow statement, balance sheet and notes to the overall financial report. The earnings announcement by corporate act as a key indicator of anticipated future performance. Investors usually misperceive the future earnings announcement (up to four quarters in advance) leading to mispricing of asset prices. This could be noticed as an over-reaction or under-reaction in stock prices due to deviation from rational expectations. (Foster et al., 1984; Bernard and Thomas, 1990; Ball and Bartov, 1996; Sloan, 1996).

The response of stock market to earnings surprise has been widely explored in previous literature. It has been observed that companies have significant abnormal returns in a one-to three-day window around earnings announcement (Falk and Levy, 1989; Ball and Kothari 1991). However, available literature lacks in providing intraday stock market efficiency with respect to earnings announcement. Goodhart and Hara (1997) opined that it would be fruitful to explore the concerned phenomenon using high frequency data.

An event study can unveil a precise picture in time to reveal the behavioral as well as role of earnings announcement on the stock prices. Moreover, interpretative role of investor is important for disseminating information (Chen et al., 2009). It has been confirmed by Balakrishnan et al. (2010) that investors' inability to infer earnings information well timed leading to a period of market inefficiency after the announcement release.

There are a many reasons to re-examine the stock market reaction to earnings surprise. Firstly, prior literature lacks in examining informational efficiency on earnings announcement date itself. Secondly, it has been assumed by some researchers that Financial year (F.Y.) 2009-2010 is a post recession recovery period which could likely to have better earnings growth as compared to subsequent years (Stock & Watson (2012). During this period, stock prices tend to be more



volatile based on equilibrium between earnings growth expectations and publically released announcement.

RESEARCH METHODOLOGY

The analysis deals with quarterly earnings announcement for F.Y. 2009-2010. Initially top 100 frequently traded companies have been taken as sample. Announcement date and announcement time have been extracted from official website of Bombay stock exchange (BSE). Out of these 100 companies, only 15 companies have been selected which have made their earnings announcement during the trading periods on trading days. Table 1 depicts the list of these 15 companies with their announcement date and time for a particular quarter in F.Y. 2009 -2010.

Table 1: List of Companies

S No.	Company Name	Symbol	JQ2009-2010	SQ2009-2010	DQ2009-2010	MQ2009-2010	MC2009-2010
1	Bank of Baroda	BANKBARODA	27 Jul 2009 11:43AM	28 Oct 2009 11:29AM	27 Jan 2010 11:46AM	28 Apr 2010 11:57AM	28 Apr 2010 12:02PM
2	Kotak Mahindra Bank Ltd.	KOTAKBANK	28 Jul 2009 11:54AM	27 Oct 2009 01:45PM	21 Jan 2010 01:47PM	11 May 2010 02:44PM	11 May 2010 02:48PM
3	Punjab National Bank	PNB	29 Jul 2009 11:17AM	29 Oct 2009 01:19PM	27 Jan 2010 02:40PM	06 May 2010 02:06PM	06 May 2010 02:09PM
4	I T C Ltd.	ITC	23 Jul 2009 01:57PM	23 Oct 2009 12:17PM	22 Jan 2010 12:45PM	21 May 2010 02:37PM	21 May 2010 02:44PM
5	Bharat Heavy Electricals Ltd.	BHEL	22 Jul 2009 02:13PM	23 Oct 2009 01:13PM	21 Jan 2010 01:33PM	26 May 2010 12:34PM	26 May 2010 12:38PM
6	Aditya Birla Nuvo Ltd.	ABIRLANUVO	29 Jul 2009 01:44PM	30 Oct 2009 01:59PM	29 Jan 2010 02:13PM	07 May 2010 02:00PM	07 May 2010 02:03PM
7	Bank of India	BANKINDIA	27 Jul 2009 01:07PM	29 Oct 2009 01:41PM	28 Jan 2010 01:54PM	07 May 2010 01:16PM	07 May 2010 01:21PM
8	Canara Bank	CANBK	22 Jul 2009 12:50PM	26 Oct 2009 12:54PM	28 Jan 2010 12:22PM	28 Apr 2010 12:27PM	28 Apr 2010 12:32PM



9	IDBI Bank Ltd.	IDBI	15 Jul 2009 01:42PM	26 Oct 2009 01:44PM	15 Jan 2010 01:32PM	30 Apr 2010 03:07PM	30 Apr 2010 03:11PM
10	JSW Steel Ltd.	JSWSTEEL	20 Jul 2009 11:37AM	23 Oct 2009 03:02PM	20 Jan 2010 03:00PM	03 May 2010 03:16PM	03 May 2010 03:19PM
11	Shriram Transport Finance Co. Ltd.	SRTRANSFIN	24 Jul 2009 01:49PM	28 Oct 2009 12:24PM	18 Jan 2010 01:14PM	29 Apr 2010 01:32PM	29 Apr 2010 01:37PM
12	Steel Authority of India Ltd.	SAIL	30 Jul 2009 02:24PM	30 Oct 2009 02:18PM	27 Jan 2010 01:25PM	28 May 2010 02:06PM	28 May 2010 02:12PM
13	Tata Chemicals Ltd.	TATACHEM	30 Jul 2009 01:39PM	29 Oct 2009 01:44PM	29 Jan 2010 01:38PM	24 May 2010 03:08PM	24 May 2010 03:08PM
14	Union Bank of India	UNIONBANK	23 Jul 2009 11:52AM	26 Oct 2009 11:37AM	27 Jan 2010 01:42PM	06 May 2010 12:52PM	06 May 2010 12:56PM
15	Yes Bank Ltd.	YESBANK	21 Jul 2009 01:45PM	21 Oct 2009 12:37PM	20 Jan 2010 11:04AM	27 Apr 2010 12:44PM	27 Apr 2010 12:49PM

High frequency data for Capital market segment has been purchased from DotEx International Limited, a 100% subsidiary of National Stock Exchange (NSE), which is a professional set-up for the data and info-vending products of NSE. Data for above-mentioned companies is extracted at one minute interval. Tsay and Yeh (2011) said that market microstructure is better examined when the observed time interval of asset prices is smaller.

DESCRIPTIVE STATISTICS OF COMPANIES RETURN ON THE EARNINGS ANNOUNCEMENT DATE

Descriptive statistics for the log returns of each company under this section include the mean, standard deviation, minimum, maximum, range, skewness, kurtosis and Augmented Dickey Fuller statistics. Table 2 represents all descriptive statistics for shortlisted 15 companies for this study.



**Table 2: Descriptive Statistics of 15 Companies Return on the Earnings Announcement
Date**

Company Name	Quarter Results	Mean	Median	Maximum	Minimum	Std. Dev.	Skewness	Kurtosis	Jarque-Bera	ADF statistics
Bank of Baroda	1st Quarter	-5.95E-06	0.000	0.008952	-0.01978	0.001970	-2.74407	32.2834	13203.6(0.000)*	-16.45666 (0.000)*
	2nd Quarter	-3.89E-06	0.000	0.017399	-0.01435	0.00255	0.39962	11.7310	1149.85(0.000)*	-18.523 (0.000)*
	3rd Quarter	3.09E-05	0.000	0.03742	-0.00724	0.002274	10.5292	176.479	531879.5(0.000)*	-32.891 (0.000)*
	4th Quarter/ Cumulative Annual results	9.23E-05	0.000	0.013694	-0.00421	0.001323	2.56473	29.6101	12760.4(0.000)*	-22.506 (0.000)*
Kotak Mahindra Bank Ltd.	1st Quarter	-4.92E-05	0.000	0.008972	-0.01606	0.001994	-1.54375	16.3720	2911.47(0.000)*	-13.101 (0.000)*
	2nd Quarter	-2.76E-05	0.000	0.010617	-0.00889	0.001687	0.120145	10.2529	794.343(0.000)*	-19.926 (0.000)*
	3rd Quarter	-7.75E-05	0.000	0.004156	-0.00946	0.001253	-1.65348	15.6705	2972.288(0.000)*	-17.265 (0.000)*
	4th Quarter/ Cumulative Annual results	-5.95E-05	0.000	0.008472	-0.00663	0.001436	0.34348	10.9543	1102.23(0.000)*	-22.330 (0.000)*
Punjab	1st Quarter	8.84E-05	0	0.007657	-0.00722	0.001749	0.493261	5.93001	141.780	-17.966



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National Bank									(0.000)*	(0.000)*
	2nd Quarter	-1.49E-05	0.000	0.007745	-0.00814	0.001413	0.076409	10.6360	(0.000)*	(0.000)*
	3rd Quarter	-8.08E-05	0.000	0.008659	-0.00739	0.001497	0.054347	9.14973	(0.000)*	(0.000)*
	4th Quarter/ Cumulative Annual results	-2.51E-06	0.000	0.004323	-0.00611	0.001059	-0.70217	8.6347	588.747 (0.000)*	-19.243 (0.000)*
ITC Limited	1st Quarter	0.000133	0.000	0.007878	-0.00446	0.001602	0.74558	5.49455	117.897 (0.000)*	-18.113 (0.000)*
	2nd Quarter	0.000105	0.000	0.007639	-0.00591	0.001196	0.748816	10.4172	799.239 (0.000)*	-20.916 (0.000)*
	3rd Quarter	5.46E-05	0.000	0.007577	-0.00635	0.001634	0.284801	6.63624	220.133 (0.000)*	-23.139 (0.000)*
	4th Quarter/ Cumulative Annual results	1.07E-04	0.000	0.012207	-0.00654	0.001589	1.388861	13.8443	2036.39 (0.000)*	-18.611 (0.000)*
Bharat Heavy Electricals Ltd.	1st Quarter	-1.46E-04	-6.43E-05	0.005881	-0.006	0.001511	-0.24323	5.49293	90.0502 (0.000)*	-19.269 (0.000)*
	2nd Quarter	-6.49E-05	0.00E+00	0.007571	-0.00567	0.001128	0.044561	12.3110	1210.23 (0.000)*	-18.151 (0.000)*
	3rd Quarter	-1.10E-04	0.00E+00	0.003747	-0.00623	0.001057	-0.9183	7.82288	432.79 (0.000)*	-18.241 (0.000)*



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	4th Quarter/ Cumulative Annual results	-1.72E-05	-4.38E-06	0.009078	-0.00363	0.001009	1.744497	20.3970	5115.9 (0.000)*	-13.422 (0.000)*
Aditya Birla Nuvo Ltd.	1st Quarter	-1.24E-04	0.00E+00	0.009968	-0.00728	0.001963	0.256567	6.12664	140.1305 (0.000)*	-20.259 (0.000)*
	2nd Quarter	-1.89E-04	0.00E+00	0.008033	-0.01123	0.002668	-0.40713	5.42132	91.0898 (0.000)*	-18.406 (0.000)*
	3rd Quarter	8.20E-05	0.00E+00	0.010368	-0.00844	0.002131	0.611991	6.77144	255.481 (0.000)*	-21.100 (0.000)*
	4th Quarter/ Cumulative Annual results	7.16E-05	0.00E+00	0.01775	-0.02687	0.00255	-1.48098	42.6134	25642.4 (0.000)*	-28.688 (0.000)*
Bank of India	1st Quarter	-1.44E-04	0.00E+00	0.014177	-0.01687	0.002319	-1.45999	20.4976	4392.61 (0.000)*	-18.291 (0.000)*
	2nd Quarter	-3.51E-04	-1.27E-04	0.008374	-0.01792	0.002583	-2.53531	18.6248	3766.59 (0.000)*	-14.714 (0.000)*
	3rd Quarter	1.77E-05	0.00E+00	0.009178	-0.0124	0.002148	-0.61783	10.0786	839.042 (0.000)*	-17.332 (0.000)*
	4th Quarter/ Cumulative Annual results	-9.90E-05	-2.84E-05	0.010516	-0.00737	0.001751	0.675206	9.63770	745.594 (0.000)*	-19.856 (0.000)*
Canara Bank	1st Quarter	-2.65E-04	0.000	0.012274	-0.05087	0.003571	-8.53785	122.496	203386. (0.000)*	-12.304 (0.000)*



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	2nd Quarter	-1.38E-04	0.000	0.006545	-0.00742	0.001693	-0.09664	5.90802	118.561 (0.000)*	-15.994 (0.000)*
	3rd Quarter	-3.06E-05	0.000	0.007147	-0.01117	0.00192	-0.98405	8.74355	599.004 (0.000)*	-20.588 (0.000)*
	4th Quarter/ Cumulative Annual results	-2.03E-05	0.000	0.006167	-0.01146	0.001411	-2.17173	22.2072	6301.47 (0.000)*	-15.208 (0.000)*
IDBI Bank Ltd.	1st Quarter	9.26E-05	0.00E+ 00	0.016157	-0.01391	0.00275	0.916685	13.7012	1645.37 (0.000)*	-9.172 (0.000)*
	2nd Quarter	9.76E-05	0.00E+ 00	0.016304	-0.00865	0.002107	2.232864	18.3570	3570.30 (0.000)*	-20.316 (0.000)*
	3rd Quarter	-3.86E-07	0.00E+ 00	0.003335	-0.00326	0.000946	0.312665	4.38943	37.725 (0.000)*	-22.314 (0.000)*
	4th Quarter/ Cumulative Annual results	6.68E-05	0.00E+ 00	0.011502	-0.00735	0.001411	2.154306	20.8691	5490.37 (0.000)*	-18.242 (0.000)*
JSW Steel Ltd.	1st Quarter	-1.21E-05	0.00E+ 00	0.009455	-0.01324	0.002169	-0.69639	11.1045	943.913 (0.000)*	-20.701 (0.000)*
	2nd Quarter	-8.05E-05	-1.66E- 04	0.013899	-0.00866	0.002183	1.161915	11.5252	1089.87 (0.000)*	-19.087 (0.000)*
	3rd Quarter	-6.99E-06	0.000	0.013525	-0.00658	0.001485	2.009871	24.8066	7989.95 (0.000)*	-21.709 (0.000)*



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	4th Quarter/ Cumulative Annual results	6.28E-06	0.000	0.006085	-0.00784	0.00111	-0.27549	12.2758	1403.11 (0.000)*	-19.248 (0.000)*
Shriram Transport Finance Co. Ltd.	1st Quarter	-1.66E-04	0.000	0.01422	-0.01643	0.002537	-0.68242	15.9574	2369.54 (0.000)*	-18.786 (0.000)*
	2nd Quarter	2.25E-20	0.000	0.006349	-0.0128	0.002088	-1.25673	11.86085	1078.075 (0.000)*	-11.404 (0.000)*
	3rd Quarter	3.94E-05	0.000	0.012433	-0.01234	0.00182	0.075779	19.10315	4127.737 (0.000)*	-14.314 (0.000)*
	4th Quarter/ Cumulative Annual results	-4.55E-05	0.000	0.016349	-0.00946	0.001655	2.086664	32.35896	13813.37 (0.000)*	-14.061 (0.000)*
Steel Authority of India Ltd.	1st Quarter	1.39E-04	2.28E-04	0.00697	-0.0066	0.001818	-0.02317	4.52868	32.6489 (0.000)*	-17.454 (0.000)*
	2nd Quarter	-8.64E-05	0.000	0.016047	-0.02086	0.00276	-1.89584	21.8334	5151.67 (0.000)*	-16.156 (0.000)*
	3rd Quarter	-9.77E-05	-9.17E-05	0.008313	-0.01556	0.001781	-1.09189	19.2933	4391.41 (0.000)*	-22.714 (0.000)*
	4th Quarter/ Cumulative Annual results	1.90E-05	0.000	0.007021	-0.00908	0.00128	0.177435	15.0841	2374.98 (0.000)*	-18.293 (0.000)*
Tata Chemicals	1st Quarter	-2.14E-05	0.000	0.004794	-0.0114	0.001775	-1.49431	10.9940	1016.67 (0.000)*	-21.959 (0.000)*



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Is Ltd.	2nd Quarter	-1.74E-04	0.000	0.007836	-0.01053	0.00194	-1.03726	9.30532	615.014 (0.000)*	-19.277 (0.000)*
	3rd Quarter	1.36E-04	0.000	0.010361	-0.01067	0.00223	-0.12255	6.21240	168.668 (0.000)*	-21.236 (0.000)*
	4th Quarter/ Cumulative Annual results	-1.76E-04	0.000	0.005266	-0.01399	0.00162	-2.73563	22.8168	6867.91 (0.000)*	-11.358 (0.000)*
	1st Quarter	-1.88E-04	0.000	0.009122	-0.0108	0.002104	-1.02598	8.67699	508.625 (0.000)*	-18.897 (0.000)*
Union Bank of India	2nd Quarter	-1.86E-04	0.000	0.007349	-0.01119	0.002121	-1.15453	8.98796	574.907 (0.000)*	-21.496 (0.000)*
	3rd Quarter	-9.86E-07	0.000	0.01461	-0.0096	0.002025	0.885309	14.3246	2134.96 (0.000)*	-22.105 (0.000)*
	4th Quarter/ Cumulative Annual results	-7.10E-05	0.000	0.008243	-0.00778	0.001573	0.142588	8.41203	477.286 (0.000)*	-18.578 (0.000)*
	1st Quarter	-4.17E-05	0.00E+00	0.009375	-0.01167	0.002369	-0.20357	6.75523	199.150 (0.000)*	-18.912 (0.000)*
Yes Bank	2nd Quarter	-1.66E-04	-8.14E-05	0.005351	-0.01295	0.001831	-1.61114	12.5778	1425.38 (0.000)*	-18.912 (0.000)*
	3rd Quarter	-1.35E-04	0.00E+00	0.004081	-0.00601	0.001209	-0.92044	6.70145	277.705 (0.000)*	-20.432 (0.000)*
	4th Quarter/ Cumulative Annual	-7.57E-05	0.00E+00	0.00606	-0.0057	0.001061	-0.50543	11.2024	1109.90 (0.000)*	-18.073 (0.000)*
	1st Quarter	-1.74E-04	0.000	0.007836	-0.01053	0.00194	-1.03726	9.30532	615.014 (0.000)*	-19.277 (0.000)*



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Mean, Maximum and Minimum return on the announcement date represents part of descriptive statistics. Mean returns on announcement date is near to zero for all quarters for all companies on the announcement date. However, Maximum and Minimum returns define the extreme nature of stock market returns and asymptotic nature of stock returns. (Longin, 1996). The following represents the Mean, Maximum and Minimum return for each company.

For *Bank of Baroda*, mean returns near to zero, but bit negative for first two quarters and positive for another two quarters. Maximum return is 0.895% and minimum return is -1.19% on the announcement date for the first quarter. However, Maximum return is 1.74% and minimum return is -1.43 % on the announcement date for the second quarter, Maximum return is 3.74% and minimum return is -0.74% on the announcement date for the third quarter, Maximum return is 1.36% and minimum return is -0.42% on the announcement date for the fourth quarter. Further, for *Kotak Mahindra Bank Ltd.*, mean returns near to zero, but bit negative for all quarters. Maximum return is 0.897% and minimum return is -1.60% on the announcement date for the first quarter. However, Maximum return is 1.06% and minimum return is -0.89 % on the announcement date for the second quarter, Maximum return is 0.42% and minimum return is -0.94% on the announcement date for the third quarter, Maximum return is 0.847% and minimum return is -0.663% on the announcement date for the fourth quarter.

For *Punjab National Bank*, mean returns near to zero, but positive for the first quarter a bit negative for the other three quarters. Maximum return is 0.765% and minimum return is -0.722% on the announcement date for the first quarter. However, Maximum return is 0.774% and minimum return is -0.814% on the announcement date for the second quarter, Maximum return is 0.865% and minimum return is -0.739% on the announcement date for the third quarter, Maximum return is 0.432% and minimum return is -0.611% on the announcement date for the fourth quarter. For *I T C Ltd.*, mean returns near to zero for all quarters. Maximum return is 0.787% and minimum return is -0.466% on the announcement date for the first quarter. However, Maximum return is 0.763% and minimum return is -0.591 % on the announcement



date for the second quarter, Maximum return is 0.757% and minimum return is -0.63% on the announcement date for the third quarter, Maximum return is 1.20% and minimum return is -0.654 on the announcement date for the fourth quarter.

For *Bharat Heavy Electricals Ltd.*, mean returns near to zero, but bit negative for all quarters. Maximum return is 0.588% and minimum return is -0.6% on the announcement date for the first quarter. However, Maximum return is 0.751% and minimum return is -0.567% on the announcement date for the second quarter, Maximum return is 0.374% and minimum return is -0.623% on the announcement date for the third quarter, Maximum return is 0.907% and minimum return is -0.363% on the announcement date for the fourth quarter. For *Aditya Birla Nuvo Ltd.*, mean returns near to zero, but bit negative for first and second quarters and positive for last two quarters. Maximum return is 0.998% and minimum return is -0.728% on the announcement date for the first quarter. However, Maximum return is 0.803% and minimum return is -1.12% on the announcement date for the second quarter, Maximum return is 1.03% and minimum return is -0.844% on the announcement date for the third quarter, Maximum return is 1.775% and minimum return is -2.678% on the announcement date for the fourth quarter.

For *Bank of India*, mean returns near to zero, but bit negative for first and second quarters and positive for last two quarters. Maximum return is 1.417% and minimum return is -1.687% on the announcement date for the first quarter. However, Maximum return is 0.837% and minimum return is -1.79% on the announcement date for the second quarter, Maximum return is 0.917% and minimum return is -1.24% on the announcement date for the third quarter, Maximum return is 1.05% and minimum return is -0.737% on the announcement date for the fourth quarter. For *Canara Bank*, mean returns near to zero, but bit negative for all quarters. Maximum return is 1.227% and minimum return is -5.08% on the announcement date for the first quarter. However, Maximum return is 0.654% and minimum return is -0.742% on the announcement date for the second quarter, Maximum return is 0.714% and minimum return is -1.17% on the announcement date for the third quarter, Maximum return is 0.616% and minimum return is -1.146% on the announcement date for the fourth quarter.



For *IDBI Bank Ltd.*, mean returns near to zero, but bit negative for third quarters and positive for first, second and fourth quarters. Maximum return is 1.61% and minimum return is -1.39% on the announcement date for the first quarter. However, Maximum return is 1.63% and minimum return is -0.865% on the announcement date for the second quarter, Maximum return is 0.335% and minimum return is -0.326% on the announcement date for the third quarter, Maximum return is 1.15% and minimum return is -0.735% on the announcement date for the fourth quarter. For *JSW Steel Ltd.*, mean returns near to zero, but bit negative for first three quarters and positive for last quarter. Maximum return is 0.945% and minimum return is -1.32% on the announcement date for the first quarter. However, Maximum return is 1.38% and minimum return is -0.866 % on the announcement date for the second quarter, Maximum return is 1.35% and minimum return is -0.658% on the announcement date for the third quarter, Maximum return is 0.608% and minimum return is -0.784% on the announcement date for the fourth quarter.

For *Shriram Transport Finance Co. Ltd.*, mean returns near to zero, but bit negative for first and fourth quarters and positive for second and third quarters. Maximum return is 1.42% and minimum return is -1.64% on the announcement date for the first quarter. However, Maximum return is 0.634% and minimum return is -1.28% on the announcement date for the second quarter, Maximum return is 1.243% and minimum return is -1.23% on the announcement date for the third quarter, Maximum return is 1.63% and minimum return is -0.946% on the announcement date for the fourth quarter. For *Steel Authority of India Ltd.*, mean returns near to zero, but bit negative for the second and third quarters and positive for the first and last quarter. Maximum return is 0.697% and minimum return is -0.66% on the announcement date for the first quarter. However, Maximum return is 1.60% and minimum return is -0.208 % on the announcement date for the second quarter, Maximum return is 0.831% and minimum return is -1.55% on the announcement date for the third quarter, Maximum return is 0.702% and minimum return is -0.908% on the announcement date for the fourth quarter. For *Tata Chemicals Ltd.*, mean returns near to zero, but bit negative for the first, second and fourth quarters and positive for the third quarter. Maximum return is 0.479% and minimum return is -1.14% on the announcement date for the first quarter. However, Maximum return is 0.783% and minimum



return is -1.053% on the announcement date for the second quarter, Maximum return is 1.03% and minimum return is -1.06% on the announcement date for the third quarter, Maximum return is 0.522% and minimum return is -1.4% on the announcement date for the fourth quarter.

For *Union Bank of India*, mean returns near to zero, but bit negative for the second and third quarters and positive for the first and last quarter. Maximum return is 0.697% and minimum return is -0.66% on the announcement date for the first quarter. However, Maximum return is 1.60% and minimum return is -0.208 % on the announcement date for the second quarter, Maximum return is 0.831% and minimum return is -1.55% on the announcement date for the third quarter, Maximum return is 0.702% and minimum return is -0.908% on the announcement date for the fourth quarter. For *Yes Bank Ltd*, mean returns near to zero, but bit negative for the all quarters. Maximum return is 0.937% and minimum return is -1.167% on the announcement date for the first quarter. However, Maximum return is 0.535% and minimum return is -1.29% on the announcement date for the second quarter, Maximum return is 0.408% and minimum return is -0.601% on the announcement date for the third quarter, Maximum return is 0.606% and minimum return is -0.57% on the announcement date for the fourth quarter.

Excess kurtosis is observed from Table 2 for all four quarters of each company represents the "leptokurtic distribution" on the announcement date. Fama (1965) defined "leptokurtic distribution" as large numbers of return values near the mean and at farthest ends. Jarque Bera test in descriptive rejects the assumption of normal distribution at 1% significance level. Further, Augmented Dickey –Fuller (ADF) test is used to test the stationarity of a time series. A non-stationary series tend to have an infinite memory and it does not decay in a shock that takes place in the process. Every random shock carries away the process from its earlier level not to return back again unless another random shock push it towards its previous level. ADF statistics for all returns series shows that return series are stationary are 1% significance level.



STOCK VOLATILITY ON EARNINGS ANNOUNCEMENT DATE

In a weak form efficient market, stock prices reflect all the information contained in the past price movements. Hence, there should be no auto-correlation present in the present price with preceding price intra-day. The most unbeaten model for characterizing high-frequency financial market volatility has been the Generalized ARCH (GARCH) model introduced by Bollerslev (1986) and the Exponential GARCH (EGARCH) model proposed by Nelson (1991). The GARCH and the EGARCH models are effortlessly infer as ARMA-type models for the conditional second-order ticks and the logarithm of the conditional variance, respectively. (Bollerslev and Mikkelsen, 1996)

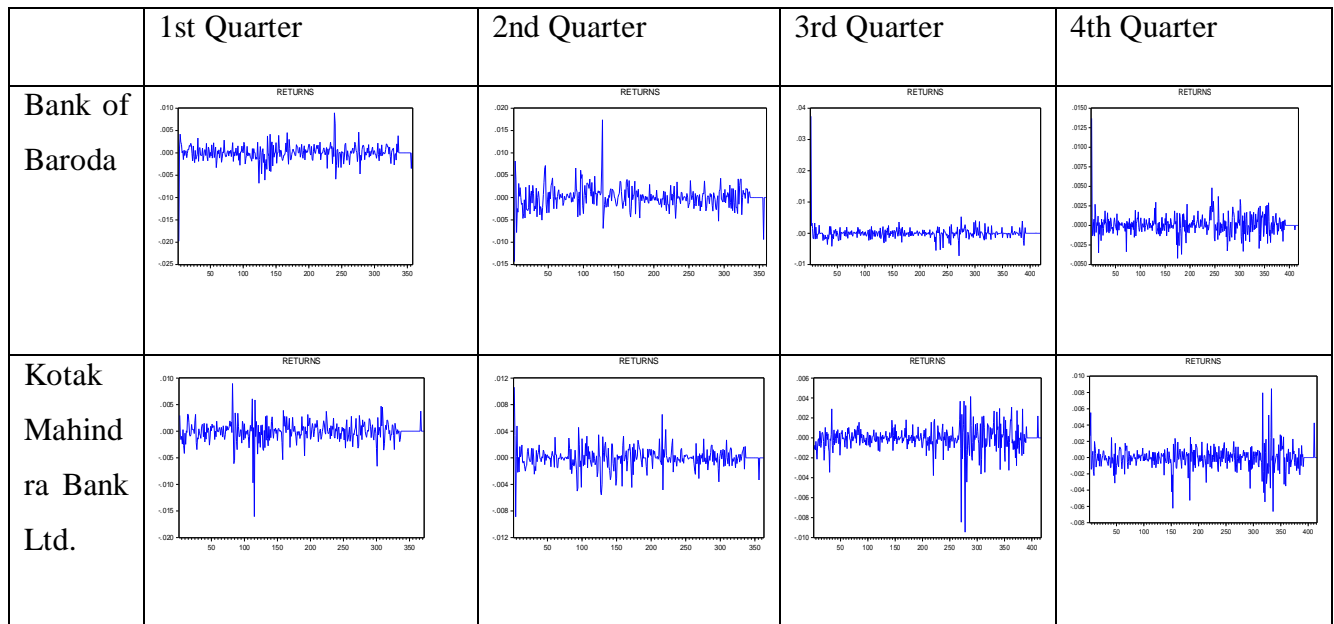
The first step in event-based studies for particular announcement is to recognize the autocorrelation functions in the stock prices. Further, the persistence of stock market returns is gauged from its auto-correlation (ACF) and partial auto correlation (PACF) functions, which form a part of the identification of a suitable ARIMA model. In order to correct the autocorrelation errors, ARIMA model is applied. An ARIMA model is a special type of regression model in which the dependent variable has been stationarized and the independent variables are all lags of the dependent variable and/or lags of the errors.

By identifying the suitable ARIMA model, we examined the auto-correlation (ACF) and partial auto correlation (PACF) functions from correlogram for all the companies on earnings announcement date. According to ARIMA model, no AR and MA term is significant for *Bank of Baroda* for all quarters. However, for *Kotak Mahindra Bank Ltd.*, AR (3) and MA (3) significant for first quarter, AR (2) and MA (2) significant for second and third quarter, AR (1) and MA (1) for fourth quarter. For *Punjab National Bank*, AR (1) is significant for first quarter, AR (1) and MA (1) for second quarter, AR (3) for third quarter and AR (5) for fourth quarter. For *ITC Ltd.*, MA (1) for the second quarter and AR (1) for the third and fourth quarter has been found to be significant. For *Bharat Heavy Electricals Ltd.*, AR (3) is found to significant for the second quarter and AR (1) MA (1) for the fourth quarter. For *Aditya Birla Nuvo Ltd.*, AR (4) is found to



significant for the third quarter and AR (1) MA (1) for the fourth quarter. For *Bank of India*, AR (1) MA (1) is found to be significant for the second quarter and AR (1) in the third quarter. For *Canara Bank*, AR (2) is found to significant for the first quarter, AR (1) MA (1) for the second quarter and AR (1) for the fourth quarter. For *IDBI Bank Ltd.*, AR (1) AR (2) MA (2) is found to be significant for the first quarter and AR (1) for the second and the third quarter. For *JSW Steel Ltd.*, only AR(1) and MA(1) has been found to be significant for the first quarter. For *Shriram Transport Finance Co. Ltd.*, MA (1) MA (2) was found to be significant in the third quarter and AR (1) MA (1) has been found to be significant in the fourth quarter. For *Steel Authority of India Ltd.*, AR (1) MA (4) has been found to be significant for the second quarter and AR (2) in the fourth quarter. For *Tata Chemicals*, AR (1) has been found to be significant for the first and fourth quarter. For *Union Bank of India*, AR (1) has been found to be significant for the second and third quarter. For *Yes Bank*, AR (1) has been found to be significant in the fourth quarter.

Figure 1: Plot of Stock Returns on Announcement Day





COMMONWEALTH JOURNAL OF COMMERCE & MANAGEMENT RESEARCH

Vol.4, Issue 9 (September 2017) ISSN: 2393-851X Impact Factor: 0.612 UGC & ISI Indexed

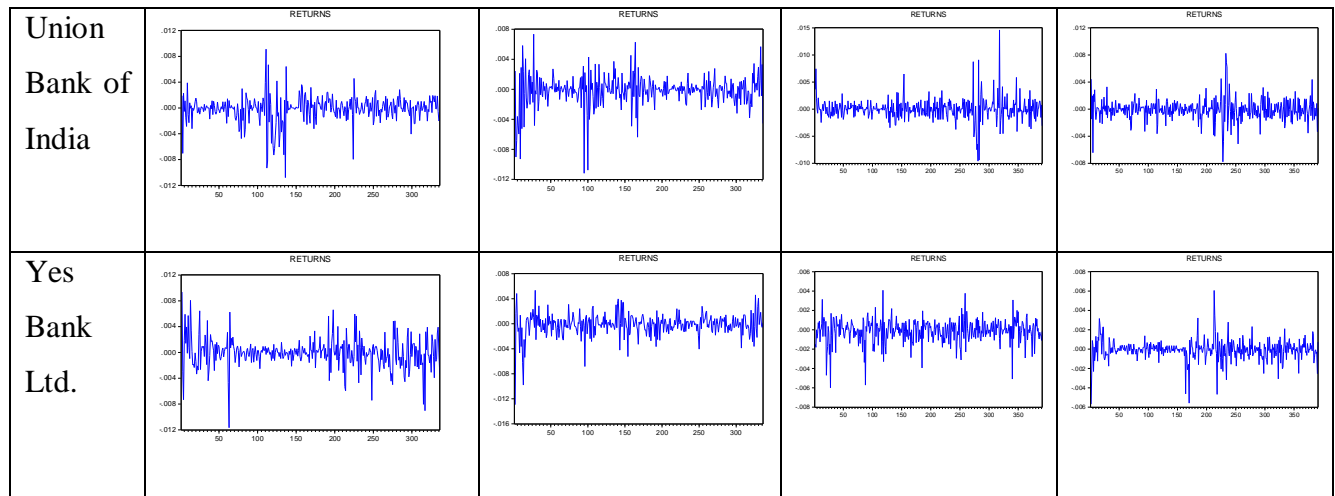
Punjab National Bank				
I T C Ltd.				
Bharat Heavy Electricals Ltd.				
Aditya Birla Nuvo Ltd.				
Bank of India				
Canara Bank				



COMMONWEALTH JOURNAL OF COMMERCE & MANAGEMENT RESEARCH

Vol.4, Issue 9 (September 2017) ISSN: 2393-851X Impact Factor: 0.612 UGC & ISI Indexed

IDBI Bank Ltd.				
JSW Steel Ltd.				
Shriram Transpo rt Finance Co. Ltd.				
Steel Authori ty of India Ltd.				
Tata Chemic als Ltd.				



Further, residuals of these models are heteroscedastic in nature. The heteroscedasticity in residuals of all companies can be observed from figure 1. From Figure 1, it is clearly seen that the period of high volatility followed by the period of high volatility and the period of low volatility followed by the period of low volatility. Hence, during earnings announcement the stock has tended for volatility to appear in bunches. In other words, the current level of volatility tends to be positively correlated with its level during the immediately preceding periods.

Thus, large returns (of either sign) are expected to follow large returns, & small returns (of either sign) to follow small returns. A plausible explanation for this phenomenon is that the information arrivals that drive prices changes to occur in, bunches rather than being evenly spaced over time. This suggests that the residuals or error terms are conditionally heteroscedastic, can be represented by ARCH and GARCH model. So, we fit a GARCH (1,1) model to the first difference of log daily prices for Nifty, Midcap and Nifty Junior using backcast values for the initial variances and Bollerslev-Wooldridge standard errors.



Table 3: Modeling Volatility using GARCH (1,1) on Earnings Announcement Day.

Company Name	Quarter Results	CONSTANT OF MEAN EQUATION	AUTO-REGRESSIVE TERMS	MOVING AVERAGE TERMS	CONSTANT OF VARIANCE EQUATION	ARCH (1)	GARCH (1)
Bank of Baroda	1st Quarter	8.62E-05 (0.289)			6.88E-07 (0.000)*	0.168237 (0.004)*	0.574085 (0.000)*
	2nd Quarter	-8.91E-05 (0.450)			2.35E-06 (0.000)*	0.370769 (0.000)*	0.217699 (0.059)***
	3rd Quarter	-1.19E-05 (0.795)			1.79E-07 (0.000)*	0.412184 (0.000)*	0.570943 (0.000)*
	4th Quarter/ Annual results	4.08E-05 (0.408)			1.13E-07 (0.000)*	0.237883 (0.000)*	0.685931 (0.000)*
Kotak Mahindra Bank Ltd.	1st Quarter	-6.33E-06 (0.915)	AR (3) 0.546505 (0.003)*	MA(3) 0.690388 (0.000)*	6.75E-07 (0.000)*	0.268125 (0.000)*	0.553364 (0.000)*
	2nd Quarter	1.83E-05 (0.795)	AR(2) -0.507252 (0.000)*	MA(2) 0.551533 (0.000)*	3.88E-07 (0.000)*	0.248522 (0.000)*	0.593067 (0.000)*
	3rd Quarter	-1.42E-05 (0.698)	AR(2) 0.702106 (0.000)*	MA(2) 0.765858 (0.000)*	9.29E-08 (0.000)*	0.309756 (0.000)*	0.662951 (0.000)*
	4th Quarter/ Annual results	-1.07E-05	AR(1)	MA(1) 0.658153	3.51E-07	0.496808	0.387704



COMMONWEALTH JOURNAL OF COMMERCE & MANAGEMENT RESEARCH

Vol.4, Issue 9 (September 2017) ISSN: 2393-851X Impact Factor: 0.612 UGC & ISI Indexed

		(0.779)	0.519605 (0.005)*	(0.000)*	(0.000)*	(0.000)*	(0.000)*
Punjab National Bank	1st Quarter	1.09E-04 (0.051)***	AR(1) -0.169574 (0.001)*		4.48E-07 (0.000)*	0.331187 (0.000)*	0.529931 (0.000)*
	2nd Quarter	-2.14E-05 (0.670)	AR (1) -0.429392 (0.002)*	MA (1) 0.340338 (0.019)**	5.96E-08 (0.001)*	0.153361 (0.000)*	0.809956 (0.000)*
	3rd Quarter	-1.10E-04 (0.076)	AR (3) 0.09314 (0.067)***		2.67E-07 (0.000)*	0.370542 (0.000)*	0.558683 (0.000)*
	4th Quarter/ Cumulative Annual results	8.49E-06 (0.850)	AR (5) -0.098767 (0.050)**		1.24E-07 (0.000)*	4.61E-01 (0.000)*	0.554563 (0.000)*
ITC Limited	1st Quarter	1.10E-04 (0.190)			6.40E-07 (0.002)*	0.220804 (0.001)*	0.503629 (0.000)*
	2nd Quarter	7.17E-05 (0.091)		MA(1) -0.107019 (0.087)***	4.06E-07 (0.001)*	0.394873 (0.000)*	0.32571 (0.014)**
	3rd Quarter	2.10E-06 (0.972)	AR (1) -0.198103 (0.002)*		4.32E-07 (0.001)*	0.190269 (0.000)*	0.619478 (0.000)*
	4th Quarter/ Cumulative Annual results	-1.60E-05 (0.752)	AR(1) 0.056378 (0.262)		2.74E-08 (0.010)*	1.30E-01 (0.000)*	0.8619 (0.000)*



COMMONWEALTH JOURNAL OF COMMERCE & MANAGEMENT RESEARCH

Vol.4, Issue 9 (September 2017) ISSN: 2393-851X Impact Factor: 0.612 UGC & ISI Indexed

Bharat Heavy Electricals Ltd.	1st Quarter	-1.63E-04 (0.050)**			1.32E-06 (0.001)*	0.152791 (0.009)*	0.257666 (0.198)
	2nd Quarter	2.50E-07 (0.996)	AR (3) 0.084531 (0.125)		1.54E-07 (0.000)*	0.252265 (0.000)*	0.613607 (0.000)*
	3rd Quarter	-9.13E-05 (0.099)***			1.48E-07 (0.000)*	0.107133 (0.006)*	0.75865 (0.000)*
	4th Quarter/ Cumulative Annual results	-1.94E-05 (0.554)	AR (1) -0.2329 (0.000)*	MA (1) 0.050041 (0.429)	1.64E-08 (0.017)**	9.03E-02 (0.000)*	0.885003 (0.000)*
Aditya Birla Nuvo Ltd.	1st Quarter	-9.14E-05 (0.349)			4.06E-07 (0.000)*	0.178019 (0.000)*	0.710076 (0.000)*
	2nd Quarter	-1.41E-04 (0.174)			1.34E-07 (0.026)**	0.094243 (0.000)*	0.881901 (0.000)*
	3rd Quarter	3.52E-05 (0.661)	AR(4) -0.071668 (0.205)		8.27E-08 (0.000)*	0.118446 (0.000)*	0.873644 (0.000)*
	4th Quarter/ Cumulative Annual results	1.87E-05 (0.772)	AR (1) -0.382275 (0.000)*	MA (1) 0.253028 (0.013)**	1.17E-06 (0.000)*	7.02E-01 (0.000)*	0.202101 (0.000)*
Bank of India	1st Quarter	-2.57E-06 (0.965)			1.21E-07 (0.000)*	0.603724 (0.000)*	0.546037 (0.000)*
	2nd Quarter	-2.27E-04 (0.081)	AR (1) -0.366587 (0.078)***	MA(1) 0.428128 (0.045)**	4.46E-07 (0.031)**	0.152237 (0.003)*	0.766652 (0.000)*



COMMONWEALTH JOURNAL OF COMMERCE & MANAGEMENT RESEARCH

Vol.4, Issue 9 (September 2017) ISSN: 2393-851X Impact Factor: 0.612 UGC & ISI Indexed

	3rd Quarter	2.50E-06 (0.971)	AR (1) -0.033549 (0.526)		2.22E-07 (0.000)*	0.26726 (0.000)*	0.696052 (0.000)*
	4th Quarter/ Cumulative Annual results	-1.34E-04 (0.046)**			9.05E-08 (0.002)*	0.133812 (0.000)*	0.846308 (0.000)*
	1st Quarter	-1.08E-04 (0.237)	AR(2) -0.135051 (0.001)*		7.80E-08 (0.020)**	7.73E-02 (0.000)*	0.90827 (0.000)*
	2nd Quarter	-5.32E-05 (0.316)	AR(1) 0.876752 (0.000)*	MA(1) -0.928887 (0.000)*	9.30E-07 (0.000)*	0.311218 (0.000)*	0.350037 (0.004)*
	3rd Quarter	1.26E-05 (0.893)			3.94E-07 (0.000)*	0.175487 (0.000)*	0.729791 (0.000)*
Canara Bank	4th Quarter/ Cumulative Annual results	9.38E-06 (0.869)	AR(1) 0.135657 (0.063)***		3.05E-07 (0.000)*	0.334277 (0.000)*	0.545081 (0.000)*
	1st Quarter		AR (1) -0.097552 (0.007)*				
	1st Quarter	-1.30E-05 (0.548)	AR (2) 0.813851 (0.000)*	MA (2) -0.949283 (0.000)*	2.75E-07 (0.000)*	1.81E-01 (0.000)*	0.761647 (0.000)*
IDBI Bank Ltd.	2nd Quarter	-8.54E-05 (0.043)**	AR (1) -0.084505 (0.041)**		1.76E-07 (0.003)*	0.926765 (0.000)*	0.447026 (0.000)*



COMMONWEALTH JOURNAL OF COMMERCE & MANAGEMENT RESEARCH

Vol.4, Issue 9 (September 2017) ISSN: 2393-851X Impact Factor: 0.612 UGC & ISI Indexed

			AR (1)				
	3rd Quarter	1.82E-05 (0.663)	-0.072515 (0.182)		1.33E-07 (0.002)**	0.260249 (0.000)*	0.605991 (0.000)*
	4th Quarter/ Cumulative Annual results	-5.58E-05 (0.244)			7.63E-08 (0.000)*	0.443402 (0.000)*	0.63845 (0.000)*
			AR (1)	MA (1)			
	1st Quarter	-2.00E-04 (0.017)**	-0.937457 (0.000)*	0.940383 (0.000)*	3.52E-07 (0.000)*	5.29E-01 (0.000)*	0.56335 (0.000)*
	2nd Quarter	-8.36E-05 (0.407)			4.30E-07 (0.000)*	0.269259 (0.000)*	0.65838 (0.000)*
	3rd Quarter	-2.96E-05 (0.591)			3.80E-07 (0.000)*	0.28846 (0.000)*	0.494376 (0.000)*
JSW Steel Ltd.	4th Quarter/ Cumulative Annual results	1.58E-05 (0.754)			4.76E-08 (0.001)*	0.175885 (0.000)*	0.80611 (0.000)*
	1st Quarter	-7.27E-05 (0.365)			1.07E-07 (0.000)*	1.79E-01 (0.000)*	0.816275 (0.000)*
	2nd Quarter	-2.11E-05 (0.803)			1.94E-07 (0.000)*	0.249076 (0.000)*	0.765566 (0.000)*
				MA (1)			
				-0.341065 (0.000)*			
				MA(2)			
Shriram Transport Finance Co. Ltd.	3rd Quarter	-2.54E-05 (0.464)		-0.158711 (0.030)**	5.30E-07 (0.000)*	0.207889 (0.002)*	0.553665 (0.000)*



COMMONWEALTH JOURNAL OF COMMERCE & MANAGEMENT RESEARCH

Vol.4, Issue 9 (September 2017) ISSN: 2393-851X Impact Factor: 0.612 UGC & ISI Indexed

			AR(1)	MA(1)			
	4th Quarter/ Cumulative Annual results	-4.50E-05 (0.358)	-0.642373 (0.000)*	0.571937 (0.000)*	1.38E-07 (0.016)**	0.172016 (0.000)*	0.739820 (0.000)*
Steel Authority of India Ltd.	1st Quarter	1.21E-04 (0.208)			2.05E-06 (0.000)*	2.26E-01 (0.011)**	0.152737 (0.237)
	2nd Quarter	1.02E-04 (0.081)***	AR (1) -0.209753 (0.011)**	MA (4) -0.101409 (0.075)***	5.37E-07 (0.000)*	0.615007 (0.000)*	0.461123 (0.000)*
	3rd Quarter	-1.22E-04 (0.114)			4.79E-07 (0.000)*	0.176754 (0.000)*	0.611691 (0.000)*
	4th Quarter/ Cumulative Annual results	-2.01E-05 (0.659)	AR(2) -0.187607 (0.001)*		7.79E-08 (0.000)*	0.091064 (0.000)*	0.849605 (0.000)*
Tata Chemicals Ltd.	1st Quarter	1.29E-05 (0.887)	AR (1) -0.162883 (0.042)**		3.03E-07 (0.002)*	8.59E-02 (0.000)*	0.80219 (0.000)*
	2nd Quarter	-7.35E-05 (0.477)			8.80E-07 (0.000)*	2.61E-01 (0.000)*	0.488436 (0.000)*
	3rd Quarter	1.18E-04 (0.276)			7.25E-07 (0.005)*	0.08923 (0.001)*	0.750042 (0.000)*
	4th Quarter/ Cumulative Annual results	-2.73E-05 (0.603)	AR (1) -0.139997 (0.030)**		1.43E-07 (0.000)*	0.182125 (0.000)*	0.732322 (0.000)*



Union Bank of India	1st Quarter	-5.08E-05 (0.524)			3.80E-07 (0.000)*	4.02E-01 (0.000)*	0.54327 (0.000)*
	2nd Quarter	-1.04E-04 (0.153)	AR(1) -0.155404 (0.023)**		1.61E-07 (0.000)*	2.34E-01 (0.000)*	0.745176 (0.000)*
	3rd Quarter	1.63E-05 (0.831)	AR(1) -0.136112 (0.042)**		4.04E-07 (0.000)*	0.311646 (0.000)*	0.634432 (0.000)*
	4th Quarter/ Cumulative Annual results	-8.79E-05 (0.178)			2.12E-07 (0.001)*	0.152093 (0.000)*	0.745132 (0.000)*
Yes Bank	1st Quarter	-2.61E-05 (0.757)			8.63E-07 (0.000)*	3.78E-01 (0.000)*	0.503776 (0.000)*
	2nd Quarter	-1.08E-04 (0.192)			2.19E-07 (0.000)*	7.82E-02 (0.002)*	0.820207 (0.000)*
	3rd Quarter	-1.28E-04 (0.032)**			2.11E-07 (0.004)*	0.151555 (0.001)*	0.710812 (0.000)*
	4th Quarter/ Cumulative Annual results	-4.40E-05 (0.465)	AR(1) 0.049156 (0.396)		5.75E-08 (0.000)*	0.054979 (0.000)*	0.885709 (0.000)*

Table 3 provides information on conditional volatility, which has been estimated by employing GARCH (1,1) methodology on the mean equation of all companies. The (1, 1) in GARCH (1, 1) refers to the presence of a first-order autoregressive GARCH term (the first term in parentheses) and a first-order moving average ARCH term (the second term in parentheses). In other words, this GARCH specification asserts that the best predictor of the variance in a period is a weighted



average of the long-run average variance, the variance predicted for the previous period, and the new information of the previous period that is captured by the most recent squared error term. Coefficients of ARCH and GARCH term is reported to analyze stock market volatility on earnings announcement date.

ARCH and GARCH term in all the cases are statistically significant; representing that current volatility is dependent on both previous forecasted variance and previous error term. Sum of ARCH and GARCH coefficient measures the persistence of volatility. For *Bank of Baroda*, the sum of coefficient for 1st quarter is 0.738, the 2nd quarter is 0.587, 3rd quarter is 0.982 and for the 4th quarter is 0.923. This sum of ARCH and GARCH coefficient represents persistent volatility for the third and fourth quarter and diminishing volatility for the 1st and 2nd quarter. Further, GARCH coefficient is greater than ARCH coefficient in all cases except 2nd quarter, it represents that conditional variance is more dependent on the last period's forecast variance for 1st, 2nd and last quarter, further, more dependent on the last period's error for 2nd quarter.

For *Kotak Mahindra Bank Ltd.*, the sum of coefficient for 1st quarter is 0.821, the 2nd quarter is 0.841, 3rd quarter is 0.97 and for the 4th quarter is 0.883. This sum of ARCH and GARCH coefficient is near to one, represents persistent volatility for all quarters. Further, GARCH coefficient is greater than ARCH coefficient in all cases except 4th quarter, it represents that conditional variance is more dependent on the last period's forecast variance for 1st, 2nd and 3rd quarter, further, more dependent on the last period's error for 4th quarter. For *Punjab National Bank*, the sum of coefficient for 1st quarter is 0.859, the 2nd quarter is 0.96, 3rd quarter is 0.92 and for the 4th quarter is 1.00. This sum of ARCH and GARCH coefficient is near to one which represents persistent volatility for all quarters. Further, GARCH coefficient is greater than ARCH coefficient in all quarters, it represents that conditional variance is more dependent on the last period's forecast variance.

For *I T C Ltd.*, the sum of coefficient for 1st quarter is 0.7, the 2nd quarter is 0.71 3rd quarter is 0.81 and for the 4th quarter is 0.991. This sum of ARCH and GARCH coefficient is near to one for 4th quarter, represents persistent volatility for all quarters. However, the sum of ARCH and GARCH coefficient less than 1 for other quarters, representing diminishing volatility on the



announcement date. Further, GARCH coefficient is greater than ARCH coefficient for 1st, 3rd and 4th quarter, it represents that conditional variance is more dependent on the last period's forecast variance for 1st, 3rd and 4th quarter, further, more dependent on the last period's error for 2nd quarter. For *Bharat Heavy Electricals Ltd*, the sum of coefficient for 1st quarter is 0.49, the 2nd quarter is 0.86, 3rd quarter is 0.87 and for the 4th quarter is 0.973. This sum of ARCH and GARCH coefficient is near to one, represents persistent volatility for all quarters except 1st quarter, representing diminishing volatility. Further, GARCH coefficient is greater than ARCH coefficient in all quarters, it represents that conditional variance is more dependent on the last period's forecast variance.

For *Aditya Birla Nuvo Ltd.*, the sum of coefficient for 1st quarter is 0.88, the 2nd quarter is 0.97, 3rd quarter is 0.98 and for the 4th quarter is 0.904. This sum of ARCH and GARCH coefficient is near to one, represents persistent volatility for all quarters. Further, GARCH coefficient is greater than ARCH coefficient in all quarters except 4th quarter, it represents that conditional variance is more dependent on the last period's forecast variance. However, for 4th quarter conditional variance is more dependent on the last period's error. For *Bank of India*, the sum of coefficient for 1st quarter is 1.14, the 2nd quarter is 0.97, 3rd quarter is 0.912 and for the 4th quarter is 0.979. This sum of ARCH and GARCH coefficient is near to one represent persistent volatility for second, third and fourth quarters but explosive volatility for the first quarter. Further, GARCH coefficient is greater than ARCH coefficient in all quarters except first quarter, it represents that conditional variance is more dependent on the last period's forecast variance. However, for first quarter conditional variance is more dependent on the last period's error.

For *Canara Bank*, the sum of coefficient for 1st quarter is 0.979, the 2nd quarter is 0.661, 3rd quarter is 0.904 and for the 4th quarter is 0.879. This sum of ARCH and GARCH coefficient is near to one, represents persistent volatility for all quarters except 1st quarter, representing diminishing volatility. Further, GARCH coefficient is greater than ARCH coefficient in all quarters, it represents that conditional variance is more dependent on the last period's forecast variance. For *IDBI Bank Ltd.*, the sum of coefficient for 1st quarter is 0.942, the 2nd quarter is 1.373, 3rd quarter is 0.86 and for the 4th quarter is 1.08. This sum of ARCH and GARCH



coefficient is near to one of the first and third quarter represents persistent volatility. However, sum is greater than in the second and fourth quarter, representing explosive volatility. Further, GARCH coefficient is greater than ARCH coefficient in all quarters except second quarter, it represents that conditional variance is more dependent on the last period's forecast variance. However, for second quarter conditional variance is more dependent on the last period's error.

For *JSW Steel Ltd.*, the sum of coefficient for 1st quarter is 1.09, the 2nd quarter is 0.927, 3rd quarter is and for the 0.782, 4th quarter is 0.981. This sum of ARCH and GARCH coefficient is near to one, represents persistent volatility for all quarters except 3rd quarter, representing diminishing volatility. Further, GARCH coefficient is greater than ARCH coefficient in all quarters, it represents that conditional variance is more dependent on the last period's forecast variance. For *Shriram Transport Finance Co. Ltd.*, the sum of coefficient for 1st quarter is 0.995, the 2nd quarter is 1.01, 3rd quarter is and for the 0.76, 4th quarter is 0.911. This sum of ARCH and GARCH coefficient is near to one represent persistent volatility for all quarters except 3rd quarter, representing diminishing volatility. Further, GARCH coefficient is greater than ARCH coefficient in all quarters, it represents that conditional variance is more dependent on the last period's forecast variance.

For *Steel Authority of India Ltd.*, the sum of coefficient for 1st quarter is 0.378, the 2nd quarter is 1.07, 3rd quarter is 0.789 and for the 4th quarter is 0.941. This sum of ARCH and GARCH coefficient is near to one of the second and fourth quarter that represents persistent volatility. However, sum is less than one in the first and third quarter, representing diminishing volatility. Further, GARCH coefficient is greater than ARCH coefficient in all quarters except second quarter, it represents that conditional variance is more dependent on the last period's forecast variance. However, for second quarter conditional variance is more dependent on the last period's error. For *Tata Chemicals Ltd.*, the sum of coefficient for 1st quarter is 0.897, the 2nd quarter is 0.748, 3rd quarter is and for the 0.837, 4th quarter is 0.912. This sum of ARCH and GARCH coefficient is near to one, represents persistent volatility for all quarters except 2nd quarter, representing diminishing volatility. Further, GARCH coefficient is greater than ARCH



coefficient in all quarters, it represents that conditional variance is more dependent on the last period's forecast variance.

For *Union Bank of India*, the sum of coefficient for 1st quarter is 0.944, the 2nd quarter is 0.97, 3rd quarter is and for the 0.97, 4th quarter is 0.897. This sum of ARCH and GARCH coefficient is near to one represent persistent volatility for all quarters. Further, GARCH coefficient is greater than ARCH coefficient in all quarters, it represents that conditional variance is more dependent on the last period's forecast variance. For *Yes Bank Ltd.*, the sum of coefficient for 1st quarter is 0.881, the 2nd quarter is 0.898, 3rd quarter is and for the 0.861, 4th quarter is 0.939. This sum of ARCH and GARCH coefficient is near to one represent persistent volatility for all quarters. Further, GARCH coefficient is greater than ARCH coefficient in all quarters, it represents that conditional variance is more dependent on the last period's forecast variance.

Conditional volatility is found to persistent for most of the companies, in other words, volatility decays very slowly on the earnings announcement in most of the cases except a few companies that decayed volatility much faster on announcement day are Bank of Baroda (2nd quarter), ITC Ltd (2nd quarter), Bharat Heavy Electricals Ltd (1st quarter), Canara Bank (2nd quarter), Steel Authority of India Ltd. (1st quarter). However, explosive volatility was found for Bank of India (1st quarter), IDBI Bank Ltd. (2nd and 4th quarter), JSW Steel Ltd. (1st quarter), Shriram Transport Finance Co. Ltd. (2nd quarter) and Steel Authority of India Ltd. (2nd quarter). Nelson (1990) said that any shocks may persist in one model and die out in another, so the conditional variance of GARCH (1, 1) may be explosive even when the process itself is strictly stationary.

Above volatility analysis, clearly reveal that the stock market is highly volatile and have persistent volatility on earnings announcement date. These price sensitive micro-economic announcements such as "Earnings announcement" have significant impact on stock market volatility. When the impact of these announcements is removed, volatility is at level across the trading day. (Ederington and Lee, 1993). These results are corroborated Hogan and Melvin (1994) findings, which reported similar persistence in volatility in the foreign exchange market due to noise and heterogeneous expectation. They termed such volatility patterns as "meteor shower" effects



IMPACT OF EARNINGS ANNOUNCEMENT ON STOCK RETURNS FOR EACH COMPANY

Announcements usually affects both conditional mean and conditional volatility of the stock market in different ways depending on many factors, such as type of news, content of news, timing of news, etc. In this section, particularly to earnings announcements from various companies and its impact on conditional mean are discussed. For this purpose, basic GARCH (1,1) is used to study the symmetric nature of information release on earnings announcement date. The impact of earnings announcement on returns on quarterly / annual results date for FY2009-2010 using GARCH by augmenting return equation with dummy variable $D=0$ for 1 min return from the opening of the trading session till the announcement time and $D=1$ for 1min return during and after earnings announcement.

Table 4: GARCH (1,1) Coefficients with return dummy on earnings announcement day.

Company Name	Quarter Results	CONSTANT OF MEAN EQUATION	DUMMY (ANNOUCMENT EFFECT ON RETURNS)	ARCH(1)	GARCH(1)
Bank of Baroda	1st Quarter	2.77E-05 (0.862)	8.97E-05 (0.624)	0.170535 (0.003)*	0.575882 (0.000)*
	2nd Quarter	-0.000342 (0.150)	3.25E-04 (0.243)	0.392194 (0.000)*	0.155553 (0.212)
	3rd Quarter	-5.60E-05 (0.421)	6.75E-05 (0.476)	0.410085 (0.000)*	0.57784 (0.000)*
	4th Quarter/ Annual results	5.80E-06 (0.933)	6.38E-05 (0.514)	0.238284 (0.000)*	0.680533 (0.000)*



COMMONWEALTH JOURNAL OF COMMERCE & MANAGEMENT RESEARCH

Vol.4, Issue 9 (September 2017) ISSN: 2393-851X Impact Factor: 0.612 UGC & ISI Indexed

Kotak Mahindra Bank Ltd.	1st Quarter	-6.65E-05 (0.574)	7.85E-05 (0.583)	0.272785 (0.000)*	0.554663 (0.000)*
	2nd Quarter	5.94E-05 (0.476)	-7.97E-05 (0.619)	0.252701 (0.000)*	0.592744 (0.000)*
	3rd Quarter	-3.63E-05 (0.124)	1.19E-04 (0.000)*	0.318866 (0.000)*	0.657407 (0.000)*
	4th Quarter/ Annual results	-9.87E-06 (0.816)	-1.01E-05 (0.923)	0.496497 (0.000)*	0.387526 (0.000)*
Punjab National Bank	1st Quarter	1.95E-04 (0.063)***	-1.15E-04 (0.346)	0.325237 (0.000)*	0.538456 (0.000)*
	2nd Quarter	-1.09E-04 (0.112)	1.48E-04 (0.201)	0.17147 (0.000)*	0.799195 (0.000)*
	3rd Quarter	-3.21E-05 (0.669)	-5.50E-04 (0.000)*	0.466975 (0.000)*	0.455863 (0.000)*
	4th Quarter/ Annual results	-2.25E-05 (0.679)	5.75E-05 (0.584)	0.392702 (0.000)*	0.597613 (0.000)*
ITC Limited	1st Quarter	1.08E-04 (0.264)	6.41E-06 (0.972)	0.22049 (0.001)*	0.503667 (0.000)*
	2nd Quarter	4.20E-05 (0.631)	5.51E-05 (0.582)	3.97E-01 (0.000)*	0.323423 (0.013)**
	3rd Quarter	1.26E-05 (0.869)	-2.40E-05 (0.842)	0.188748 (0.000)*	0.619748 (0.000)*
	4th Quarter/ Annual results	-1.59E-05 (0.756)	-1.77E-06 (0.995)	0.13023 (0.000)*	0.861893 (0.000)*
Bharat Heavy Electricals Ltd.	1st Quarter	-1.54E-04 (0.093)	-3.46E-05 (0.860)	0.152327 (0.010)*	0.257916 (0.198)



COMMONWEALTH JOURNAL OF COMMERCE & MANAGEMENT RESEARCH

Vol.4, Issue 9 (September 2017) ISSN: 2393-851X Impact Factor: 0.612 UGC & ISI Indexed

	2nd Quarter	-2.73E-05 (0.726)	7.59E-05 (0.502)	2.46E-01 (0.000)*	0.631991 (0.000)*
	3rd Quarter	-3.19E-05 (0.694)	-2.14E-04 (0.037)**	0.108505 (0.008)*	0.778616 (0.000)*
	4th Quarter/ Cumulative Annual results	-3.41E-05 (0.420)	3.45E-05 (0.613)	0.091972 (0.000)*	0.883352 (0.000)*
Aditya Birla Nuvo Ltd.	1st Quarter	-8.09E-05 (0.491)	-2.45E-05 (0.908)	0.178218 (0.000)*	0.709931 (0.000)*
	2nd Quarter	-1.30E-04 (0.247)	-1.38E-04 (0.648)	9.44E-02 (0.000)*	0.881644 (0.000)*
	3rd Quarter	3.43E-05 (0.693)	1.07E-05 (0.962)	0.118654 (0.000)*	0.873433 (0.000)*
	4th Quarter/ Cumulative Annual results	-4.76E-05 (0.527)	3.60E-04 (0.010)*	0.789367 (0.000)*	0.127305 (0.009)*
Bank of India	1st Quarter	8.42E-06 (0.912)	-2.31E-05 (0.843)	0.602172 (0.000)*	0.547338 (0.000)*
	2nd Quarter	-1.99E-04 (0.212)	-1.03E-04 (0.695)	1.50E-01 (0.004)*	0.767473 (0.000)*
	3rd Quarter	4.56E-07 (0.995)	2.11E-05 (0.908)	0.266653 (0.000)*	0.696469 (0.000)*
	4th Quarter/ Cumulative Annual results	-1.21E-04 (0.139)	-7.06E-05 (0.598)	0.13546 (0.000)*	0.844528 (0.000)*
Canara Bank	1st Quarter	-9.11E-05 (0.458)	-5.71E-05 (0.762)	0.077316 (0.000)*	0.908026 (0.000)*
	2nd Quarter	4.66E-05 (0.122)	-2.47E-04 (0.000)*	3.33E-01 (0.000)*	0.383749 (0.002)*



COMMONWEALTH JOURNAL OF COMMERCE & MANAGEMENT RESEARCH

Vol.4, Issue 9 (September 2017) ISSN: 2393-851X Impact Factor: 0.612 UGC & ISI Indexed

	3rd Quarter	-1.28E-05 (0.925)	7.53E-05 (0.690)	0.179725 (0.000)*	0.7277 (0.000)*
	4th Quarter/ Annual results	0.00E+00 (0.440)	-3.06E-04 (0.006)*	0.249479 (0.000)*	0.737835 (0.000)*
IDBI Bank Ltd.	1st Quarter	-2.68E-05 (0.156)	1.09E-04 (0.009)*	0.200133 (0.000)*	0.749089 (0.000)*
	2nd Quarter	-5.10E-05 (0.262)	-2.96E-04 (0.019)**	9.11E-01 (0.000)*	0.455478 (0.000)*
	3rd Quarter	5.20E-05 (0.304)	-1.51E-04 (0.083)***	0.246836 (0.000)*	0.613258 (0.000)*
	4th Quarter/ Annual results	-5.59E-05 (0.256)	3.34E-05 (0.937)	0.443395 (0.000)*	0.63861 (0.000)*
JSW Steel Ltd.	1st Quarter	-4.74E-04 (0.001)*	3.40E-04 (0.049)**	0.533921 (0.000)*	0.541391 (0.000)*
	2nd Quarter	-7.77E-05 (0.450)	-7.85E-05 (0.872)	2.70E-01 (0.000)*	0.658454 (0.000)*
	3rd Quarter	1.77E-06 (0.974)	-5.51E-04 (0.001)*	0.346406 (0.000)*	0.441024 (0.000)*
	4th Quarter/ Annual results	8.54E-06 (0.865)	4.37E-04 (0.082)***	0.178032 (0.000)*	0.803688 (0.000)*
Shriram Transport Finance Co. Ltd.	1st Quarter	-7.01E-05 (0.436)	-2.04E-05 (0.925)	0.178011 (0.000)*	0.816802 (0.000)*
	2nd Quarter	-0.000147 (0.227)	0.000169 0.3150	0.255425 (0.000)*	0.763975 (0.000)*



COMMONWEALTH JOURNAL OF COMMERCE & MANAGEMENT RESEARCH

Vol.4, Issue 9 (September 2017) ISSN: 2393-851X Impact Factor: 0.612 UGC & ISI Indexed

	3rd Quarter	-2.60E-05 (0.529)	1.99E-06 (0.979)	0.207417 (0.002)*	0.554206 (0.000)*
	4th Quarter/ Annual results	-3.70E-05 (0.521)	-3.69E-05 (0.733)	0.171808 (0.000)*	0.741574 (0.000)*
Steel Authority of India Ltd.	1st Quarter	8.59E-05 (0.432)	1.72E-04 (0.466)	0.249081 (0.006)*	0.131427 (0.251)
	2nd Quarter	1.05E-04 (0.121)	-1.55E-05 (0.902)	6.14E-01 (0.000)*	0.462548 (0.000)*
	3rd Quarter	-1.17E-04 (0.218)	-1.95E-05 (0.901)	0.175832 (0.000)*	0.614392 (0.000)*
	4th Quarter/ Annual results	1.47E-07 (0.997)	-1.41E-04 (0.147)	0.092164 (0.000)*	0.849772 (0.000)*
Tata Chemicals Ltd.	1st Quarter	-5.11E-05 (0.629)	2.33E-04 (0.185)	0.081557 (0.000)*	0.816612 (0.000)*
	2nd Quarter	-9.51E-05 (0.496)	7.58E-05 (0.720)	2.48E-01 (0.000)*	0.500491 (0.000)*
	3rd Quarter	1.26E-04 (0.335)	-2.58E-05 (0.908)	0.089364 (0.001)*	0.748389 (0.000)*
	4th Quarter/ Annual results	-2.42E-05 (0.644)	-5.41E-04 (0.345)	0.181524 (0.000)*	0.731658 (0.000)*
Union Bank of India	1st Quarter	-1.30E-04 (0.358)	1.47E-04 (0.385)	0.405643 (0.000)*	0.53967 (0.000)*
	2nd Quarter	-1.56E-04 (0.239)	7.10E-05 (0.659)	2.31E-01 (0.000)*	0.747376 (0.000)*
	3rd Quarter	6.35E-05 (0.465)	-2.45E-04 (0.146)	0.352002 (0.000)*	0.62206 (0.000)*



	4th Quarter/ Annual results	-8.77E-05 (0.297)	-4.49E-07 (0.997)	0.152089 (0.000)*	0.745122 (0.000)*
Yes Bank	1st Quarter	9.89E-05 (0.298)	-7.78E-04 (0.000)*	0.414244 (0.000)*	0.532871 (0.000)*
	2nd Quarter	-6.83E-05 (0.567)	-6.38E-05 (0.711)	7.92E-02 (0.004)*	0.819232 (0.000)*
	3rd Quarter	-1.74E-04 (0.046)**	6.20E-05 (0.594)	0.150517 (0.001)*	0.713618 (0.000)*
	4th Quarter/ Annual results	8.55E-06 (0.925)	-1.29E-04 (0.304)	0.056096 (0.000)*	0.882531 (0.000)*

Every company has a different impact on returns based on type of announcement, the importance of the announcement, timings of announcement, etc. Many factors such as importance of news, frequency of news, the asymmetric nature of news, persistent or conflicting news affecting "post announcement drift" was explained by Eddelbüttel and McCurdy (1998); Melvin and Yin (2000); Leng (1996); Laakkonen (2004) etc. El-Gazzar (1998) further disclosed that the market reaction to earnings announcement is also dependent on private and institutional holdings. Table 4 shows the statistical results of earnings announcements on the conditional mean using GARCH (1, 1) model.

There is seen no significant impact on the conditional mean on the announcement date for *Bank of Baroda* from all quarters. The reason behind such this may be the timings of the announcement, which is before noon for all quarters, so there is enough time to inform get assimilated in the market till market close. However, for *Kotak Mahindra Bank Ltd.*, conditional mean of the third quarter was found to be significant.

Similarly, third quarter results were found to be significant for *Punjab National Bank*. This may be due to the announcement of the third quarter was very near to market closing, that is at 2:40



pm, so may this announcement have not got enough time for information assimilation. For *ITC Ltd.*, conditional mean was not found to significant for any of the quarters. Further, for *Bharat Heavy Electricals Ltd.*, the third quarter was found to be significant, may be due to significant increase in net profit margin from 12.75% to 14.85%. However, for *Aditya Birla Nuvo Ltd.*, the fourth quarter was found to be significant, this may be due to significant increase in net profit margin in the fourth quarter from 6.44% to 10.79%. On the other hand, returns of *Bank of India* does not have any significant impact due to the earnings announcement, may be due to efficient absorption of announcement in the market till trading close. But, for *Canara Bank*, conditional mean was found to be significant for the second and the fourth quarter, this may be due to significant change in net profit margin for both quarters. For the second quarter, there was a significant increase in net profit margin from 12.18% to 19.34% and for the fourth quarter, there was a significant decrease in net profit margin from 22.45% to 10.49%.

Earnings announcement of *IDBI Bank Ltd.* has shown significant changes in the conditional mean for first three quarters. This may be due to the importance of news announcement about the earnings of the bank, which has increased from 4.96% in first quarter to 7.16% in the third quarter. However, annual results and fourth quarter results are already anticipated by the investors based results of the first three quarters. This may be the reason that fourth quarter or annual results lack its significance due to the ability of investors to anticipate the company's progress. In case of *JSW Steel Ltd.*, all quarters were significant except the second quarter for conditional mean. This may be due to changes in net profit margin for consecutive quarters. As of the first quarter, there was a significant increase in net profit margin of 3.24 % in March ending year 2009 to 8.68% for the first quarter. However, for the second quarter, net profit margin was only increased from 8.68% to 9.86%, as compared to net profit margin for third and fourth quarter, 11.5% and 13.7% respectively. So, the third and fourth quarter was found to be significant as compared to the insignificant second quarter for conditional mean.

For *Shriram Transport Finance Co. Ltd.*, the returns were not found to significant on the trading day till closure. This may be due to efficient absorption of earnings announcement during the trading period and secondly, there was not much significant change in the net profit margin of



the company throughout quarters. So, assuming persistent announcement content by investors does not create a significant difference in returns. Similarly, no significant difference in conditional mean was observed for *Steel Authority of India Ltd., Tata Chemicals Ltd. and Union Bank of India* in any of the quarter. However, for Yes Bank, returns for the first quarter were found to be significant, this may be due to significant increase in net profit margin of 14.15% to 18.44% in first quarter net profit margins. Rest quarters of the banks was insignificant for conditional mean, as there was not much difference in net profit margin of the bank and investor assumes persistent news announcement, leading to efficient absorption of the news.

Conditional mean was found insignificant for the most of the quarter for all companies except for few companies which are Kotak Mahindra Bank Ltd.(3rd quarter), Punjab National Bank(3rd quarter), Bharat Heavy Electricals Ltd(3rd quarter), Aditya Birla Nuvo Ltd. (4th quarter) , Canara Bank(2nd and 4th quarter), IDBI Bank Ltd(1st, 2nd and 3rd quarter), JSW Steel Ltd.(1st, 2nd and 4th quarter), Yes Bank (1st quarter)

Conditional mean was found insignificant for the most of the quarter for all companies except few. Hence, the study provides an evidence that in most of the cases, no significantly different returns are seen on the announcement date. These results are consistent with Engle, R. F. (1998), Christiansen, C. (2000). However, the reasons for the abnormal returns achieved for some companies on earnings depend upon many factors explained by Kross & Schroeder. (1984). Their study defined earnings announcement "timing effect" depends upon many factors such as the content of the news is favorable or adverse, type of news is the annual or quarterly results, news was publicly informed by a larger cap firm or smaller cap firm and consistency of the news.

EARNINGS ANNOUNCEMENT AND ITS ASSYMETRIC EFFECT ON VOLATILITY

Effect of announcements usually affects the conditional volatility of the stock market in different ways depending on many factors, such as type of news, content of news, the timing of the news, investors' perceptions. Further, content of news (good or bad news) effect in different ways.



Engle & Ng (1993) measured the impact of news on volatility. Their study confirmed the asymmetric effect and found EGARCH model suitable for capturing asymmetric effect.

In this section, particularly to earnings announcements from various companies and its impact on conditional volatility are discussed. Apart from this, the asymmetric effect of the news is also considered to explore the impact of earnings announcement on volatility. For this purpose, basic GARCH (1,1) is used to study the symmetric nature of information release on earnings announcement date. The impact of earnings announcement on volatility and its asymmetric effect for quarterly / annual results date for FY2009-2010 using EGARCH by augmenting return equation with dummy variable $D=0$ for 1 min return from the opening of the trading session till the announcement time and $D = 1$ for 1min return during and after earnings announcement. Table 5 shows the statistical results of earnings announcements on the conditional volatility using EGARCH model.

Table 5: Impact of Earnings Announcement on Stock Prices Volatility: Asymmetric GARCH (EGARCH)

Company Name		CONSTANT OF VARIANCE EQUATION	ASYMMETRIC NEWS EFFECT(?)	DUMMY(ANNOUCMENT EFFECT ON VOLATILITY)
Bank of Baroda	1st Quarter	-2.626273 (0.000)*	0.026522 (0.601)	0.127992 (0.005)*
	2nd Quarter	-5.8443 (0.000)*	0.197498 (0.001)*	-0.17977 (0.096)***
	3rd Quarter	2.39E-07 (0.000)*	0.326902 (0.000)*	-8.55E-08 (0.089)***
	4th Quarter/ Cumulative Annual results	9.14E-08 (0.000)*	-0.122994 (0.077)***	-8.13E-08 (0.000)*
Kotak Mahindra	1st Quarter	-3.450795	-0.021391	-0.167776



COMMONWEALTH JOURNAL OF COMMERCE & MANAGEMENT RESEARCH

Vol.4, Issue 9 (September 2017) ISSN: 2393-851X Impact Factor: 0.612 UGC & ISI Indexed

Bank Ltd.		(0.000)*	(0.560)	(0.004)*
	2nd Quarter	-4.971452 (0.000)*	-0.190495 (0.001)*	-0.331912 (0.000)*
	3rd Quarter	8.87E-08 (0.000)*	-0.168963 (0.019)	8.57E-08 (0.027)**
	4th Quarter/ Cumulative Annual results	3.88E-01 (0.000)*	-0.224601 (0.000)*	2.49E-01 (0.000)*
Punjab National Bank	1st Quarter	-1.619954 (0.003)*	-0.04077 (0.430)	-0.058153 (0.082)***
	2nd Quarter	8.03E-08 (0.000)*	0.090631 (0.058)***	-6.47E-08 (0.000)*
	3rd Quarter	-2.35E+00 (0.000)*	-0.023804 (0.512)	8.69E-02 (0.038)**
	4th Quarter/ Cumulative Annual results	-1.28E+00 (0.000)*	-0.081281 (0.026)**	-1.33E-01 (0.000)*
ITC Limited	1st Quarter	-3.090364 (0.004)*	0.056299 (0.265)	0.129167 (0.040)**
	2nd Quarter	-3.79E+00 (0.000)*	0.002416 (0.963)	1.88E-01 (0.006)*
	3rd Quarter	-1.38E+00 (0.007)*	0.041868 (0.194)	1.23E-03 (0.954)
	4th Quarter/ Cumulative Annual results	-8.93E-01 (0.003)*	-0.0026 (0.933)	6.91E-02 (0.234)
Bharat Heavy	1st Quarter	-3.646242	-0.11808	-0.152092



COMMONWEALTH JOURNAL OF COMMERCE & MANAGEMENT RESEARCH

Vol.4, Issue 9 (September 2017) ISSN: 2393-851X Impact Factor: 0.612 UGC & ISI Indexed

Electricals Ltd.		(0.077)***	(0.021)**	(0.097)***
	2nd Quarter	-2.87E+00 (0.000)*	-0.109331 (0.029)**	5.91E-02 (0.133)
	3rd Quarter	-4.91E+00 (0.000)*	-0.197078 (0.000)*	3.74E-01 (0.000)*
	4th Quarter/ Cumulative Annual results	-4.08E-01 (0.012)*	-0.044137 (0.036)**	-1.04E-02 (0.301)
Aditya Birla Nuvo Ltd.	1st Quarter	5.25E-07 (0.001)*	0.215531 (0.010)*	-2.28E-07 (0.030)**
	2nd Quarter	-6.69E-01 (0.012)**	-0.072234 (0.017)**	3.92E-02 (0.125)
	3rd Quarter	-5.06E-01 (0.001)*	0.088088 (0.000)*	2.83E-02 (0.072)***
	4th Quarter/ Cumulative Annual results	-1.96E+01 (0.000)*	-0.118593 (0.016)*	7.19E-01 (0.010)*
Bank of India	1st Quarter	-1.09E+00 (0.000)*	-0.318433 (0.000)*	-6.26E-02 (0.047)**
	2nd Quarter	-1.42E+00 (0.011)**	-0.078891 (0.070)***	-3.43E-02 (0.217)
	3rd Quarter	-1.65E+00 (0.000)*	0.005112 (0.890)	7.55E-02 (0.051)**
	4th Quarter/ Cumulative Annual results	-9.29E-01 (0.007)*	-0.051551 (0.080)***	6.85E-02 (0.009)*
Canara Bank	1st Quarter	-1.71E+01	0.190905	1.08E+00



COMMONWEALTH JOURNAL OF COMMERCE & MANAGEMENT RESEARCH

Vol.4, Issue 9 (September 2017) ISSN: 2393-851X Impact Factor: 0.612 UGC & ISI Indexed

		(0.000)*	(0.003)*	(0.000)*
	2nd Quarter	-3.63E+00 (0.000)*	-0.182587 (0.001)*	-2.40E-02 (0.662)
	3rd Quarter	-3.02E+00 (0.000)*	-0.103578 (0.027)**	1.67E-01 (0.000)*
	4th Quarter/ Cumulative Annual results	-5.18E+00 (0.000)*	-0.200494 (0.000)*	3.49E-01 (0.000)*
IDBI Bank Ltd.	1st Quarter	2.19E-07 (0.000)*	0.126522 (0.014)**	9.86E-08 (0.481)
	2nd Quarter	-2.31E+00 (0.000)*	-0.22799 (0.000)*	1.01E-01 (0.050)*
	3rd Quarter	1.10E-07 (0.004)*	-0.235464 (0.008)*	1.32E-07 (0.030)**
	4th Quarter/ Cumulative Annual results	-1.14E+00 (0.000)*	-0.101534 (0.004)*	2.27E-01 (0.000)*
JSW Steel Ltd.	1st Quarter	1.54E-06 (0.003)*	-0.329152 (0.076)***	-1.00E-06 (0.021)**
	2nd Quarter	3.01E-07 (0.000)*	0.112539 (0.247)	-3.31E-07 (0.067)***
	3rd Quarter	3.90E-07 (0.000)*	0.105807 (0.254)	5.24E-07 (0.059)***
	4th Quarter/ Cumulative Annual results	-1.20E+00 (0.000)*	0.00961 (0.744)	3.53E-02 (0.714)
Shriram Transport Finance Co. Ltd.	1st Quarter	-8.34E-01 (0.000)*	-0.235209 (0.000)*	4.02E-02 (0.030)**



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	2nd Quarter	-1.234459 (0.000)*	0.120118 (0.001)*	-0.068672 (0.004)*
	3rd Quarter	-2.370583 (0.000)*	-0.018719 (0.662)	0.006904 (0.878)
	4th Quarter/ Cumulative Annual results	-2.134601 (0.000)*	0.029423 (0.481)	0.051065 (0.174)
Steel Authority of India Ltd.	1st Quarter	2.10E-06 (0.000)*	-0.295094 (0.087)***	2.50E-07 (0.646)
	2nd Quarter	-2.77E+00 (0.000)*	-0.020655 (0.630)	-2.69E-02 (0.729)
	3rd Quarter	-2.15E+00 (0.007)*	0.030832 (0.301)	1.09E-01 (0.032)**
	4th Quarter/ Cumulative Annual results	-8.73E-01 (0.000)*	0.10164 (0.000)*	2.51E-02 (0.075)***
Tata Chemicals Ltd.	1st Quarter	-1.25E+00 (0.001)*	-0.110457 (0.001)*	-2.62E-05 (0.999)
	2nd Quarter	-8.66E+00 (0.000)*	-0.117234 (0.134)	5.07E-01 (0.000)*
	3rd Quarter	-6.38E-01 (0.000)*	0.163088 (0.000)*	3.24E-03 (0.698)
	4th Quarter/ Cumulative Annual results	-1.88E+00 (0.000)*	-0.224344 (0.000)*	7.30E-02 (0.393)



Union Bank of India	1st Quarter	2.39E-07 (0.001)*	-0.055055 (0.637)	2.14E-07 (0.016)**
	2nd Quarter	-1.30E+00 (0.000)*	0.054041 (0.100)	-5.04E-02 (0.107)
	3rd Quarter	-2.24E+00 (0.000)*	-0.031375 (0.538)	1.80E-01 (0.002)*
	4th Quarter/ Cumulative Annual results	-1.63E+00 (0.000)*	0.034154 (0.475)	1.56E-02 (0.566)
Yes Bank	1st Quarter	-2.47E+00 (0.000)*	-0.033171 (0.511)	1.92E-01 (0.000)*
	2nd Quarter	-1.85E+00 (0.000)*	-0.100755 (0.007)*	-1.06E-01 (0.009)*
	3rd Quarter	-2.29E+00 (0.002)*	-0.090534 (0.012)**	-8.54E-02 (0.028)**
	4th Quarter/ Cumulative Annual results	-1.90E+00 (0.000)*	-0.027898 (0.210)	-3.18E-02 (0.061)***

The EGARCH model for companies represents the effect of an announcement on volatility through the significance and the sign of the coefficient. The coefficient of volatility factor having negative sign indicates the volatility decreased after an announcement and this may be due to matching of actual results with pre-conceived earnings of the company by investors. On the other hand, positive sign of the volatility coefficient shows that it has increased after the announcement which may be due to mismatch between pre-conceived notion and actual earnings of the company. In case of asymmetric effect in EGARCH model, both significance value as well as a sign of asymmetric coefficient is important for interpreting the results. A positive (negative) sign of coefficient represents that good (bad) news increase volatility more as compared to bad (good) news (Black, 1976).



For *Bank of Baroda*, conditional volatility was found to be significant for all quarters, however, asymmetric effect was observed only for the last three quarters. From, statistical analysis reported in the table, shows a decline in volatility after the announcement except for the first quarter. This may be due to match of expectations of investors with actual earnings. Further, good news increases more volatility for the first and second quarter and bad news increases volatility for last quarter. For *Kotak Mahindra Bank Ltd.*, volatility decreased for first two quarters, but increased for last two quarters. On the other hand, asymmetric effect was found to be significant for second and last quarter, which depicts that bad news increases volatility more as compared to good news. For *Punjab National Bank*, volatility decreased after the first, second and fourth quarter, but increased in a third quarter. In addition to this good news has a significant effect on volatility for a second quarter and bad news have a significant effect on volatility for a fourth quarter.

For *I T C Ltd*, there was a significant increase in volatility for the first two quarters, but the asymmetric effect was found to be insignificant for all the quarters. For *Bharat Heavy Electricals Ltd.*, conditional volatility decreased in the first quarter, but increased for the third quarter. In addition to this, conditional volatility is greatly affected by negative news in all quarters. For *Aditya Birla Nuvo Ltd.*, volatility increased in first quarter but decreased in third and fourth quarter. Supplementing asymmetric effect, positive news increases volatility for first and third quarter, but negative news increases volatility for second and fourth quarter. For *Bank of India*, conditional volatility increased in the first quarter, but decreased in the third and fourth quarter. In addition to this, negative news increases more volatility for first, second and fourth quarter. For *Canara Bank*, volatility increased after the announcement for first, third and fourth quarter. As well as negative earnings news impact more for last three quarters, but positive earnings news impact more of a first quarter.

For *IDBI Bank Ltd.*, conditional volatility increased for the last three quarters and negative news on earnings generates more volatility. But for the first quarter, positive earnings news generates more volatility. For *JSW Steel Ltd.*, volatility increased after the earnings announcement for third quarter, but declined for the first and second quarter. Further, negative news increases more



volatility in the first quarter. For *Shriram Transport Finance Co. Ltd.*, volatility increased in a first quarter and declined in a second quarter, but remained unaffected after the announcement in the third and fourth quarter. Considering an asymmetric effect, negative news on earnings creates more volatility for a first quarter, but positive news initiates more volatility for the second quarter. For *Steel Authority of India Ltd.*, volatility increased after third and fourth quarter, but the asymmetric effect has confirmed the good news to more volatility for last quarter and bad news to be more volatile for the first quarter.

For *Tata Chemicals Ltd.*, volatility increased after earnings announcement only in the second quarter, but the asymmetric effect was significant for first, third and fourth quarter. Negative news increases volatility in the first and fourth quarter, but positive news increases volatility in the third quarter. For *Union Bank of India*, volatility increased for the first and third quarter, but there is no presence of asymmetric effect on the announcement date. For *Yes Bank*, volatility decreased for second, third and fourth quarter, but increased in the first quarter. Considering the asymmetric effect, negative news creates more volatility for a second and third quarter.

Volatility tends to significantly increase or decrease after the earnings announcement, due to convergence of expected results and actual results. Prices tend to be more volatile if there are major differences between expected and actual results. Return volatility increases after the earnings announcement for Bank of Baroda (1st quarter), Kotak Mahindra Bank Ltd. (2nd and 4th quarter), Punjab National Bank (3rd quarter), ITC Limited (1st and 2nd quarter), Bharat Heavy Electricals Ltd (3rd quarter), Aditya Birla Nuvo Ltd. (3rd and 4th quarter), Bank of India (3rd and 4th quarter), Canara Bank (1st, 3rd and 4th quarter), IDBI Bank Ltd. (2nd, 3rd and 4th quarter), JSW Steel Ltd. (3rd quarter), Shriram Transport Finance Co. Ltd. (1st quarter), Steel Authority of India Ltd. (3rd and 4th quarter), Tata Chemicals Ltd. (2nd quarter), Union Bank of India (1st and third quarter), Yes Bank Ltd. (1st quarter). However, Return volatility decreases after the earnings announcement for Bank of Baroda (2nd, 3rd and 4th quarter), Kotak Mahindra Bank Ltd. (1st and 2nd quarter), Punjab National Bank (1st and 2nd quarter), Bharat Heavy Electricals Ltd. (1st quarter), Aditya Birla Nuvo Ltd. (1st quarter), Bank of India (1st quarter), JSW Steel Ltd. (1st and 2nd quarter), Shriram Transport Finance Co. Ltd. (2nd quarter), Yes



Bank Ltd. (2nd, 3rd and 4th quarter). Earnings response tends to be more volatile if there is a mismatch between actual earnings and expected earnings; however, the earnings response tends to decline due if actual and expected earnings tend to be similar. (Easton, P. D., & Zmijewski, M. E. (1989)).

The asymmetric effect is found in two forms, first bad news increases volatility more as compared to good news termed as "leverage effect" (Black, 1976) and second good news increases more volatility in financial markets. In this study, evidence for the both types of asymmetric effect was found. Companies corroborating "leverage effect" are Bank of Baroda (4th quarter), Kotak Mahindra Bank Ltd. (2nd and 3rd quarter), Punjab National Bank (4th quarter), Bharat Heavy Electricals Ltd. (1st, 2nd, 3rd and 4th quarter), Aditya Birla Nuvo Ltd. (2nd and 4th quarter), Bank of India (1st, 2nd and 4th quarter), Canara Bank (2nd, 3rd and 4th quarter), IDBI Bank Ltd. (2nd, 3rd and 4th quarter), JSW Steel Ltd. (1st quarter), Shriram Transport Finance Co. Ltd.(1st quarter), Steel Authority of India Ltd. (1st quarter), Tata Chemicals Ltd. (1st and 4th quarter), Yes Bank Ltd. (2nd and 3rd quarter). However, Companies whose volatility increase with good news on earnings announcement day are Bank of Baroda (2nd and 3rd quarter), Punjab National Bank (2nd quarter), Aditya Birla Nuvo Ltd. (1st and 3rd quarter), Canara Bank (1st quarter), IDBI Bank Ltd. (1st quarter), Shriram Transport Finance Co. Ltd. (2nd quarter), Steel Authority of India Ltd. (4th quarter), Tata Chemicals Ltd. (3rd quarter). The asymmetric effect of news is in line with findings given by Campbell and Hentschel (1992), Andersen et al. (2003), Maheu and McCurdy (2004). These different types of asymmetric effect are influenced by many other factors such as insider trading, pre- announcement anticipation or post announcement adjustments. (Patell & Wolfson (1982)).

CONCLUDING OBSERVATIONS

Event study methodology has been used to estimate nexus between Intraday stock market volatility and earnings announcement. Event based methodology is a standard approach established by Fama *et al.* (1969). It has been used by various researches for measuring the effect of any scheduled or unscheduled information announcement on the various market values of



financial instruments. However, in earlier research, impact of earnings announcement is studied over the period of particular days around the announcement. This low frequency study of announcement impact is nowadays lacking their importance due to availability of high frequency data sets. Further, announcement impact tends to nullify in the long term at low frequency data, due price adjustments within the day of the news release. Analysis reveals that stock returns on announcement date is found to be conditionally asymmetric in nature and have short run interdependence. Volatility is found to be highly persistent and in some cases explosive on date of earnings announcement. However, conditional mean is found to be insignificant in most of the cases, except for a few companies. Reasons behind such significant differences in mean may be due to the releasing time of news, its content, consistency, annual/quarterly results and moreover, news released by large/small firms etc.

Intraday volatility on earnings announcement date was compared for two periods: pre/post announcement period. Pre-announcement period includes the time period from market opening to quarterly result announcement time and post announcement period includes the period of announcement time till market close for each company. It is found that there is the significant difference in volatility due to apparent over-reaction of information flow. These results somewhat corroborate the results of Mohanty (2004) study, which assessed the speed and accuracy of the stock price reaction to public announcement and proved that stocks generally react to public news quite quickly, but the first adjustment is not always the correct one and these anomalies may not be significant enough to be exploited to reach at a profitable trading strategy.

On the other hand, positive or negative information released on the quarterly results date has an asymmetric effect on stock market volatility, i.e. market reacts to good or bad news differently. In the stock market, it is assumed that volatility increases more after bad news than after the good ones, termed as *Leverage Effect* (Black, 1976). The results of present analysis corroborates for leverage effect with respect to some companies while it contradicts leverage effect with some other companies.



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