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Market Timing Ability of Fund Managers – Indian Experience

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This paper analyzes the market timing ability and stock selection skills of Indian mutual fund managers for the period 2001-12 using Treynor and Mazuy Model (1966). In order to achieve this objective, a sample of 68 open-ended equity diversified mutual fund schemes have been selected. The study reveals that, Indian mutual fund managers are not good at timing the market whereas, they possess excellent stock selection skills for choosing the portfolio. They are not able to outperform the market using their skill of timing ability.

Introduction

Mutual funds are vehicles for mobilising savings of individuals and households and channelizing them into capital market instruments. The returns reaped by investing in various instruments are distributed to investors in proportion of their investment. Mutual funds offer various benefits to investors which makes them the most popular avenue of investment; the major being diversification and professional management of funds at lower costs. Knowing how the mutual fund schemes are performing is of immense importance to the investors. It helps the investors in taking informed decisions. In case, if the fund is not performing well and not fetching the returns as per the expectations of the investor, he/she would switch investments to another fund doing well in the market. Performance evaluation and revision is the last stage in the process of investment management. Great care needs to be taken while revising a portfolio. Revision of portfolio essentially means securities with high risk and low return should be replaced with the securities having higher return and relatively lower risk. This task requires skill and expertise on part of the fund manager. Churning of the portfolio is dependent on the investment objective of the fund. In order to achieve investment objectives, a mutual fund manager can either pursue an active fund management strategy or a passive fund management strategy. An active fund management strategy calls for the fund manager to have a good market timing ability. Fund

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managers that pursue an active strategy with respect to the market component are known as market timers. Portfolio managers vary the cash position of their portfolio based on market forecast. In a rising market, the fund manager would normally raise the risk of his portfolio either by shifting from cash to stocks, or by raising the beta of the equities in the portfolio, or a combination of both. The same principle applies in the falling market, where the fund manager would decrease the risk of the portfolio by shifting to cash from equities or by decreasing the beta of the equities portion on the portfolio, or combination of both. However, in a passive fund management strategy, the fund manager constructs a portfolio that replicates the index (benchmark). In this strategy, the fund manager is free from the responsibility of market timing and stock selection skills. Passive management is an attempt to construct a portfolio that mimics the overall market return.

Evaluation of mutual fund performance has gained lot of significance in the recent past. Many academicians and researchers have evolved various models and performance measures to study the same. Market timing studies have been carried out in various countries viz. United States, Europe, New Zealand, Greece, Australia, Portugal etc. Researchers over the period of years have studied the impact of various factors on the performance of mutual funds in Indian and abroad. These factors include; Fund size, investment style, market timing ability and stock selection skills of the fund manager, expense ratio, organisation structure, Weightage given to the assets in the Portfolio, Portfolio Turnover Rate, Load Charges etc.

One of the factors widely researched include market timing ability and the stock selection skills of the fund manager. The fund manager's market timing capacity and his stock selection expertise have been studied independently or in combination with a choice of other factors influencing the performance of the manager's portfolio. Market timing ability of the fund manager basically focuses on whether the portfolio manager is capable enough to earn superior returns on his portfolio by timing the market. Simply put, it means if fund manager is able to predict the rise in the market and accordingly increase his investments in advance and vice versa. It focuses on his ability to enter in market when he anticipates the market to rise and to exit from the market in case of downturn.

Background

Fund managers forecasting skills could be divided into two distinct components viz. forecasting price movements of individual securities, also termed as micro forecasting or security analysis and forecasting of price movements of the stock market as a whole, termed as macro forecasting or market timing (Fama, 1972 in Lee and Rahman,1990). The successful market timer is the one who can increase the portfolio weight on equities prior to a rise in the market and decreases the weight on equities prior to a fall in the market (Bollen and Busse, 2001).

Evaluating the market timing ability and stock selection skills of the fund manager as a factor affecting the performance of mutual funds came into

limelight with the study carried out by Treynor and Mazuy in 1966. They developed a model for testing the market timing ability of mutual fund manager based on a regression analysis of the managed portfolio's realised returns, which includes a quadratic term. They used 57 open-ended Mutual funds during the period of 1953-1962. The results reported no evidence that managers have outperformed the market.

Grinblatt and Titman (1994) analysed the determinants of mutual fund performance using three measures; Jensen's measure, Positive period weighting measure and Treynor-Mazuy Model. The results indicate that, the turnover is significantly positively related to ability of fund managers to earn superior returns. Very few funds showed market timing ability. It further revealed that, performance of the fund is positively related to portfolio turnover rate but not the size of the mutual funds or expenses of mutual funds. Bollen and Busse (2001) estimated the timing ability using both daily and monthly returns on funds. Their findings revealed that, mutual funds may possess more timing ability than previously documented. Tripathy(2005) studied market timing ability of the fund managers applying both, Treynor and Mazuy Model and Hendriksson and Merton Model. The study indicates that the fund managers have not been successful in reaping returns in excess of the market.

Market timing ability of the fund manager was studied along with the fund characteristics like fund size, expense ratio, fund age, load etc and persistence in the performance. The study concluded that, expenses do not reduce the returns on the funds and performance is positively related to fund size and expense ratio and negatively related to load charges (Bauer, Otten and Rad, 2006). Swinkels and Joe (2006) studied investment style timing based on daily data of mutual funds applying Treynor and Mazuy Model. The results revealed that, mutual fund managers possesses skill in timing the market when the relation between market sensitivity and the realised market return is significantly positive. Gallagher, Ross and Swan (2008) proposed a new measure of market timing ability. They used the database of daily transactions and concluded that fund manager's outperformance is significantly related to individual security timing.

Most of the previous work finds little evidence that fund managers possess market timing ability. Little efforts have been made in India to study the market timing ability of Indian mutual funds.

Research Methodology

The study aims to cover a period of 12 years ranging from 1st April 2001 to 31st March 2012 in order to evaluate the impact of market timing ability of the fund managers on the performance of selected open ended equity mutual funds schemes in India.

For the purpose of the study, we have selected 68 open-ended equity mutual funds. The funds launched after 1st April 2001 are not selected. Growth option, Dividend option and Bonus option are considered as separate funds in the study. Only the retail plans of the funds are included in the sample

size. The Net Asset Value (NAV) of the funds is obtained from fact sheets and the respective mutual funds websites. The data for the study is mainly derived from AMFI Website, Bluechipindia website and RRfinance website. The benchmark index used for the calculation of market return is S&P CNX Nifty; the main index of National Stock Exchange of India Ltd. The data is collected from the NSE website. The risk-free rate is the rate of return of the 91-days. Treasury Bills rate is obtained from Reserve Bank of India website and Indiastat website.

Fund Returns are computed based on daily NAV of mutual funds. It is computed as follows:

Rp = [(Today's NAV – Yesterday's NAV) / Yesterday's NAV] * 100

The market returns are computed using S&P CNX Nifty Index. It is computed as follows:

Rm = [(Today's Index – Yesterday's Index) / Yesterday's Index] * 100

The monthly fund return, market return and risk free rate of return is considered for the purpose of computation.

Hypothesis

Null Hypothesis (H0): Mutual Fund managers do not possess the requisite market timing ability and stock selection skills and hence they do not outperform the market.

Alternate Hypothesis (H1): Mutual Fund Managers possess good market timing ability and stock selection skills and hence they are able to outperform the market.

Model for Market Timing (Treynor and Mazuy Model)

Treynor and Mazuy model was developed by Treynor and Mazuy in 1966 to test market timing abilities of the mutual fund manager. They suggested that, a squared term should be added to the simple linear relationship model which is given as under:

$$R_p - R_f = \alpha + \beta (R_m - R_f) + \gamma (R_m - R_f)^2 + e_p$$

Where, Rp = the return on the fund,

R_m = the return on the market,

R_f = the risk free rate of return,

e_p = the error term and,

α, β and γ are parameters of the model

The parameter γ indicates market timing ability of the fund manager whereas; the parameter β indicates stock selection skills of the fund manager. If the value of parameter ã is significantly positive, it indicates that the fund manager is able to time the market in right direction and vice versa. Value of parameter ã greater than zero indicates market timing ability.

The parameter β indicates stock selection skills of the fund manager. The underlying principle of the equation is that, if a fund manager is not engaged in market timing and concentrate only at the stock selection, the average beta of the fund would be constant. In that case fund return would be straight-line linear relationship against market return.

Table 1 reports the results of market timing ability of the fund manager using Treynor and Mazuy Model. For calculating significance levels, heteroscedasticity and autocorrelation consistent standard error are used. It is important to obtain heteroscedasticity consistent standard errors because adding a quadratic term gives rise to the problem of heteroscedasticity in the model. The Durbin-Watson test is used to correct any potential serial correlation. The table also displays the value of the parameters along with their t-statistic. It also reports the Adjusted R^2 and Durbin-Watson test value for serial autocorrelation.

The results reveal that out of 68 open-ended equity diversified mutual fund schemes, 5 schemes viz. Birla Sunlife Advantage (Gr), Birla Sunlife Equity (Gr), DSPBR Equity (Div), Franklin India Blue Chip (Div) and Tata Ethical Fund (Div) are positively significant at 1% significance level, 6 schemes namely, HDFC Capital Builder (Gr), ICICI Prudential Top 200 (Gr), Principal Growth (Div), Principal Growth (Gr), Tata Ethical Fund (Gr) and UTI Master Value (Gr) are positively significant at 2% significance level and 3 schemes namely, LIC Nomura MF Growth (Gr), Tata Growth (Gr) and Taurus Bonanza (Gr) are positively significant at 5% significance level.

It indicates that 20% of the schemes are successful market timers. There are 4 schemes for which the t-values are negatively significant. These schemes are not able to succeed in market timing and they tend to time the market in wrong direction. These schemes include HDFC Growth (Div), SBI Magnum Multiplier Plus 93 (Gr), Templeton India Growth (Div) and UTI Master Plus 91 (Gr).

Stock selection skills of the fund manager are denoted by the parameter 'b'. The t value of 'b' is significantly positive at 5% significance level for all schemes except DSPBR Opportunities Dividend Fund which indicates that the Indian mutual fund portfolio managers possess excellent stock selection skills for their portfolios. They rely only on their security selection skills for outperforming the market. To summarise, out of the total sample size of 68 open-ended equity diversified mutual fund schemes, the fund managers of 14 schemes are successful market timers, the fund managers of 4 schemes time the market in wrong direction whereas, the remaining 50 schemes do not possess any market timing ability, i.e. they exercise a passive fund management strategy.

R-squared values reflect the proportion of variation in portfolio return caused by market return. Out of 68 sample funds selected, majority of the funds have accounted for very high variation in portfolio return caused by that of market return. 58 funds have reported r-squared value above 0.60.

Table 1: Results of Treynor and Mazuy model

Sl No.	Name of the Fund	β	t(β)	γ	t(γ)	R^2	Adjusted R^2	D W Test
1	Birla Sunlife Advantage (Div)	0.99	18.4425***	0.00	1.31	0.82	0.81	1.85
2	Birla Sunlife Advantage (Gr)	1.01	22.1419***	0.01	1.8812*	0.88	0.88	1.70
3	Birla Sunlife Equity (Div)	0.99	24.3772***	0.00	0.25	0.85	0.84	2.02
4	Birla Sunlife Equity (Gr)	1.05	23.5445***	0.00	1.696*	0.88	0.88	1.94
5	Dspbr Opportunities (Div)	0.06	0.31	-0.01	-0.61	0.01	0.00	1.50
6	Dspbr Opportunities (Gr)	0.98	31.3503***	0.00	0.93	0.91	0.91	1.80
7	Dspbr Equity (Div)	1.04	12.9009***	0.01	1.707*	0.65	0.64	2.14
8	Franklin India Blue Chip (Div)	1.08	12.3419***	0.01	1.7212*	0.76	0.75	1.92
9	Franklin India Blue Chip (Gr)	0.93	25.355***	0.00	0.39	0.90	0.89	1.83
10	Franklin India Prima Plus (Div)	0.83	24.4122***	0.00	-1.62	0.85	0.85	2.13
11	Franklin India Prima Plus (Gr)	0.89	30.8425***	0.00	0.97	0.91	0.91	1.77
12	Franklin India Prima (Div)	1.02	9.9471***	0.00	0.41	0.56	0.55	2.13
13	Franklin India Prima (Gr)	0.99	25.1871***	0.00	0.62	0.83	0.83	1.75
14	Hdfc Top 200 (Div)	0.74	3.7614***	0.01	0.67	0.13	0.12	1.56
15	Hdfc Top 200 (Gr)	0.92	24.0361***	0.00	-0.08	0.90	0.90	1.68
16	Hdfc Capital Builder (Div)	0.86	17.1433***	0.00	-0.06	0.71	0.70	1.84
17	Hdfc Capital Builder (Gr)	0.90	44.2782***	0.00	2.097**	0.97	0.96	1.72
18	Hdfc Equity (Div)	0.90	30.5833***	0.00	-0.17	0.93	0.93	1.90
19	Hdfc Equity (Gr)	0.94	47.7571***	0.00	1.24	0.95	0.95	1.62
20	Hdfc Growth (Div)	0.88	48.9245***	0.00	- 2.9952***	0.96	0.96	1.89
21	Hdfc Growth (Gr)	0.89	31.5373***	0.00	0.64	0.91	0.91	1.71

Contd...

22	Icici Prudential Top 200 (Div)	0.95	13.4714***	0.00	1.03	0.63	0.62	2.22
23	Icici Prudential Top 200 (Gr)	0.96	24.5655***	0.00	2.0808**	0.89	0.89	1.86
24	Ing Core Equity (Div)	1.03	11.6072***	0.00	-0.41	0.66	0.65	2.20
25	Ing Core Equity (Gr)	1.00	27.6587***	0.00	-0.54	0.87	0.87	2.34
26	Jm Equity (Div)	1.05	18.6764***	0.00	1.07	0.74	0.73	2.26
27	Jm Equity (Gr)	1.06	24.9562***	0.00	1.56	0.89	0.89	1.73
28	Kotak 50 (Div)	0.76	8.5573***	0.00	0.34	0.41	0.40	2.39
29	Kotak 50 (Gr)	1.17	4.0508***	0.00	0.28	0.23	0.22	2.55
30	Lic Nomura Equity (Div)	1.04	19.2314***	0.00	-0.39	0.79	0.78	2.17
31	Lic Nomura Equity (Gr)	1.09	23.1045***	0.00	1.05	0.88	0.87	2.04
32	Lic Nomura Mf Growth (Gr)	1.04	26.3703***	0.01	2.7764***	0.87	0.87	1.66
33	Morgan Stanley Growth (Gr)	0.99	23.9925***	0.00	0.74	0.89	0.89	2.08
34	Principal Growth (Div)	1.02	14.1476***	0.01	2.5866**	0.70	0.70	2.03
35	Principal Growth (Gr)	0.99	19.6674***	0.01	2.4269**	0.87	0.87	1.77
36	Reliance Growth (Div)	0.86	18.8906***	0.00	-0.44	0.74	0.73	2.09
37	Reliance Growth (Gr)	0.92	22.3539***	0.00	0.16	0.84	0.84	1.64
38	Reliance Growth (Bonus)	0.83	4.7717***	0.00	-0.37	0.15	0.14	2.02
39	Reliance Vision (Div)	0.92	13.3596***	0.00	0.41	0.63	0.62	1.85
40	Reliance Vision (Gr)	1.00	18.9384***	0.00	1.33	0.82	0.82	1.45
41	Reliance Vision (Bonus)	0.88	9.2572***	-0.01	-1.62	0.44	0.43	1.95
42	Sbi Msfu Contra (Div)	0.89	19.5821***	0.00	-0.44	0.81	0.81	1.84
43	Sbi Msfu Contra (Gr)	0.94	14.8201***	0.00	0.48	0.67	0.66	1.72
44	Sbi Magnum Equity (Div)	0.98	15.3035***	0.00	0.71	0.77	0.77	2.10
45	Sbi Magnum Equity (Gr)	0.96	14.1028***	0.00	0.90	0.71	0.71	2.01
46	Sbi Magnum Global Fund 94 (Div)	0.92	8.8482***	0.00	-0.04	0.55	0.55	1.98

Contd...

47	Sbi Magnum Global Fund 94 (Gr)	0.95	10.0257***	0.00	0.55	0.63	0.62	1.91
48	Sbi Magnum Multiplier Plus 93 (Div)	0.94	32.433***	0.00	-1.56	0.89	0.89	2.03
49	Sbi Magnum Multiplier Plus 93 (Gr)	0.92	32.3834***	0.00	-1.8236*	0.89	0.89	2.20
50	Sundaram Growth (Div)	0.96	14.8309***	0.00	-1.13	0.67	0.66	2.21
51	Sundaram Growth (Gr)	1.01	18.9109***	0.00	0.59	0.88	0.88	1.92
52	Tata Growth (Gr)	0.88	23.415***	0.01	3.3814***	0.82	0.81	2.01
53	Tata Pure Equity (Div)	0.92	21.6988***	0.00	0.87	0.82	0.82	2.10
54	Tata Pure Equity (Gr)	0.93	24.5492***	0.00	0.53	0.89	0.88	1.64
55	Tata Ethical Fund (Div)	1.01	20.8176***	0.01	1.7776*	0.79	0.79	1.91
56	Tata Ethical Fund (Gr)	1.03	25.0508***	0.01	2.5129**	0.85	0.85	1.87
57	Taurus Bonanza (Gr)	1.05	22.6788***	0.01	2.8532***	0.80	0.80	1.77
58	Taurus Discovery (Gr)	0.99	9.7685***	0.00	0.25	0.62	0.61	1.52
59	Taurus Starshare (Gr)	0.99	12.294***	0.00	0.08	0.68	0.67	1.89
60	Templeton India Growth (Div)	0.87	59.7794***	-0.01	-7.2545***	0.97	0.97	1.85
61	Uti Equity (Div)	0.86	29.4007***	0.00	-1.24	0.88	0.88	1.74
62	Uti Equity (Gr)	0.86	28.5592***	0.00	-1.21	0.89	0.88	1.88
63	Uti Mastershare (Div)	0.96	17.339***	0.00	1.15	0.85	0.84	1.98
64	Uti Mastershare (Gr)	0.87	18.9848***	0.00	-0.45	0.85	0.85	1.87
65	Uti Master Value (Div)	0.89	11.3571***	0.01	1.16	0.50	0.49	1.99
66	Uti Master Value (Gr)	0.94	16.9659***	0.01	2.3271**	0.70	0.69	1.97
67	Uti Master Plus 91 (Div)	0.90	24.044***	0.00	-1.25	0.87	0.87	1.92
68	Uti Master Plus 91 (Gr)	0.83	23.0321***	0.00	-3.2555***	0.89	0.89	2.81

*1% significance level
**2% significance level
***5% significance level

Table 2: Statistical significance of timing parameters

Total sample funds	Number of funds showing positive timing parameters	Number of funds showing statistically significant positive timing parameters	Number of funds showing statistically significant negative timing parameters	Posititve as % of total funds	Significant as % of positive	Positively significant as % of total sample funds
68	54	14	4	66.18	131.11	21%

Table 2 reveals the statistical significance of timing parameters. Out of the total 68 sample mutual fund schemes examined, 45 funds (66.18%) have displayed positive timing parameters, out of which only 14 funds (31.11%) are showing statistically significant positive timing parameters. Four funds time the market in the wrong direction; they have reported statistically significant negative timing parameters. 31.11% of the fund managers display statistically significant market timing skill out of total 45 funds displaying positive timing parameters.

The overall picture of Indian mutual fund managers with reference to their market timing ability displays that, only 21% out of the total sample 68 mutual funds reports statistically significant market timing ability. This figure is very low to accept the alternative hypothesis formulated. Indian mutual fund managers do time the market perfectly, but this skill is affected by various unfavourable global and domestic factors that have a negative impact on the Indian stock markets. Further, the market timing skill of the fund manager is examined with respect to a chosen benchmark (CNX Nifty). Thus, the return earned on the fund may differ based on the benchmark chosen by the fund manager to assess his timing skill.

Table 3 displays the results of Treynor and Mazuy Model for Quantile I. Quantile I include 25 small-sized mutual fund schemes, out of which 3 schemes namely, LIC Nomura MF Growth Growth Fund, Tata Growth Growth Fund and Taurus Bonanza Growth Fund have showed positively significant results at 5% level of significance. UTI Master plus 91 Growth Fund reports negatively significant t value, hence the scheme's fund manager does not possess a superior market timing ability. The fund manager tends to time the market in the wrong direction. Birla Sunlife Advantage Growth Fund and Tata Ethical Dividend Fund are positively significant at 1% level of significance. t-values of the following schemes are positively significant at 2% level of significance: Principal Growth Dividend Fund, Principal Growth Growth Fund, Tata Ethical Growth Fund and UTI Master Value Growth Fund. All the mutual fund schemes included in Quantile I display superior expertise in selection of securities.

Quantile II includes 27 mid-sized mutual fund schemes. Table 4 displays the results of Treynor and Mazuy Model for Quantile II. The results display that only 3 schemes are positively significant with their fund managers

Table 3: Results of Treynor and Mazuy model of quantile I
(Small size funds)

Sr No.	Name of the fund	b	T(b)	γ	T(γ)	Adj. R^2	D W TEST
1	Birla Sunlife Advantage (GR)	1.01	22.14***	0.01	1.88*	0.88	1.70
2	Ing Core Equity (DIV)	1.03	11.60***	0.00	-0.41	0.65	2.20
3	Ing Core Equity (GR)	1.00	27.65***	0.00	-0.54	0.87	2.34
4	Jm Equity (DIV)	1.05	18.67***	0.00	1.07	0.73	2.26
5	Jm Equity (GR)	1.06	24.95***	0.00	1.56	0.89	1.73
6	Lic Nomura Equity (DIV)	1.04	19.23***	0.00	-0.39	0.78	2.17
7	Lic Nomura Equity (GR)	1.09	23.10***	0.00	1.05	0.87	2.04
8	Lic Nomura Mf Growth (GR)	1.04	26.37***	0.01	2.77***	0.87	1.66
9	Principal Growth (DIV)	1.02	14.14***	0.01	2.58**	0.70	2.03
10	Principal Growth (GR)	0.99	19.66***	0.01	2.42**	0.87	1.77
11	Reliance Growth (Bonus)	0.83	4.77***	0.00	-0.37	0.14	2.02
12	Reliance Vision (Bonus)	0.88	9.25***	-0.01	-1.62	0.43	1.95
13	Sbi Magnum Equity (GR)	0.96	14.10***	0.00	0.90	0.71	2.01
14	Sundaram Growth (DIV)	0.96	14.83***	0.00	-1.13	0.66	2.21
15	Sundaram Growth (GR)	1.01	18.91***	0.00	0.59	0.88	1.92
16	Tata Growth (GR)	0.88	23.45***	0.01	3.38***	0.81	2.01
17	Tata Ethical Fund (DIV)	1.01	20.81***	0.01	1.77*	0.79	1.91
18	Tata Ethical Fund (GR)	1.03	25.05***	0.01	2.51**	0.85	1.87
19	Taurus Bonanza (GR)	1.05	22.67***	0.01	2.85***	0.80	1.77
20	Taurus Discovery (GR)	0.99	9.76***	0.00	0.25	0.61	1.52
21	Taurus Starshare (GR)	0.99	12.29***	0.00	0.08	0.67	1.89
22	Uti Equity (GR)	0.86	28.55***	0.00	-1.21	0.88	1.88
23	Uti Mastershare (GR)	0.87	18.98***	0.00	-0.45	0.85	1.87
24	Uti Master Value (GR)	0.94	16.96***	0.01	2.32**	0.69	1.97
25	Uti Master Plus 91 (GR)	0.83	23.03***	0.00	-3.25***	0.89	2.81

*1% significance level, **2% significance level, ***5% significance level

Table 4: Results of Treynor and Mazuy model of quantile II
(Mid-size funds)

Sr No.	Name of the fund	b	T(b)	γ	T(γ)	Adj. R^2	D W Test
1	Birla Sunlife Advantage (DIV)	0.99	18.44***	0.00	1.31	0.81	1.85
2	Birla Sunlife Equity (DIV)	0.99	24.37***	0.00	0.25	0.84	2.02
3	Birla Sunlife Equity (GR)	1.05	23.54***	0.00	1.69*	0.88	1.94
4	Dspbr Opportunities (DIV)	0.06	0.31	-0.01	-0.61	0.00	1.50
5	Dspbr Opportunities (GR)	0.98	31.35***	0.00	0.93	0.91	1.80
6	Franklin India Prima Plus (DIV)	0.83	24.41***	0.00	-1.62	0.85	2.13
7	Franklin India Prima Plus (GR)	0.89	30.84***	0.00	0.97	0.91	1.77
8	Franklin India Prima (DIV)	1.02	9.94***	0.00	0.41	0.55	2.13
9	Franklin India Prima (GR)	0.99	25.18***	0.00	0.62	0.83	1.75
10	Hdfc Capital Builder (DIV)	0.86	17.14***	0.00	-0.06	0.70	1.84
11	Hdfc Capital Builder (GR)	0.90	44.27***	0.00	2.09**	0.96	1.72
12	Hdfc Growth (DIV)	0.88	48.92***	0.00	-2.99***	0.96	1.89
13	Hdfc Growth (GR)	0.89	31.53***	0.00	0.64	0.91	1.71
14	Icici Prudential Top 200 (DIV)	0.95	13.47***	0.00	1.03	0.62	2.22
15	Icici Prudential Top 200 (GR)	0.96	24.56***	0.00	2.08**	0.89	1.86
16	Kotak 50 (DIV)	0.76	8.55***	0.00	0.34	0.40	2.39
17	Kotak 50 (GR)	1.17	4.05***	0.00	0.28	0.22	2.55
18	Sbi Magnum Equity (DIV)	0.98	15.30***	0.00	0.71	0.77	2.10
19	Sbi Magnum Global Fund 94 (DIV)	0.92	8.84***	0.00	-0.04	0.55	1.98
20	Sbi Magnum Global Fund 94 (GR)	0.95	10.02***	0.00	0.55	0.62	1.91
21	Sbi Magnum Multiplier Plus 93 (DIV)	0.94	32.43***	0.00	-1.56	0.89	2.03
22	Sbi Magnum Multiplier Plus 93 (GR)	0.92	32.38***	0.00	-1.82*	0.89	2.20
23	Tata Pure Equity (DIV)	0.92	21.69***	0.00	0.87	0.82	2.10
24	Tata Pure Equity (GR)	0.93	24.54***	0.00	0.53	0.88	1.64
25	Templeton India Growth (DIV)	0.87	59.77***	-0.01	-7.25***	0.97	1.85
26	Uti Master Value (DIV)	0.89	11.35***	0.01	1.16	0.49	1.99
27	Uti Master Plus 91 (DIV)	0.90	24.04***	0.00	-1.25	0.87	1.92

*1% significance level, **2% significance level, ***5% significance level

having superior market timing ability. These are Birla Sunlife Equity Growth Fund at 1% level of significance and HDFC Capital Builder Growth Fund, ICICI Prudential Top 200 Growth Fund at 2% level of significance. The fund managers of HDFC Growth Dividend Fund, Templeton Indian Growth Dividend Fund and SBI Magnum Multiplier plus 93 Dividend Fund do not possess the requisite skills to time the market. With reference to stock selection skills of the Quantile II mutual fund schemes, the fund managers of all the schemes possess superior skills in selecting stocks except DSPBR Opportunities Dividend Fund.

Table 5 reports the results of Treynor and Mazuy Model for Quantile III. Quantile III comprises of 16 large-sized sample mutual fund schemes. All the sample fund schemes included in Quantile III have superior security selection skills. However, the fund managers of only DSPBR Equity Dividend Fund and Franklin India Bluechip Dividend Fund have displayed positively significant market timing ability at 1% level of significance. Rest of the fund managers have failed in timing the market.

Table 6 displays the statistical significance of timing parameters based on Quantiles. Quantile I includes Small Sized Funds (25 Funds). Quantile II comprises of Mid-sized funds (27 Funds) and Quantile III is for Large sized Funds (16 Funds). Among 25 small-sized funds, 64% of the sample funds are able to show positive timing parameters, out of which 56.25% (9) are significantly positive. Among mid-sized funds, 67% of the sample funds are able to show positive timing parameters, out of which 17% (only 3) are significantly positive. Among large-sized funds, 69% of the sample funds are able to show positive timing parameters, out of which 18% (only 2) are significantly positive.

Table 6 also reports the percentage of funds displaying significantly positive parameters out of total number of small-sized, mid-sized and large-sized funds. Out of total 25 small-sized funds, 36% of the fund managers reported significantly positive timing skill. 11% of total 27 mid-sized funds have reported superior market timing skill and 13% out of total 16 large size funds have reported statistically significant market timing ability. Based on the above figures, we arrive at a conclusion that, small-sized fund managers possess greater market timing skills vis-a-vis mid-size and large-sized funds. Small-size funds with a limited corpus at their disposal are able to time the market more efficiently. Fund size is an important parameter that affects the performance of the mutual funds to a greater extent.

Conclusion

This paper studies the market timing ability as one of the factor that affects the performance of mutual funds using Treynor and Mazuy Model. These results indicate that Indian Mutual Fund managers are not successful market timers. They possess good security selection skills which they rely on for outperforming the market.

Table 5: Results of Treynor and Mazuy model of quantile III
(Large size funds)

Sr No.	Name of the fund	b	T(b)	γ	T(γ)	Adj. R^2	D W Test
1	Dspbr Equity (DIV)	1.04	12.90***	0.01	1.70*	0.64	2.14
2	Franklin India Blue Chip (DIV)	1.08	12.34***	0.01	1.72*	0.75	1.92
3	Franklin India Blue Chip (GR)	0.93	25.35***	0.00	0.39	0.89	1.83
4	Hdfc Top 200 (DIV)	0.74	3.76***	0.01	0.67	0.12	1.56
5	Hdfc Top 200 (GR)	0.92	24.03***	0.00	-0.08	0.90	1.68
6	Hdfc Equity (DIV)	0.90	30.58***	0.00	-0.17	0.93	1.90
7	Hdfc Equity (GR)	0.94	47.75***	0.00	1.24	0.95	1.62
8	Morgan Stanley Growth (GR)	0.99	23.99***	0.00	0.74	0.89	2.08
9	Reliance Growth (DIV)	0.86	18.89***	0.00	-0.44	0.73	2.09
10	Reliance Growth (GR)	0.92	22.35***	0.00	0.16	0.84	1.64
11	Reliance Vision (DIV)	0.92	13.35***	0.00	0.41	0.62	1.85
12	Reliance Vision (GR)	1.00	18.93***	0.00	1.33	0.82	1.45
13	Sbi Msfu Contra (DIV)	0.89	19.58***	0.00	-0.44	0.81	1.84
14	Sbi Msfu Contra (GR)	0.94	14.82***	0.00	0.48	0.66	1.72
15	Uti Equity (DIV)	0.86	29.40***	0.00	-1.24	0.88	1.74
16	Uti Mastershare (DIV)	0.96	17.33***	0.00	1.15	0.84	1.98

*1% significance level, **2% significance level, ***5% significance level

Table 6: Statistical significance of timing parameters based on quantiles

Fund Size	Total sample funds	Number of funds showing positive timing parameters	Number of funds showing statistically significant positive timing parameters	Number of funds showing statistically significant negative timing parameters	Posititve as % of total funds	Significant as % of positive	Positively significant as % of total sample funds
Small sized funds (Q1)	25	16	9	1	64.00	56.25	36%
Mid sized funds (Q2)	27	18	3	3	66.67	16.67	11.11%
Large sized funds (Q3)	16	11	2	0	68.75	18.18	12.5%

Hence it is concluded that, the Indian mutual fund managers must improve their market timing skills by focussing on the external market related information so as to promote the confidence among retail investors who prefer to invest their hard earned money and small savings in mutual funds. The growth of Indian Mutual Fund Industry largely depends on mutual fund managers whose skills in market timing would improve the confidence of the investing public in Mutual Funds Schemes.

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Impact of Analysts' Recommendations on Stock Returns

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This paper analyses the market impact of analysts' forecast. Analysts are generally optimistic in their prediction since they recommend buy more considerably than sells. This paper focuses on publicly available information in the form of analyst recommendation. This study examines the information content of analyst stock recommendations and explores the behaviour of returns after significant stock price movements. The study covers a sample of 30 stocks traded on Indian stock market. Recommendations were analysed using event study methodology and market model is used to estimate abnormal returns for stock around the recommendation dates.

Introduction

Stock recommendations are analysts' professional judgement regarding near stock price movements. Analysts play a pivotal role in the financial market by communicating all the relevant information regarding the company to the investors and traders. They work for major brokerage houses and institutional investment firms like mutual funds and insurance companies. Apart from conveying information, they also make buy, sell and hold recommendation. They help in making the markets efficient by communicating the required information to the investors. They provide new information and interpret the already released information by studying plethora of factors regarding industry, economic and business trends so that better decisions can be taken by the investors. By doing so, they exert considerable influence in today's market place. Company's fundamentals remaining the same, mere mention of a company by a popular analyst can cause its stock price to rise or fall.

Indeed they are the important intermediaries who provide valuable research to investors by reducing information asymmetry. Brokerage houses and analysts employ substantial resources to conduct fundamental and technical analysis of listed firms so that investor's portfolio can be improved. These forms of analyst's recommendations are generally published in the media (newspaper and electronic media).

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Much of the literature suggests that when analysts speak, investors listen. This is how market efficiency improves and investors are able to value company's assets more accurately.

As per efficient market hypotheses (Fama, 1970) there would be no effect of analyst recommendation. All the information should be available to investors and nobody should gain abnormal profits from inside information. However, if there is weak form of efficient market, recommendations by reducing asymmetry, may promote efficiency. Over the years, role of analyst is becoming increasingly crucial because they have some impact on the stock prices. In India especially, equity research is becoming a widespread activity.

Review of Literature

Many studies have investigated the impact of analysts' recommendations on stock prices. As early as in 1933, Alfred Cowles inquired whether stock market forecasters could forecast the market or stocks. By forecasting 36 forecasters between 1928 and 1932, he concluded that they could not. Colker (1963) concluded that recommendations earn no abnormal returns for the investors. Davies and Canes (1978), Groth, Lewellen, Schlarbaum, & Ronald (1979), Black (1973), Copeland and Mayers (1981), and Givoly and Lakonishok (1979) concluded that analysts' recommendations do create value for the investors. Schlumpf et al; (2008) found significant positive abnormal results in the stocks recommended by analysts on the day of publication of analysts' report and concluded that increase in the price of securities was mainly to the price pressure created by the analysts in the market and abnormal returns were reversed within the 15 days of the announcement. Barber and Loeffler (1993) concluded that increase in prices were result of both price pressure and information content available in the recommendation. Fama (1998) denies the existence of long-term return abnormalities, but does not exclude the possibility of short-term abnormal returns. Liang (1999) concluded that there were significant positive abnormal returns for two days in the stocks after the recommendation announcements, which were reversed within 15 days after the publication. Alternatively, one could argue that analysts who revise their recommendations more often are acting on noise, perhaps owing to overconfidence (Barber and Odeon, 2000; Odeon, 1998). Hemang and Prem (1995) analyzed the impact of recommendations on share prices made by prominent managers at Barron's annual round table. Grossman and Stieglitz (1980) pointed out the "impossibility of informationally efficient markets". Fang and Yasuda (2011) found that top-ranked All-American analysts, who tend to be more experienced than lower-ranked All-American and other analysts, recommend better investments as measured by subsequent risk-adjusted returns. Jegadeesh and Kim (2006) showed that analysts who make bolder recommendations than the consensus have a greater price impact. Loh and Stulz (2011) argue that star analysts and more experienced analysts tend to issue more influential stock recommendations than do other analysts. However, Barber et al. (2007) found that analysts employed by investment banks provide less profitable buy recommendations than analysts employed by independent research

firms. Recommendation profitability can also differ based on corporate events. For example, Bradley et al. (2008), and Loh and Stulz (2011) indicate that recommendations issued concurrently with companies' earnings announcements are more influential. Finally, there is evidence that recommendations accompanied by earnings forecasts are more profitable (Kecskes et al., 2010), and that other items included in analysts' reports, such as price targets and qualitative analysis, also impact the profitability of recommendations Hobbs, Kovacs and Sharma (2012) found that analysts who frequently revise their stock recommendations outperform those who do not. Bagnoli et al (2009) analysed that analyst whose stock recommendations were positively correlated with recent or future investor sentiment tends to issue relatively less profitable recommendation.

Objectives

The broad objectives are:

1. To examine whether analysts' recommendations have impact on share prices.
2. To know whether there is any leakage of the information before the analysts' recommendations are published.

Based upon the above objectives, following hypotheses can be drawn:

1. H_{o1}: Analysts' recommendations have no impact on stock prices.

   H_{a1}: Analysts' recommendations have impact on stock prices.
2. H_{o2}: There is no leakage of information.

   H_{a2}: There is leakage of information.

Research Methodology

The brokerage analyst recommendations used in this study are taken from the website myIris.com (www.myiris.com) and from the e- versions of various business newspapers such as economic times, business standard, financial express, the Hindu. 30 buy recommendations were obtained from the above mentioned sources. The closing adjusted stock prices for the companies for which buy recommendation are given have been analysed for a period of 15th April -15th May 2013. Data on closing prices of stock and market index is acquired from yahoo finance. Every day closing prices are adjusted for dividends and stock splits.

Securities with only buy recommendations are selected and sell recommendations were not taken. Reason for not selecting sell recommendations is that analysts' are reluctant in giving sell recommendations. Prices of each recommended security are taken to analyse their daily returns and to calculate parameters for market model. To estimate parameters of the market model, share prices data and market index data are collected for a total period of 83-90 days prior to the recommendation of data. An event window of 20 days before and 20 days after the

recommendation data is used for the calculation of abnormal returns. Return on NSE Index is taken as a proxy for return on market portfolio.

Methodology

This is an empirical study based on secondary data. The methodology adopted in carrying out this study is known as the event-study approach. Event, in this case is the recommendation given by the analyst. Basic idea for event study methodology in this study is to find out the abnormal returns incurred due to analysts' recommendations. Event window of ±20 day's windows from the date of release of each recommendation is defined. Average and dispersion of the data on closing prices of various stocks are analysed. The parameters of the market model are estimated over a period that varies from 83-90 days. Then, abnormal returns were calculated for the 41 days centred on the publication day t=0. Z-test statistics are calculated for abnormal returns for event window which comprises of 41 days centred on publication (event) day to check the statistical significance of the results. Abnormal returns are calculated as actual returns less expected returns. Market model is used to calculate expected returns. The market model is a statistical model which relates the return of any given security to the return of the market portfolio. The following market model is used to estimate the parameters:

$$R_{it} = \alpha_i + \beta_i R_{mt} + \varepsilon_{it} \quad (1)$$

Where,

R_{it} = rate of return of the common stock of the firm on day t.

R_{mt} = rate of return of market index on day t.

α_i and β_i are the estimated parameters that vary from security to security.

We used the estimated parameters i.e. α_i and β_i to compute daily expected returns by using the following equation.

$$ER_{it} = \alpha_i + \beta_i R_{mt} \quad (2)$$

Where,

ER_{it} = Expected return on stock I at period t dependent on R_{mt}.

R_{mt} = Rate of return of market index on the t-day.

Next we found out the actual return by using the following formula:

$$R_{it} = \frac{P_t - P_t - 1}{P_t - 1} \quad (3)$$

Here, log returns of the stock and market index are calculated.

Then abnormal returns (ARs) are computed as the difference between the actual return (equation 3) and the expected returns (equation 2) for 41 days i.e. recommendation date and ± 20 days.

$$AR_{it} = R_{it} - ER_{it} \quad (4)$$

Next, the average abnormal returns (AARs) are calculated as given below:

$$AAR_{it} = \sum_{i=1}^{N} \frac{ARit}{N} \quad (5)$$

Where,

AR_{it} is the abnormal return for stock i on t trading day relative to the event date.

N is the number of companies in the sample. (30 in our case)

Further, to measure the impact of stock recommendations, we calculate cumulative average abnormal returns (CAAR) for the different periods. It is given by the following equation.

$$CAAR_{t1.t2} = \frac{1}{N}\sum_{i=1}^{N}\sum_{t=T1}^{T2} ARit \quad (6)$$

Finally tests of statistical significance are conducted to know whether ARs, AARs and CAARs are statistically significant or not using Zi values as computed by the following equation:

$$Z_{it} = \sum \frac{SARit}{\sqrt{N}} \quad (7)$$

Where,

SAR_{it} = Standardised abnormal return of i stock at period t.

N = Number of companies listed in our sample.

Analysis

The first question is whether brokers are more likely to issue positive reports than express negative views about Companies. In other words, do they recommend to buy more often than any other recommendation? Optimism basically means that the analysts' are quite optimist about the future growth potential of that company. Therefore, currently buying the shares of that company might yield abnormal return in the coming future.

Table1: Negative alphas of sample companies

S.no.	Company	Alpha
1	Indian overseas bank	-0.00339
2	Kajaria ceramics	-0.00018
3	Petronet	-0.00128
4	Sterlite	-0.00222
5	Bharti airtel	-0.0031
6	IDFC	-0.00064228
7	Kpit	-0.00042
8	Petronet LNG	-0.0007
9	TVS Motor	-0.0012
10	Fortis	-0.00202
11	Mangalam cement	-0.00378
12	ACC	-0.00117
13	Cummins	-0.00121
14	GPPL	-0.0026
15	Gujarat gas	-0.00262
16	Grasim	-0.00124
17	Exide industries	-0.0003
18	Raymond	-0.00468

With the help of the Table 2 we can analyse that the alpha is significantly negative for the above stated companies. Its implication is that brokers are much more likely to issue a strong buy recommendation. Even without any formal statistical tests, this appears to indicate considerable optimism among brokers. However with the help of this study it has been seen that there is considerable variation among the different brokers. Motilal Oswal, Pioneer Intermediaries and Religare, ICICI Securities, Karvy appear to be the most optimistic in giving their recommendations while Rooshnil Securities, HDFC Securities and Business Line seem to be the most conservative. Optimist here implies that they are more likely to give buy recommendations. Therefore based on their skills and level of expertise, brokers are likely to give recommendations. Can an investor following these recommendations make abnormal returns? Table 2 will clarify this.

Table 2: Average cumulative abnormal returns of recommended stocks over a window of 41 days.

Days	CAAR	Z	Positive	Negative
-20	0.001461	0.620219	46.67%	53.33%
-19	-0.00231	-0.73113	36.67%	63.33%
-18	0.003419	0.656129	53.33%	46.67%
-17	0.007353	1.361891	63.33%	36.67%
-16	-0.00464	-1.33499	46.67%	53.33%
-15	0.000946	0.30554	46.67%	53.33%
-14	0.001653	0.474023	70.00%	30.00%
-13	0.003097	1.09145	56.67%	43.33%
-12	0.000304	0.081274	40.00%	60.00%
-11	0.001056	0.534407	40.00%	60.00%
-10	0.001421	0.519964	50.00%	50.00%
-9	-0.00269	-0.75955	40.00%	60.00%
-8	-0.00171	-0.6883	26.67%	73.33%
-7	-0.00216	-0.94876	56.67%	43.33%
-6	-0.00013	-0.05367	40.00%	60.00%
-5	-0.00565	-2.41908	23.33%	76.67%
-4	-0.00013	-0.05712	46.67%	53.33%
-3	-0.00742	-2.15378	33.33%	66.67%
-2	-0.00039	-0.09333	53.33%	46.67%
-1	-0.00735	-1.62722	40.00%	60.00%
0	-0.00155	-0.29087	33.33%	66.67%
1	-0.00662	-1.13706	50.00%	50.00%

Contd...

Contd...

2	-0.00363	-0.97456	50.00%	50.00%
3	-0.00114	-0.3645	43.33%	56.67%
4	-0.00559	-1.85776	40.00%	60.00%
5	0.000738	0.305564	50.00%	50.00%
6	0.004423	1.961637	53.33%	46.67%
7	0.00009	0.041501	43.33%	56.67%
8	0.003172	0.950227	53.33%	46.67%
9	-0.00228	-0.60666	40.00%	60.00%
10	0.00212	0.706712	60.00%	40.00%
11	0.004415	2.003503	66.67%	33.33%
12	0.004225	1.279298	56.67%	43.33%
13	0.004143	1.453359	56.67%	43.33%
14	-0.00511	-0.92739	46.67%	53.33%
15	0.003675	1.15081	53.33%	46.67%
16	-0.00175	-0.33245	56.67%	43.33%
17	-0.00318	-0.62888	53.33%	46.67%
18	-0.00065	-0.20458	50.00%	50.00%
19	0.000126	0.040278	53.33%	46.67%
20	0.001548	0.50084	40.00%	60.00%

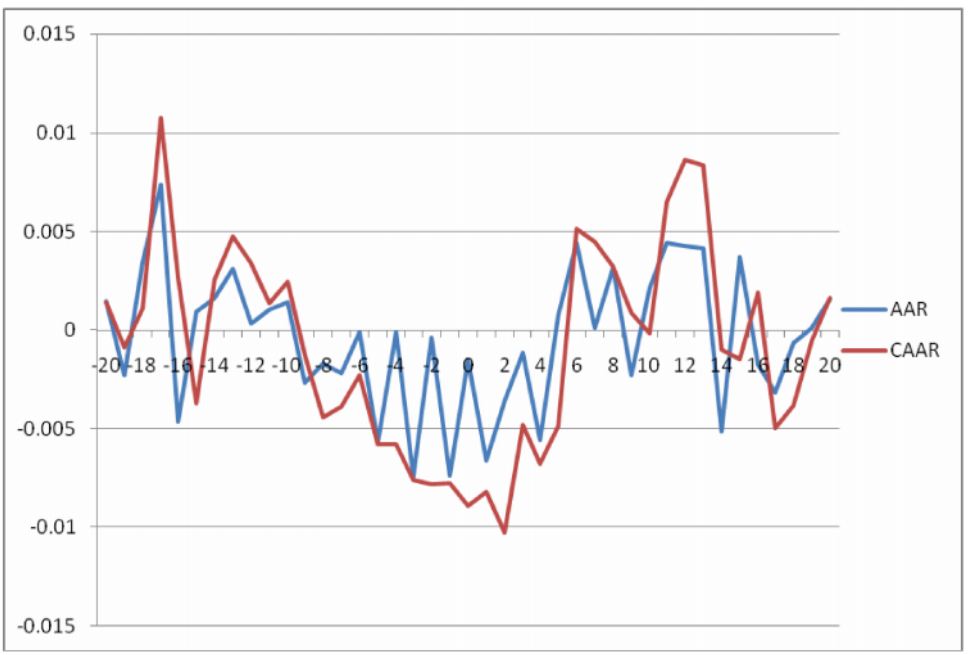

Figure 1: Average abnormal returns and cumulative average abnormal returns over the window of (-20, 0, 20)

Simple Z Test is applied to check the statistical significance of abnormal returns around the announcement dates. Figure 1 clearly shows that the investor community has not taken advantage of the analysts' recommendations. This implies that there is absence of any private or insider information based on which investors could have made abnormal gains. This shows that we do not reject the null hypothesis (H_{02}) i.e. there is no leakage of information. There is no significant reaction by investors on the day of recommendation. Rather we found that there were generation of abnormal losses up till 4^{th} day of announcement which became significant only on 4^{th} day at 10% level. After that the returns have become positive and they were significant on 6^{th} and 11^{th} day of announcement at 10% level of significance. Overall, we found that there is no significant pattern of generation of abnormal returns in our sample. Therefore, results arrived are consistent with the null hypotheses ($H_{01)}$, leading to its acceptance, which means that as per this study, analysts' recommendations do not have any considerable impact on the stock prices of the company which they are recommending.

Conclusion

Clearly the equity analysis industry is much less organized and structured in India than in developed markets. Equity analysis is an important segment of the financial services industry and is poised for growth in India. The business media play an active role in influencing stock prices. Media influences investor sentiment. In making a stock recommendation, financial analysts explicitly express their expectation about the relative near-term return performance of a given firm. Traders and other market participants digest news rapidly, revising and rebalancing their asset positions accordingly. In this study while analyst provide an important source of information in today's market, investors should understand the potential conflicts of interest, analysts might face. E.g. some analysts might work for firms that underwrite or own securities of the companies which the analysts cover. Sometimes they themselves own stock in the companies, either directly or indirectly, through employee stock purchase pools. Based on the analysis of 30 buy recommendations from different brokers involving different companies, it is found that brokerage analysts in India are more likely to give positive recommendations rather than negative recommendations i.e. optimism can be seen in terms of more buy rather than sell recommendation.

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The Impact of Insider Ownership on Financial Leverage

HARINDER KAUR AND KARAMJEET SINGH

The study investigates the impact of insider ownership on the financial leverage of BSE-200 Index companies for five financial years, i.e., 2008 to 2013. The dependent variable is firm's leverage which is measured by two proxies and the independent variable is insider ownership which has been measured by percentage of shareholding by promoters and promoter groups in the firm's equity capital. Pooled OLS multiple regression and Panel data regression models are used for estimation alongwith correlation analysis by taking age, firm size, profitability and asset tangibility as control variables. The findings suggest that insider ownership has positive relationship with financial leverage so it does not provide support to reduce-debt for tunneling effect.

Introduction

Recent studies of corporate ownership structure demonstrate that dispersed ownership structure is far from a norm around the world. The majority of corporations in most countries exhibit concentrated ownership (Du and Dai 2005). More importantly, many corporations also show a sharp divergence of cash flow rights from control rights in the hands of the largest shareholder. These findings suggest that the conflict of interests between large shareholders and minority shareholders is a major theme of corporate governance (La Porta *et al.* 1999; Claessens *et al.* 2000).

A large body of literature do confirm the evidence that corporate governance, particularly the role of ownership structure, is crucial in determining the incentive of insiders to expropriate minority shareholder. The impact of corporate governance on the firm value has been extensively studied in recent years. Most of the literature has highlighted the role of ownership structure that has the impact on the firm value. However relatively lesser attention has been paid to the relationship between insider ownership and the capital structure.

Insider ownership reflects the governance problem arising due to variance in the cash flow and control rights such ownership entails. The owners of the closely held company taking it to the stage of IPO are promoters in Indian

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context. They are considered insiders till they dilute their stake through disposal of their holding in the secondary market. The persons or bodies other than the promoters having investment in the share capital are non-promoter shareholders (Haldar et al. 2010). This situation can potentially impact a firm's financing decisions, particularly choices regarding leverage. The literature on corporate ownership structure suggests that insider equity ownership affects managerial decisions related to operating risk and financial leverage.

Review of Literature

The academic literature on corporate ownership suggests that insider equity ownership affects managerial decisions related to operating risk and financial leverage. Kim and Sorenson (1986), and Agrawal and Mandelker (1987) for American firms; Boubaker (2007) for French firms; and Holmen et al. (2004) for Swedish firms all found evidence of a positive relationship between debt and managerial ownership. Considering U.S. firms, Nielsen (2006) empirically documented a trade-off between a levered financial structure and a weak shareholding. These results suggest that debt will help in expropriation because it gives more power on economic resources.

However, the conclusions are not unanimously univocal. Faccio et al. (2003) moderate the former idea. In the United States, debt seems to play an effective, disciplinary role in governance. In Europe, the companies at the bottom of a pyramid, who are seen as more vulnerable, are not particularly indebted. In contrast, Friend and Lang (1988), Holderness and Shaheen (1998) found a negative relationship between management ownership and leverage and this result is consistent with the premise that capital structure decisions are at least in part motivated by managerial self-interest. On the other hand, in Asia, the situation is different, with strong pressure on the firms in the pyramid. However, excessive debt leverage exposes the firm to failure, a situation where both public and private earnings for the control group are lost. Holderness et al. (1999) found no relationship and show that managerial stock ownership does not increase with debt leverage.

Kang and Horowitz (1991) studied the possible switching points of the relationship between insider equity ownership and financial leverage by running regressions on various subsets of U.S. firms divided according to levels of insider ownership. Their finding of positive and negative relationships using different switching points to categorize firms parallels the positive alignment and negative entrenchment effects of managerial ownership in Morck et al. (1988).

Grullon et al. (2001) for American firms or Brailsford et al. (2002) for Australian firms concluded in favor of a nonlinear complex relation between control and debt, positive at the beginning but turning negative at a certain point of control. For the latter, the inside shareholders will try to avoid a loss of control linked to a risk of financial distress, so they will limit the debt ratio of the controlled firm. Ellul (2008) confirms such a nonlinear relationship in a large sample of family firms over many countries. The relationship is

positive at low levels of managerial share ownership and negative at high levels of managerial share ownership. Shleifer and Vishny (1997) argued that these investors can function as monitoring mechanisms to ensure that managers make value maximizing decisions. Analyzing the impact of ownership on debt levels, Kim and Sorenson (1986) and Agrawal and Mandelker (1987) find support for the hypothesis that leverage is positively related to managerial equity ownership. These findings are consistent with the hypothesis that managerial equity ownership plays a role in reducing agency problems.

In summary, the empirical evidence on the effect of managerial ownership and ownership by insiders on the leverage (i.e. debt-equity choice) is inconclusive and a further study on the issues is warranted.

Conceptual Framework

Large shareholders, especially the promoters, have enormous power in influencing corporate policy. Capital structure decision, as one important corporate policy, is certainly affected by the controlling large shareholder's preferences.

The theoretical prediction of the direction of the effects is ambiguous. On the one hand, the controlling shareholder would like to raise debt ratio in order to prevent the dilution of their shareholding dominance from issuing new equities, which can be termed as the non-dilution entrenchment effect (Du and Dai 2005). The controlling shareholder may also be motivated to increase corporate leverage to signal to the outside capital market that the corporate governance is sound even in the presence of the divergence of cash flow rights and control rights, which may help the firm to expand external finance (Stulz 1988).

On the other hand, a high corporate leverage with obligation to repay a substantial amount of debt will constrain the large shareholder's capability to tunnel corporate resources. Under a heavy debt burden, the firm must utilize a large proportion of corporate earnings for the purpose of debt repayment (Friend and Lang 1988). This would restrict the power of the controlling shareholder to conduct inter-corporate revenue transfer to tunnel corporate financial resources, which may lead the controlling shareholder to lower debt ratio. This reduce-debt-for-tunneling effect will prompt the controlling shareholder to reduce corporate leverage.

The empirical evidence on the impact of control-enhancing mechanisms on leverage is very limited. Given this mixed and contradictory evidence, the direction of the relationship between ownership and financial leverage is not clear.

Need of the Study

There are large number of studies on ownership, governance structure and leverage (Morck 1998; Holderness, 1998; Faccio et al. 2003). However, most of the attention has been given to corporate governance problems in

developed countries. In India, ownership structure is highly concentrated in the hands of promoters and their family members and acquaintances (Phani et al. 2005). When so much fortune of capital markets is concentrated in the hands of so few people (promoter group), it becomes important topic for research.

Past studies produced widely divergent results on the relationship between insider ownership and financial leverage. Some studies have suggested that debt is positively related to insider's equity ownership (Leland and Pyle 1977; Stulz 1988; Berger et al. 1997;; Holmen 2004), while other empirical studies have argued for a negative relationship between managerial ownership and debt levels (Friend and Lang 1988; Holderness 1998; Faccio et al. 2003). While studies like (Holderness et al. 1999; Anderson and Reeb 2003) found no relationship between insider ownership and capital structure choices.

Thus, it is evident that there is still difference of opinion among researchers on this topic. Moreover, relevant previous research from India highlights opportunities for further research in this area.

Objective

The main objective of this study is to examine the impact of the insider ownership on the financial leverage of publicly listed BSE firms.

Hypothesis

Positive relationship exists between insider ownership and financial leverage.

Research Design

Sample

To assess the effect of insider ownership on the financial leverage, in emerging economy, we focus on Indian corporate sector. The data set includes 200 companies which are included in the S&P BSE 200 Index of Bombay Stock Exchange (BSE) of India. Banking, financial and public sector companies are excluded from the sample as they are subject to different regulatory bodies. In addition, companies with incomplete information were also deleted from the sample. These criteria resulted in a final sample of 126 companies. This study uses the data for the five financial years from April 2008 to March 2013.

All the data for this study has been sourced from the Annual reports of the companies and the corporate database (PROWESS) maintained by the Centre for Monitoring the Indian Economy (CMIE).

Methodology

Univariate analysis and multivariate analysis are both employed. For univariate analysis, descriptive statistics have been presented. Correlation matrix has been constructed to test for multicollinearity. After the univariate analysis, the pooled OLS multiple regression analysis (Kumar 2004; Phani

et al. 2005; Du and Dai 2005; Lin 2008) has been conducted to examine the overall influence of insider ownership on the financial leverage. Robustness of the results has been checked by applying panel data regression. The Pooled OLS regression equation that this study employed for the multivariate analysis is as follows

$$\text{Leverage} = \beta_0 + \beta_1 \text{ (Insider Ownership)} + \beta_2 \text{ (Control Variables)} + \varepsilon$$

where,

β_0 = represents the overall constant in the model:

β_1, β_2 = k vectors of regressors;

ε = are the error terms.

Dependent Variable: Financial leverage is the dependent variable of inquiry in this study. Two different measures of leverage were considered for the purpose of robustness and comparability. Consistent with Antoniou et al. (2008), first measure of leverage was defined as the ratio of book value of long term debt divided by total assets (LEV1). This indicator captures the characteristics of firm indebtedness. Another measure of leverage was defined as the ratio of debt to equity of the firms (LEV2). Similar measures of capital structure were used in similar studies by Kang and Horowitz 1991; Anderson and Reeb 2003; King and Santor 2008.

Independent Variable: Insider ownership is the independent variable. 'Insider' variable is defined as the percentage of insider holding in the firm. Insider holding means the shareholding by promoters and promoter groups in the firm's equity capital. The percentage of insider ownership is defined as the number of shares owned by insiders divided by the total number of shares outstanding and multiplied by 100. The above-mentioned criterion was used in previous studies by McConaughy et al., (1998), Mishra et al. (2001), Chang (2001), Phani et al. (2005) and Saravanan (2009).

Control Variables: In order to control for the other possible variables that are usually considered in financial literature as influencing the firm's capital structure, which are not captured by the ownership variable are included as control variables. The control variables used in the study have been selected with reference to those employed in earlier empirical studies. So, age, size, profitability and asset tangibility have been treated as control variables in the study to control for the impact of firm-specific characteristics on leverage.

Age: Age has non-linear impact on firm debt, suggesting that the younger firms rely on debt more than the equity, this trend reverses once they become older. This result is plausible as the older firms have the history of performance and they are known in the market, therefore they may have lower cost of capital if raised in form of equity than debt. Age has been measured as the natural log of number of years since inception to the date of observation (Kumar 2004).

Firm Size: Numerous studies suggest that financial leverage is a function of firm size (Titman and Wessels 1988). Firm size has been measured as the

natural log of the book value of total assets (Faccio et al., 2003). The hypothesized relationship between firm size and leverage is mixed (Kim and Sorensen 1986; Rajan and Zingales 1995). On the one hand, the larger firms usually have a higher debt ratio because it is usually easier for large firms to borrow from the banks or to raise debt in the capital markets. On the other hand, information asymmetry is likely less severe for larger firms than for smaller firms. The outside investors might find it easier to get more information about the firms. This allows larger firm to raise equity directly from the capital markets, allowing large firms to have lower leverage.

Profitability: Firm Profitability has been measured by return on assets (ROA) which is calculated as a ratio of net income to total assets (Mishra et al. 2001; Din and Javid 2011). Myers (1984) suggested that more profitable firms use less debt because they have sufficient internal funds. Several empirical studies have found a negative relationship between profitability and leverage (Friend and Lang, 1988). On the other hand, the positive relation between profitability and leverage is also supported when considering the supply side. Rajan and Zingales (1995) argue that creditors prefer to give loans to firms with high current cash flow. High profit firms with abundant cash flow are expected to exhibit higher leverage than low profit firms do.

Asset Tangibility: Asset tangibility is ratio of net fixed assets to total assets at the date of observation (Mishra et al. 2001; Randoy and Goel 2000). Tangible assets can serve as collateral, which will make it easier to obtain loans. Moreover, the asset substitution problem is less likely to occur when firms have more assets already in place (Myers, 1984). Thus, the higher the value of tangible assets, the more likely a firm will have a high leverage ratio (Kumar 2004; Du and Dai 2005).

Results and Analysis

The descriptive statistics show that the insider ownership ranges widely in our sample. It varies from 0 to 90 percent, with a mean of 52.85 percent and a median of 52.48 percent. There is huge gap in the ownership pattern of the firms. This shows that on an average the sampled companies are dominated by promoter's stake. The sample includes young as well as old firms with respect to age. The age of the firms varies between 2 years to 116 years while the average age of firms is around 38 years.

Table1:Descriptive statistics

	N	Mini-mum	Maxi-mum	Mean	Median	Std. Deviation
Age (years)	630	2	116	38.30	29.00	25.772
Roa (times)	630	-0.2439	0.75686	0.0906	0.0778	.08688
Assettan (times)	630	.00	.786	0.2578	0.22518	0.18344
Inown (%)	630	.00	90.00	52.85	52.48	17.69
Size (Rs. millions)	630	50101.60	13374094.4	1115108	360892.7	2.14619
Lev1 (times)	630	.00	.6687	.1624	.14438	.1503
Lev2 (times)	630	.00	17.58	.7230	.40000	1.6094

The sample also includes large as well as small firms in respect of size. Total assets (mean Rs. 1115108 million) vary between Rs. 50101.60 million to Rs. 13374094.4 millions. Debt level varies from zero to 67 percent. The average ROA is 9.06 percent with a maximum of 75.6 percent and a minimum of -24.4 percent. The asset tangibility varies from 0 to 78.6 percent with a mean of 25.78 percent and median of 22.52 percent. It once again reinforces the wide variations that exist in our sample.

Bivariate Correlation Analysis

The Pearson correlation was used to measure the degree of the linear association between independent and dependent variables. It was used to find how closely related two variables are (e.g., Leverage and ROA). It is also used as a tool to identify multicollinearity between the explanatory variables. Table 2 provides the correlation matrix for all the key variables in the analysis.

Table 2: Correlation matrix

	Lev1	*Lev2*	*Inown*	*Age*	*Size*	*Roa*	*Assettan*
Lev2	0.469**	1					
Inown	-0.008	0.086*	1				
Age	-0.23**	-0.12**	-0.29**	1			
Size	0.321**	0.130**	-0.138*	0.0452	1		
Roa	-0.53**	-0.29**	0.083*	0.184**	-0.246	1	
Assettan	0.319**	0.208**	-0.016	-0.09*	0.071**	-0.085	1

** denotes correlation is significant at the 0.01 level.
* denotes correlation is significant at the 0.05 level.

From the Table 2 it is observed that there is a strong negative correlation between leverage (LEV1) and ROA followed by age and insider ownership. Another measure of leverage (LEV2) shows significant negative relation with ROA and size. ROA also has significant negative correlation with size and leverage. Asset tangibility has positive correlation with size.

The matrix also indicated positive relationship of insider ownership with ROA while negative relationship with age and size, but this relationship is very weak, having no major influence.

Multivariate Regression Analysis

Table 3 and 4 present the results of regression analysis. To check whether variables are collinear, VIF tests were performed. All the variance inflation factor (VIF) coefficients are less than 2 and tolerance coefficients are greater than 0.50. Thus, multicollinearity among the independent variables should not be seen as the problem in both the models. Autocorrelation has been checked by Durbin-Watson statistics which state the absence of autocorrelation.

Table 3: Pooled OLS regression estimates on factors affecting leverage

	Lev1				Lev2			
	Regression coefficients		Collinearity statistics		Regression coefficients		Collinearity statistics	
	B	Sig	Tole-rance	VIF	B	Sig	Tole-rance	VIF
Constant	.035	.376			-.594	.405		
Inown	.017	.093	.891	1.122	.010	.004	.880	1.136
Age	-.128	.000	.856	1.168	-.048	.564	.854	1.170
Size	.257	.000	.950	1.052	.088	.091	.919	1.088
Roa	-.774	.000	.940	1.064	-5.041	.000	.886	1.128
Assettang	.206	.000	.951	1.051	1.584	.000	.981	1.019
R^2			0.415				0.240	
Adjusted R^2			0.410				0.233	
Anova's Sig			0.000				0.000	
Durbin-Watson			1.859				1.931	

Table 3 shows the Pooled regression model representing the factors affecting the leverage by taking the ratio of long term debt to total assets (LEV1) and debt equity ratio (LEV2) as the measures of financial leverage. The table shows adjusted R^2 of around 41 percent and 24 percent which shows that independent variables explain around 41 percent of the variances in the leverage (LEV1) and 24 percent in LEV2, and both the models are statistically significant at 1 percent. The results show that insider ownership has significant positive impact on the leverage of the firm which means that with the increase in the level of shareholding by promoters, the debt level of the firm also rises and vice versa. It has also been found that size of the firm and profitability also positively affected financial leverage whereas age of the firm and the profitability has significant negative impact on the leverage.

The robustness of the results has been checked by applying fixed effect panel regressions (Table 4). These models show the adjusted R^2 of 83.5 percent and 47.8 percent. Analyzing the regression coefficients, the main finding remain the same that financial leverage is positively related with the ownership by promoters irrespective of the measure used for the leverage. Similar results were shown by this model that leverage is negatively impacted by profitability and age whereas the size and asset tangibility affects the leverage positively.

Overall it can be concluded that the empirical results accept the hypothesis framed regarding the relationship between insider ownership and financial leverage. Contrast with Friend and Lang 1988; Holderness 1998; Faccio et al. 2003, our study found significant positive relationship between insider ownership and financial leverage.

Table 4: Panel regression estimates on factors affecting leverage (LEV2)

	Lev1		Lev2	
	B	Sig	B	Sig
Constant	0.469	0.000	-1.221	0.568
Inown	0.0128	0.039	0.016	0.645
Age	-0.210	0.000	-0.127	0.036
Size	0.0307	0.004	0.599	0.045
Roa	-0.346	0.000	0.281	0.822
Assettang	0.107	0.008	1.952	0.025
R^2	0.870		0.478	
Adjusted R^2	0.835		0.339	
ANOVA's Sig	0.000		0.008	
Durbin-Watson	1.342		1.824	

Conclusion

The empirical results of this study accept the hypothesis regarding the relationship between insider ownership and financial leverage. Contrast with Friend and Lang 1988; Holderness 1998; Faccio et al. 2003, results show that financial leverage is positively affected by the stake of insiders in the firm's equity capital. The results have considerable implication regarding the capital structure debate. By arguing for a link between the ownership structure and capital structure and through empirical support, this paper adds to an understanding of variation in capital structure.

In the present study BSE-200 has been used, other indices can be used for more comprehensive results. Period and sample of the study can be extended to draw more meaningful conclusions. Broad based industry wise comparison and cross country analysis can be conducted. Other ownership variables like ownership of directors, managers and their families can be used as proxy for insiders. In addition to ratio of book value of debt to total assets, other measures can be used as indicators of firm's leverage. Moreover, the analysis of corporate governance in the financial institutions and its impacts on the firms will be very helpful, in particular for regulators to propose concrete measures for improving the financial system.

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Capital Structure and Firm's Characteristics: Evidence from Indian Automobile Industry

NISHI SHARMA AND GURMAIL SINGH

The present paper is expected to provide thoughtful insight through investigating the relationship of capital structure with characteristics of Indian automobile firms that faced major oscillations in recent years. The study diagnoses the impact of eight independent variables over leverage through pooled, fixed effect and random effect regression analysis. The results divulged that leverage is positively related with size, tangibility and growth whereas it has negative relation with tax rate. Profitability has negative effect on long term leverage and liquidity has negative influence over total leverage. Firm's uniqueness and non debt tax shield failed to demonstrate any significant impact over capital structure.

Introduction

How do the firms choose their capital structure? A question raised before decades is still unanswered (Antoniou, Guney and Paudyal 2002). In spite of extensive research in this field, the deliberation is still going to have consensus over the factors determining the capital structure of companies. Modigliani and Miller (1958) have given the concept of irrelevance to capital structure which illustrates that under certain key assumptions, firm's value is unaffected by its capital structure. Thereafter many research efforts have been contributed to explore the consequences of relaxing the ideal assumptions of the theory. But unfortunately they become failure to resolve the controversy of determinants of capital structure and created further nebulousness to the issue. For an instance, Pecking order theory alludes that leverage is negatively related with profitability as well as firm's growth (Pettit and Singer, 1985; Keshtkar, Valipour and Javanmard 2012). At the flip side, Trade-off theory predicts that firms with higher level of profit should have high debt ratios due to an obvious reason of deductibility of the interests from the taxable income respectively. Researchers could also not get any consensus over the relationship of leverage with key variables.

Further, most of the studies have been undertaken in context to developed countries which may not be as fruitful with respect to developing countries.

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Like many developing countries evidence for mainly pecking order behaviour in Asian companies (Fan and So 2004) which is in sharp contest to the findings on US and European markets where evidence for Trade off theory are found. The primary reason for such difference is the possible huge difference between institutional structure of developing and developed nations. Getzmann, Lang and Spremann (2010) noticed that research in Asian market is necessary. Chen (2004) also observed that the majority of the research results have been derived from the experience of developed economies but little work has been done to further our knowledge of capital structure within developing countries.

Review of Literature

The pioneer work of Modigliani and Miller (1958) insinuated that the value of a firm is independent from the financing decisions of the organisation. However the theory was subjected to certain restrictive assumptions of perfect capital market with no arbitrage, no transaction costs/ tax and parity of debt & equity costs. Though this array of assumptions does not hold well in practice yet capital structure theories are of value (Groth and Anderson, 1997) and gave birth to an unresolved mystery of what determines capital structure of a company?

After the seminal work of Modigliani and Miller (1958), a series of capital structure theories were brought forward in the past 40 years, including the Trade-off theory (Modigliani and Miller, 1963), Agency Cost theory (Jensen and Meckling, 1976), Signalling theory (Ross, 1977), Pecking Order theory (Myers, 1984), and Equity Market Timing theory (Baker and Wurlger, 2002; Hennessy and Whited, 2005). But unfortunately instead of resolving the issue, these studies portrayed the topic as one of the most controversial topic of finance. There is a dearth of unanimity about the relationship of leverage with different variables. For example, profitability found to have negative relation with leverage in developed countries (Titman and Wessels 1988, Rajan and Zingales 1995, Antoniou et al, 2002 and Bevan and Danbolt 2002) as well as in developing countries (Booth et al, 2001, Pandey 2001, Um 2001, Wiwattanakantang 1999, Chen 2004 and Al-Sakran 2001). The relationship is in favour of Pecking Order theory of capital structure also. But some others like Kim and Berger (2008) found positive relation between profitability and leverage which is in consensus with trade off theory. The study suggests that a high profit level leads to rise in higher debt capacity as well as accompanying tax shields. The added tax shields turns into positive relationship between profitability and financial leverage.

Similar to profitability, there are different opinions as to the relationship of leverage with tangibility, growth of firm and effective tax rate. Titman and Wessels (1988), Rajan and Zingales (1995) and Wiwattanakantang (1999) observed positive relationship between leverage and tangibility. This is so because firms having higher tangibility of the asset are more competent

enough to provide collateral to the debt (Jensen and Meckling, 1976; Myers, 1977; Abor, 2008). Further higher tangibility of the asset reflects better liquidation value of firms (Harris and Raviv 1991; Titman and Wessels 1988). However some other studies like Booth et al, (2001) studying capital structure of ten developing countries and Huang and Song (2002) studying Chinese companies narrated a negative relation between tangibility and leverage. Um (2001), also intimated a negative relationship between debt and tangibility as due to low level of tangible assets, management may choose a high level of debt to mitigate equity agency costs. Bevan and Danbolt (2000 and 2002) found a positive relationship between tangibility and long-term debt, whereas pointed out a negative relationship for short-term debt and tangibility in the UK.

The study conducted by Wald (1999) reported that growth is positively related with debt in China, which confirms the same relationship found in developed countries except the United States. Booth et al, (2001) found that out of ten countries the relation between growth and leverage is generally positive in all countries except for South Korea and Pakistan. Pandey (2001) also noticed a positive relationship between growth and both long-term and short-term debt ratios in Malaysia. On the contrary Chung (1993) and Rajan and Zingales (1995) remarked that due to the higher costs associated with the agency relationship between shareholders and debt holders in growing industries, there exist a negative relationship between growth and the level of leverage in developed countries.

Deliberation regarding relationship between effective tax rate and leverage is also going on. Haugen and Senbet (1986) pointed out that higher tax liability acts as an incentive to use more debt due to the tax deductibility of interest on loan. Therefore there is a positive relationship between effective tax rate and leverage ratio. Harris and Raviv (1991) also remarked that leverage is positively related to non-debt tax shields, research & development expenditure, advertising expenditure and firm's uniqueness. At the flip side other school of thought establishes a negative relation between tax rate and debt capacity of firms. As higher tax rate would result into lesser availability of internal funds as well as higher cost of capital. This would ultimately result into reduced fixed capital formation and demand for external debt (Kremp et al., 1999).

Size of a firm has also found to be a good explanatory variable for its leverage ratio (Antoniou et al, 2002). Most of the studies mentioned positive relation between size and leverage. Hamaifer et al, (1994) argue that larger firms have higher debt capacity which implies a positive relationship between size and leverage. Um (2001) also indicated that larger firms will be induced to use more debt than smaller ones. Titman and Wessels (1988) reported that total debt ratio as well as long-term debt ratio has a positive correlation with the size of the firm. G-7 countries also evidenced a positive relationship between size and leverage. Wiwattanakantang (1999), Booth et al, (2001), Pandey (2001), Al-Sakran (2001), and Huang and Song (2002) found a significant positive relationship between leverage ratios and size in developing

countries. In fact large firms are too big to fail (Bevan and Danbolt 2002). The study reported that size is positively related to long-term debt but it is found to be negatively related to short-term debt.

In short, there is a position of indecisiveness in context to relationship of leverage with its determinants. Here it is important to note that whereas, most of these studies to date are based on data from developed countries (Buferna et.al. 2005). There are few studies that provide evidence from developing countries. Further there is a dearth of study conducted at micro level. In this reference the present study attempts to analyse the determinants of capital structure in Indian automobile industry.

Research Methodology

The present paper studies the capital structure of Indian automobile industry through the panel data of 10 years from 2003-12. The data has been collected from 46 automobile companies (Annexure I) from CMIE prowess which is one of the most reliable data source for Indian companies. The continuous availability of required data was the selection criterion for the companies. Capital structure has been portrayed by long term as well as total leverage. As leverage may be calculated on the basis of total assets as well as capital employed, therefore, four variables have been used to characterise capital structure of companies. The study identifies eight explanatory variables viz., profitability, tangibility, effective tax rate, non-debt tax shield, size, growth, uniqueness and liquidity (Table 1).

The strength and direction of relationship between dependent and independent variables have been tested through regression analysis. As the problem of multi-co linearity and serial correlation among variables may result into spurious results of regression therefore at the outset, correlation has been estimated among dependent and independent variables. Thereafter pooled, fixed effect and random effect regression analysis have been conducted to establish the relationship between dependent and independent variables.

The administered models are as follows:

Model 1: $LDCE = \alpha + b_1G + b_2L + b_2NDTS + b_4P + b_5S + b_6T + b_7TR + b_2U + \in$

Model 2: $LDTA = \alpha + b_1G + b_2L + b_2NDTS + b_4P + b_5S + b_6T + b_7TR + b_2U + \in$

Model 3: $TDCE = \alpha + b_1G + b_2L + b_2NDTS + b_4P + b_5S + b_6T + b_7TR + b_2U + \in$

Model 4: $TDTA = \alpha + b_1G + b_2L + b_2NDTS + b_4P + b_5S + b_6T + b_7TR + b_2U + \in$

Here α is a constant term, b is regression coefficient and $\in$ is an error term. The individual significance of independent variables has been examined through probability of t statistics and their joint significance has been tested through probability of F statistics. The efficacy of model has been examined through the value of R squared i.e. the extent of variation in dependent variable as explained by independent variables. Further to compare the results of fixed and random effect model Hausman test has been applied.

Null Hypothesis: Random effects model is more efficient as compared to Fixed effects model.

Alternative Hypothesis: Fixed effect regression is more useful.

Table 1: List of selected variables

S.No.	Variable	Formula
Dependent Variable	Leverage	$LDCE = \frac{\text{Long term debt}}{\text{Capital employed}}$
		$LDTA = \frac{\text{Long term debt}}{\text{Total assets}}$
		$TDTA = \frac{\text{Long term debt + Short term debt}}{\text{Captal employed}}$
		$LDTA = \frac{\text{Long term debt + Short term debt}}{\text{Total assets}}$
Independent Variable 1.	Growth (G)	$G = \frac{\text{Net Sales}_t}{\text{Net Sales}_{t-1}}$
Independent Variable 2.	Liquidity (L)	$L = \frac{\text{Current Assets}}{\text{Current Liabilities}}$
Independent Variable 3.	Non debt tax shield (NDTS)	$NDTS = \frac{\text{Depreciation}}{\text{Total assets}}$
Independent Variable 4.	Profitability (P)	$P = \frac{\text{Profit before depreciation and tax}}{\text{Total assets}}$
Independent Variable 5.	Size (S)	$\text{Size} = \log(\text{Total Assets})$
Independent Variable 6.	Tangibility (T)	$T = \frac{\text{Net Fixed Assets}}{\text{Total assets}}$
Independent Variable 7.	Tax Rate (TR)	$TR = 1 - \left(\frac{\text{Profit after tax}}{\text{Profit before tax}}\right)$
Independent Variable 8.	Uniqueness (U)	$U = \frac{\text{Selling and distribution expenses}}{\text{Net sales}}$

Results

Table 2 portrays the descriptive statistics of different variables and the results of Jarque Berra (JB) test. The test aims at validating / rejecting the null hypothesis of normality of data. Data is assumed to be normal if it has zero skewness with a kurtosis value of 3 leading to zero value of test statistics.

Table 2: Descriptive statistics

Variables	Mean	Maximum	Minimum	Standard Deviation	Skeweness	Kurtosis	JB statistics
G	0.20	2.10	- 0.95	0.25	1.28	14.89	2835.31
LDCE	0.44	6.35	0.00	0.52	7.72	79.08	115498.40
LDTA	0.26	1.26	0.00	0.18	1.59	8.91	863.05
L	1.34	12.16	0.17	1.13	5.28	40.39	28933.33
NDTS	0.05	0.15	0.00	0.02	1.18	5.91	269.11
P	0.17	0.58	- 0.58	0.09	-1.05	15.70	3178.27
S	8.42	13.23	4.80	1.63	0.55	3.08	23.48
T	0.37	0.74	0.04	0.14	0.05	2.54	4.29*
TR	0.26	1.48	-10.26	0.52	-18.16	368.08	2579884.00
TDCE	1.04	10.83	0.23	0.89	6.96	67.43	83288.75
TDTA	0.60	1.98	0.18	0.22	2.41	14.88	3151.30
U	0.03	0.12	0.00	0.03	0.86	2.99	56.61

Source: Author's Calculation

*Indicates acceptance of null hypothesis of normality of distribution.

Table clearly demonstrates that size and liquidity of selected companies tend to be most volatile during the study period. The scrutiny of skewness, kurtosis and JB statistics provides sufficient ground to reject null hypothesis for all variables except tangibility. However, non-normality of distribution may be ignored to proceed for regression in case of panel data.

As the problem of multi-collinearity among variables may result into spurious results of regression analysis therefore at the outset, correlation has been estimated between dependent and independent variables. Table 3 depicts the results of correlation of variables with dependent variables.

Table 3: Correlation of independent variables with dependent variables

Variables	LDCE	LDTA	TDCE	TDTA
Growth	0.08*	0.06	0.09*	0.09**
Liquidity	– 0.17**	– 0.09*	– 0.27**	– 0.36**
NDTS	0.17**	0.17**	0.05	0.11**
Profitability	– 0.32**	– 0.38**	– 0.27**	– 0.37**
Size	– 0.24**	– 0.19**	– 0.17**	– 0.13**
Tangibility	0.39**	0.52**	0.15**	0.28**
Tax rate	– 0.09**	– 0.13**	– 0.07	– 0.15**
Uniqueness	– 0.02	– 0.14**	0.04	– 0.09*

Source: Author's Calculation

** Indicates that correlation is significant at the 5% level.

* Indicates that correlation is significant at the 10% level.

Table 3 exhibits significant correlation between independent and dependent variables. But the same is not so strong to effectuate the problem of multi-colinearity among data. Therefore we may proceed to the regression analysis. The results of regression models have been summarised in Table 4.

The findings of the regression analysis confide that the debt to total assets ratio (model 2 and model 4) is more appropriate measure to leverage for the selected variables. In case of debt to capital employed ratio (model 1 and model 3) the regression coefficient has been found to be very lesser to accept the authenticity of the results.

Further, apparently, the results of fixed effect model have been found in much better position than random effect model. But to draw conclusive evidence Hausman test has been conducted (Table 5).

Probability of chi square test is not sufficient enough to accept the null hypothesis. Therefore we may assert that results of random effect model are not superior to that of fixed effect model. In other words the results of fixed effect model can be better trusted upon. The findings of fixed effect regression model for leverage in terms of total assets may by outlined as below:

Table 4: Results of Regression Analysis

			Constant	G	L	NDTS	P	S	T	TR	U	R^2	Adjust R^2	F-statistic
Model 1	Pooled Effect	Coefficient	0.58	0.37**	-0.03	1.15	-2.00**	-0.03**	1.01**	-0.05	0.24	0.28	0.26	21.56**
		Std. error	0.16	0.09	0.02	1.2	0.27	0.01	0.19	0.04	0.84			
	Fixed Effect	Coefficient	0.17	0.08	-0.02	-1.91	-0.05	0.01	0.97**	-0.02	-1.65	0.69	0.65	16.89**
		Std. error	0.33	0.07	0.03	1.4	0.26	0.03	0.24	0.03	1.57			
	Random Effect	Coefficient	0.45	0.13*	-0.03	-1.5	-0.50**	-0.02	1.06**	-0.03	-1.11	0.09	0.07	5.64**
		Std. error	0.23	0.07	0.02	1.25	0.24	0.02	0.21	0.03	1.16			
Model 2	Pooled Effect	Coefficient	0.16	0.11**	0	-0.28	-0.76	0	0.62**	-0.03*	-0.78**	0.42	0.41	40.12**
		Std. error	0.05	0.03	0.01	0.37	0.08	0	0.06	0.01	0.26			
	Fixed Effect	Coefficient	-0.07	0.02	0	0	-0.21**	0.03**	0.32**	-0.01*	-0.39	0.8	0.78	30.86**
		Std. error	0.09	0.02	0.01	0.39	0.07	0.01	0.07	0.01	0.43			
	Random Effect	Coefficient	0.09	0.03*	0	-0.17	-0.32**	0.01**	0.40**	-0.02**	-0.77**	0.16	0.15	10.73**
		Std. error	0.07	0.02	0.01	0.36	0.07	0.01	0.06	0.01	0.35			
Model 3	Pooled Effect	Coefficient	2.09	0.64**	-0.17**	2.53	-3.19**	-0.06**	-0.05	-0.07	1.36	0.19	0.17	12.97**
		Std. error	0.29	0.16	0.03	2.18	0.49	0.03	0.35	0.07	1.53			
	Fixed Effect	Coefficient	1.77	0.2	-0.16**	-6.68**	0.23	-0.07	0.87*	-0.03	1.21	0.62	0.57	12.30**
		Std. error	0.64	0.13	0.05	2.67	0.5	0.06	0.46	0.06	3			
	Random Effect	Coefficient	1.9	0.27**	-0.17**	-4.54**	-0.5	-0.08**	0.72*	-0.03	1.16	0.08	0.06	4.68**
		Std. error	0.43	0.13	0.04	2.37	0.46	0.04	0.4	0.06	2.18			
Model 4	Pooled Effect	Coefficient	0.73	0.17**	-0.06**	0.64	-1.03**	0	0.20**	-0.04**	-0.94**	0.34	0.33	29.25**
		Std. error	0.06	0.04	0.01	0.49	0.11	0.01	0.08	0.02	0.34			
	Fixed Effect	Coefficient	0.24	0.07*	-0.06**	-0.75	-0.1	0.05**	0.15*	-0.02**	-0.38	0.81	0.78	31.70**
		Std. error	0.11	0.02	0.01	0.47	0.09	0.01	0.08	0.01	0.53			
	Random Effect	Coefficient	0.48	0.08**	-0.06**	-0.77**	-0.26**	0.03**	0.20**	-0.03**	-0.90**	0.23	0.22	17.27**
		Std. error	0.09	0.02	0.01	0.44	0.08	0.01	0.07	0.01	0.44			

Source: Author's calculation

** Indicates that correlation is significant at the 5% level. And *Indicates that correlation is significant at the 10% level.

Table 5: Results of Hausman Test

Variable	LDCE		LDTA		TDCE		TDTA	
	Difference (e^{-2})	Probability	Difference (e^{-2})	Probability	Difference (e^{-2})	Probability	Difference (e^{-2})	Probability
P	0.98	0.000	0.05	0.000	3.74	0.0002	0.07	0.000
T	1.28	0.4229	0.07	0.0012	4.93	0.5158	0.08	0.1089
TR	0.00	0.1973	0.00	0.0092	0.01	0.5308	0.00	0.0127
NDTS	39.68	0.5178	2.02	0.2410	152.67	0.0835	2.51	0.9303
S	0.06	0.1645	0.00	0.0017	0.21	0.8837	0.00	0.0002
G	0.01	0.0001	0.00	0.0001	0.05	0.0009	0.00	0.0006
U	112.38	0.6148	6.38	0.1321	425.38	0.9811	8.21	0.0704
L	0.02	0.5059	0.00	0.9341	0.07	0.7557	0.00	0.5964
Chi-Sq. Statistic	38.45		38.46		28.69		40.04	
Probability	0.0000		0.0000		0.0000		0.0000	

Source: Author's calculation

1. Results of regression analysis divulge that selected variables are powerful enough to explain around 78% variation in leverage of selected automobile companies.
2. F test statistics is significant at 5% level of significance which evidence that the selected independent variables are jointly significant to influence leverage of a company.
3. T test statistics witnessed that:
    - Growth and liquidity are significant to influence total leverage but not long term leverage. Growth has positive impact upon leverage whereas liquidity negatively influences leverage.
    - Non debt tax shield found to be an insignificant factor except when variables were regressed with fixed effect for long term capital employed.
    - Profitability negatively influence long term leverage but fails to have any significant impact upon total leverage. The results are in confirmation with Booth et al, 2001, Pandey 2001, Um 2001, Wiwattanakantang 1999, Chen 2004 and Al-Sakran 2001, Kim and Berger 2008 and Su 2010).
    - Size has been observed as a significant variable to influence long term as well as total leverage. Size has found to positively associated with leverage. This is so because bigger firms are lesser prone to corporate failure and therefore they can easily get debt financing. The results are in the lines with the results of Hamaifer et al, (1994); Um (2001); Titman and Wessels (1988); Wiwattanakantang (1999), Booth et al, (2001), Pandey (2001), Al-Sakran (2001), and Huang and Song (2002); Bevan and Danbolt 2002.
    - Tangibility has also been found to have positive impact upon leverage. The results are in consensus to Jensen and Meckling, 1976; Myers, 1977; Titman and Wessels, 1988; Harris and Raviv 1991; Rajan and Zingales, 1995; Wiwattanakantang 1999, Abor, 2008, Akhtar and Oliver 2009.
    - Tax rate reported to negatively influences leverage. The results are in confirmation to Kremp et al., (1999).
    - Uniqueness of company also found to be insignificant for leverage under fixed effect regression models. However the same was found significant through pooled and random effect regression analysis.

Conclusion

The results support fixed effect regression model and recommended use of debt to total assets ratio for estimating leverage of the company. Regression results annunciate that Indian automobile companies also favours Pecking order theory like other Asian companies. The long term capital structure of firms found to be negatively influenced by profitability of companies. The results are in contradiction to studies of developed nations which favour

applicability of trade off theory. The present study reported that uniqueness of a company does not have any significant impact upon capital structure. However, the result is suspected to hold true for other industries where selling expenses play crucial role to upgrade business and secure market patronage.

The findings indicate that companies having more tangible assets, bigger in size and enjoying growth in net sales are expected to have more debt ratio as they are in a better position to shield their investors and provide collateral to the debt. However the influence of growth and liquidity over long term leverage was negligible on long term leverage. This is probably why some of the studies have reported contradictory results even for developing countries. Liquidity and effective tax rate seem to have negative impact upon total leverage. In current precarious situation any shareholder may expect sound and stable profits only after ensuring optimal capital structure of the company. In this context the results are expected to provide insight to design different company specific variables in a manner that could ensure best possible capital structure in contemporary situations.

However, the present study has been conducted at micro level, it would have been of more interest to extend the study to all manufacturing industry and examine the impact of industry specific factors like governance, ownership, diversification, agency cost etc.

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Annexure I: List of selected companies

A B G Shipyard Ltd., Amtek Auto Ltd., Ashok Leyland Ltd., Atul Auto Ltd., Auto Pins (India) Ltd., Automobile Corpn. Of Goa Ltd., Automotive Axles Ltd., Automotive Stampings & Assemblies Ltd., Banco Products (India) Ltd., Bharat Forge Ltd., Bharat Gears Ltd., Bharat Seats Ltd., Bimetal Bearings Ltd., Bosch Chassis Systems India Ltd., Bosch Ltd., Denso India Ltd., Dynamatic Technologies Ltd., Eicher Motors Ltd., Federal-Mogul Goetze (India) Ltd., Force Motors Ltd., Gabriel India Ltd., Hero Motocorp Ltd., Hindustan Motors Ltd., I P Rings Ltd., J M T Auto Ltd., Jay Bharat Maruti Ltd., K A R Mobiles Ltd., Kalyani Forge Ltd., Mahindra & Mahindra Ltd., Maruti Suzuki India Ltd., Motherson Sumi Systems Ltd., Munjal Showa Ltd., Pricol Ltd., Rico Auto Inds. Ltd., Ring Plus Aqua Ltd., S M L Isuzu Ltd., Shriram Pistons & Rings Ltd., Sona Koyo Steering Systems Ltd., Subros Ltd., Sundaram Brake Linings Ltd., Suprajit Engineering Ltd., T V S Motor Co. Ltd., Tata Motors Ltd., Wheels India Ltd., Z F Steering Gear (India) Ltd.

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Volatility Modeling and Forecasting for Banking Stock Returns

KRISHNA MURARI

In this paper, an attempt has been made to model and forecast the volatility of the Indian banking sector. A popular banking sector CNX bank index of national stock exchange of India (NSE) which includes 12 most liquid and large capitalized Indian Banking stocks is used as a time series. Data has been collected since the inception of the index i.e. January 2000; a total of 3122 observations up to the period of June 2013, are used in modeling the volatility of the banking stock returns using univariate Box-Jenkins or ARIMA model. ADF test and unit root testing is done to know the stationarity of the series, later the AR(p) and MA(q) orders are identified with the help of minimum information criterion as suggested by Hannan- Rissanen. As per the analysis, ARIMA (1,0,2) model was found to be the best fit to forecast the volatility of bank stock returns. The final equation for the model is $Y_t = 0.09314169 + 0.67310852Y_{t-1} + 0.12303398u_{t-2}$ which can be used by the investors and speculator to forecast the short run bank stock returns.

Introduction

The Indian banking Industry has witnessed key changes, dazzling a number of underlying developments since 2000. Innovation in communication and information technology has facilitated growth in internet-banking, ATM Network, Electronic transfer of funds and quick diffusion of information. Structural reforms in the banking sector have improved the health of the banking sector. The reforms recently introduced include the enactment of the Securitization Act to step up loan recoveries, establishment of asset reconstruction companies, initiatives on improving recoveries from Non-performing Assets (NPAs) and change in the basis of income recognition has raised transparency and efficiency in the banking system. Spurt in treasury income and improvement in loan recoveries has helped Indian Banks to record better profitability. The effect of all such changes has been crucial on the stock prices of the banks. It is, therefore, important to study the nature of banking stock's volatility during these years.

Volatility is a measure of variability in the price of an asset. Volatility is associated with unpredictability and uncertainty about the price. It is

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often used as synonymous of risk which means higher the volatility, higher the risk in the market (Kumar & Gupta, 2009). In other words, we can say that in case of high volatility, the market does not function properly and it leads to disruption of market. As a concept, volatility is simple and intuitive. It measures variability or dispersion about a central tendency. To be more meaningful, it is a measure of how far the current price of an asset deviates from its average past prices. Greater the deviation, greater is the volatility. At a more fundamental level, volatility can indicate the strength or conviction behind a price move (Raju, 2004). It is difficult to estimate about the future trend of volatility in market because it is affected by a large number of factors including political stability, economic fundamentals, government budget, policies of the government, corporate performance etc. However, by calculating historical volatility a prediction can be assumed about the future trend in the volatility.

Modeling and forecasting volatility of a daily financial asset price return is an important and challenging financial problem that has received a lot of attention in recent days. It is widely agreed that although daily and monthly financial asset prices returns are approximately unpredictable, returns volatility is highly predictable phenomenon with important implications for financial economics and risk management (Torben & Doberv, 2009). The decision of the investors to sell or to buy depend directly on the volatility of securities prices that they expect to happen in the near future, since they build their predictions on the movements of the securities prices whether up or down, that is to protect themselves from the losses that they may meet, or to reduce it as much as possible.

Univariate Box-Jenkins (UBJ) or Autoregressive Integrated Moving Average (ARIMA) models are especially suited to short-term forecasting. Pankratz (1983) considered short-term forecasting, because most ARIMA models place heavy emphasis on the recent past rather than the distant past. This emphasis on the recent past means, that long-term forecasts from ARIMA models are less reliable than short-term forecasts.

Charles A. et.al (2008) studied the relationship between Stock Markets and Foreign Exchange market, and determined whether movements in exchange rates have an effect on stock market in Ghana. They found that depreciation in the local currency leads to an increase in stock market returns in the long run. Where as in the short run it reduces stock market returns. Mohammad S. et.al (2009) modeled the relationship between macroeconomic variables and prices of shares in Karachi stock exchange in Pakistan context from 1986 to 2008 period. They showed that internal factors of firms like increase production and capital formation do not effect significantly while external factors like exchange rate and reserve do effect. Siti R. et.al (2011) analyzed the crude oil prices using Box-Jenkins methodology and Generalized Autoregressive Conditional Heteroscedasticity, they found that ARIMA(1,2,1) and GARCH(1,1) are the appropriate models under model identification, estimation, diagnostic checking and forecasting future prices. Samnel (2011) used ARIMA model to predict inflation in Ghana, they found that inflation is integrated of order one and follows (6,1,6) order.

Al-Zeaud & Ali (2011) fitted the ARIMA (2,0,2) model for weekly date of banking sector from Amman stock Exchange (ASE) for a period of 2005 to 2010. Kaur (2004) investigated the nature and characteristics of stock market volatility in India with emphasis on day of the week effect or the weekend effect using volatility cluster modeling. She found that asymmetrical GARCH models outperform the conventional OLS models and symmetrical GARCH models by the application of asymmetrical GARCH models EGARCH (1,1) to Sensex and TARCH (1,1) to Nifty returns. Sohail C. et.al(2012) identified and estimated the mean and variance components of the daily closing share price using ARIMA-GARCH type models by explaining the volatility structure of the residuals obtained under the best suited mean models for the time series. Many other works have also been carried out in order to identify the stock return behavior and time series volatility modeling in various countries (Abdalla & Suliman, 2012); (Poon & Granger, 1992); (Ocran & N., 2007);(Gokcan, 2000); (Bollerslev, 1976);(Faisal, 2012); (Alberg, Shalit, & Yosel, 2008);(Kumar, 2006);(Tripathy, 2010).

Objective

The objective of the study is to model the volatility of banking stock returns in Indian stock market through UBJ analysis or the ARIMA modeling.

Research Design

In order to have a good benchmark of the Indian banking sector, India Index Service and Product Limited (IISL) developed the CNX Bank Index. The daily stock price data on CNX Bank Index have been taken from *Datazone*, the online database of NSE. The database contains all the actively traded stocks from banking sector at any given time on the NSE. CNX Bank Index is an index comprised of the most liquid and large capitalized Indian Banking stocks. It provides investors and market intermediaries with a benchmark that captures the capital market performance of Indian Banks. The index has 12 stocks from the banking sector which trade on the National Stock Exchange.

The CNX Bank Index represent about 14.44% of the free float market capitalization of the stocks listed on NSE and 85.50% of the free float market capitalization of the stocks forming part of the Banking sector universe as on March 30, 2012(NSE, 2012). The study spans the period January 2000 (with base value of 1000) through June 2012.

Daily stock prices have been converted into daily returns. The present study uses the logarithmic difference of prices of two successive periods for the calculation of rate of return. The logarithmic difference is symmetric between up and down movements and is expressed in percentage terms for ease of comparability with the straightforward idea of a percentage change.

If P_t be the closing level of Index on date *t* and P_{t-1} be the same for its previous business day, i.e., omitting intervening weekend or stock exchange holidays, then the one day return on the market portfolio is calculated as:

$$Y_t = LN\left(\frac{P_t}{P_{t-1}}\right) \times 100$$

where, *LN(z)* is the natural logarithm of '*z*.'

Statistical Tools

The daily and intra-day stock price data have been first processed by using Microsoft Excel. Subsequently, time series analysis packages EViews and MINITAB programs have been used to test the banking index dynamics, return and volatility data for various statistical properties and to estimate ARMA and ARIMA class of models.

Econometric Methodology

In any time series analysis, the test for stationarity is important because, in the presence of non-stationary series, the standard estimation procedures are not applicable. Thus, we begin our analysis with testing for stationarity, i.e., unit root testing. We then fit an ARMA model to the data generating process and follow the process suggested by Box & Jenkins (1976).

Testing of Stationarity of the Time Series

Unit root testing

A test of stationarity (or nonstationarity) that has been widely popular over the past several years is the unit root test. We start with

$$Y_t = \rho Y_{t-1} + \mu_t \qquad -1 \le \rho \le 1 \tag{1}$$

Where, μ_1 is a white noise error term.

Now, subtracting Y_{t-1} from both sides of the above equation

$$Y_1 - Y_{t-1} = \rho Y_{t-1} - Y_{t-1} + \mu_1$$

$$\Delta Y_1 = (\rho - 1)\ (Y_{t-1}) + \mu_1$$

$$\Delta Y_1 = \delta Y_{t-1} + \mu_1 \tag{2}$$

Where $\delta = \rho - 1$ and $\Delta$is the first difference operator. In practice, to test the null hypothesis that $\delta = 0$. If $\delta = 0$ then $\rho = 1$ that is, there is a unit root, meaning thereby the time series is nonstationary.

Augmented Dickey Fuller Test

Y_t in equation (1) is assumed that the error term μ_1 was uncorrelated. But, in case the μ_1 is correlated, Dickey and Fuller developed a test known as the Augmented Dickey-Fuller (ADF) test. This test is conducted by augmenting the preceding equation by adding the lagged values of the dependent variable

ΔY_1. To be specific, the ADF test here consists of estimating the following regression

$$\Delta Y_1 = \delta Y_{t-1} + \sum_{i=1}^{m} \alpha_1 \Delta Y_{t-1} + \varepsilon_t \quad (3)$$

Where ε_t is pure white noise error term and the no. of lagged difference terms so that the error term in equation (3) is serially uncorrelated.

AR, MA and ARIMA Modeling of Banking Stock returns

An Autoregressive (AR) Process

Let Y_t represents the Bank Index at time t. If we model Y_t as

$$(Y_t - \delta) = \alpha_1 + (Y_{t-1} - \delta) + \mu_t$$

Where δ is the mean of Y and u_t is and uncorrelated random error term with zero mean and constant variance σ^2 (i.e. white noise), then we say that Y_t follows a first order autoregression, or AR (1) stochastic process.

Y_t can be modeled for p^{th} order autoregressive or AR (p) process as

$$(Y_t - \delta) = \alpha_1 (Y_{t-1} - \delta) + \alpha_2 (Y_{t-1} - \delta) + ... \alpha_p (Y_{t-p} - \delta) + \mu_t \quad (4)$$

A Moving Average (MA) Process

Suppose we model Y as Bank Index as follows

$$Y_1 + \mu + \beta_0 u_t + \beta_1 u_{t-1}$$

where μ a constant and *u* is a white noise stochastic error term. Here, Y at time t is equal to a constant plus a moving average of the current and past error terms. Thus, the above equation follows a first order moving average or MA (1) process.

To generalize, moving average or MA(*q*) process can be written as

$$Y_1 + \mu + \beta_0 u_t + \beta_1 u_{t-1} + \beta_2 u_{t-2} + ... \beta_q u_{t-q} \quad (5)$$

An Autoregressive and Moving Average (ARMA) Process

It is quite likely that Y has characteristics of both AR and MA and is therefore ARMA. Thus, if Y_t follows an ARMA(*p, q*) process can be written as

$$Y_1 + \theta + \alpha_1 Y_{t-1} + \beta_0 u_1 + \beta_1 u_{t-1}; \quad (6)$$

where θ represents a constant term.

An ARIMA Modeling Process

Generally, many of the time series which are not stationary are integrated. Therefore, if we have to difference a time series *d* times to make it stationary and then apply ARMA(*p, q*) model to it, we say that original time series is ARIMA (*p, d, q*) that is an autoregressive Integrated Moving Average time series where *p* denotes the no. of autoregressive terms, *d* the no. times the series has to be differenced before it becomes stationary and *q* the no. of moving average terms. The ARIMA Modeling process consists of following steps:

Specification of ARMA orders

Hannan- Rissanen (Hannan & Rissanen, 1982) procedure is used to specify the autoregressive and moving average orders of an ARIMA model. It is assumed that the order of differencing, d, and the deterministic terms have been pre specified. The information criteria are often used as a guide in model selection. Following information criteria are used to identify the orders of ARMA.

$$AIC(n.l) = \log s^2(n.l) + \frac{2}{T(n+l)} \quad (7)$$

$$SIC(n.l) = \log s^2(n.l) + \frac{2\log T}{T(n+l)} \quad (8)$$

$$HQ(n.l) = \log s^2(n.l) + \frac{2\log(\log T)}{T(n+l)} \quad (9)$$

Where σ is the residual from fitted model from all combinations *(n, l)* for which $n,l < p_{max} < h.l$ is the value of the log of the likelihood function with the *n* parameters estimated using *T* observations. As a user of these information criteria for a model selection guide, the model with the smallest information criterion is selected.

Estimation

At this stage, we get precise estimates of the coefficients of the model chosen at the identification stage. We fit this model to the available data series to get estimates of α_i, β_j and θ. and. This stage provides some warning signals about the adequacy of our model. In particular, if the estimated coefficients do not satisfy certain mathematical inequality conditions, that model is rejected.

Model Checking

Box and Jenkins suggest some diagnostic checks to determine whether an estimated model is statistically adequate? Checking of the adequacy of an ARIMA model is done with the help of residual autocorrelation and non-normality test.

Test for Residual Autocorrelation

The portmanteau test is used to check the following pair of hypothesis

$H_0: \rho_{u,1} = \ldots = \rho_{u,h} = 0$ *versus* $H_1: \rho_{u,t} \neq 0$ for at least one $i = 1, \ldots, h$.

Where $\rho_{u,1} = corr(u_t, u_{t-1})$ denotes the autocorrelation coefficient of the residual series. If the u_t are residuals from an estimated ARMA(p,q) model, the portmanteau test statistics is:

$$Q_h = T\sum_{j=1}^{h} \hat{\rho}_{u,j}^2 \quad (10)$$

Where $\rho_{u,j} = T^{-1} \sum_{t=j+1}^{T} \hat{u}_t^{\,s} \hat{u}_{t-j}^{\,s}$ *and* $\hat{u}_t^{\,s} = \frac{\hat{u}_t}{\hat{\sigma}_u}$ are the standardized estimation residuals.

Jarque-Bera Test for Non-normality

This test is based on the third and fourth moments of a distribution i.e. skewness and kurtosis. Denoting the standardized estimation residuals by $u_t^{\,s}$, the test checks whether the third and fourth moments of the standardized residuals are consistent with a standard normal distribution. The test statistics is

$$JB = \frac{T}{6}\left[T^{-1}\sum_{t=1}^{T}(\hat{u}_t^s)^3\right]^2 + \frac{T}{24}\left[T^{-1}\sum_{t=1}^{T}(\hat{u}_t^s)^4 - 3\right]^2 \quad (11)$$

Where $T^{-1}\sum_{t=1}^{T}(\hat{u}_t^s)^3$ is a measure for the skewness of the distribution and $\sum_{t=1}^{T}(\hat{u}_t^s)^4$ for the kurtosis. The test statistic has an asymptotic $x^2(2)$, distribution if the null hypothesis is correct and the null hypothesis is rejected if *JB* is large.

ARCH-LM test

The test for neglected autoregressive conditional heteroskedasticity (ARCH) is done based on an ARCH (q) model to the estimation residuals,

$$\hat{u}_t^2 = \beta_0 + \beta_1 \hat{u}_{t-1}^2 + \cdots + \beta_q \hat{u}_{t-q}^2 + e_t \quad (12)$$

Checking the null hypothesis

$$H_0: \beta_1 = \cdots = \beta_q = 0 \; versus \; H_1: \beta_1 \neq 0 \; or \ldots \beta_q \neq 0.$$

Under the normality assumptions the LM statistics is obtained from the coefficient of determination, R^2 of regression of above equation.

$$ARCH_{LM}(q) = TR^2 \quad (13)$$

It has an asymptotic $\chi^2(q)$ distribution if the null hypothesis of no conditional heteroskedasticity holds (Engle 1982).

Forecasting

Under Univariate Box-Jenkins (UBJ) analysis or ARIMA Model building for volatility, the last step is to forecast the asset returns with a specification of lower and upper bound. This step includes the prediction of the financial asset returns using the model so developed on the basis of ARIMA (*p*,*d*,*q*) orders.

Findings and Analysis of Banking Sector Volatility

Diagnostic Tests

As a part of the diagnostics, we begin with a visual inspection of the plot of daily returns on CNX Bank Index as shown in Chart 1. It can be seen that returns continuously fluctuate around a mean value that is close to zero. The movements are in the positive as well as negative territory and larger fluctuations tend to cluster together separated by periods of relative calm. This is consistent with Fama's (1965) observation that stock returns exhibit volatility clustering where large returns tend to be followed by large returns and small returns by small returns leading to adjacent periods of volatility and stability.

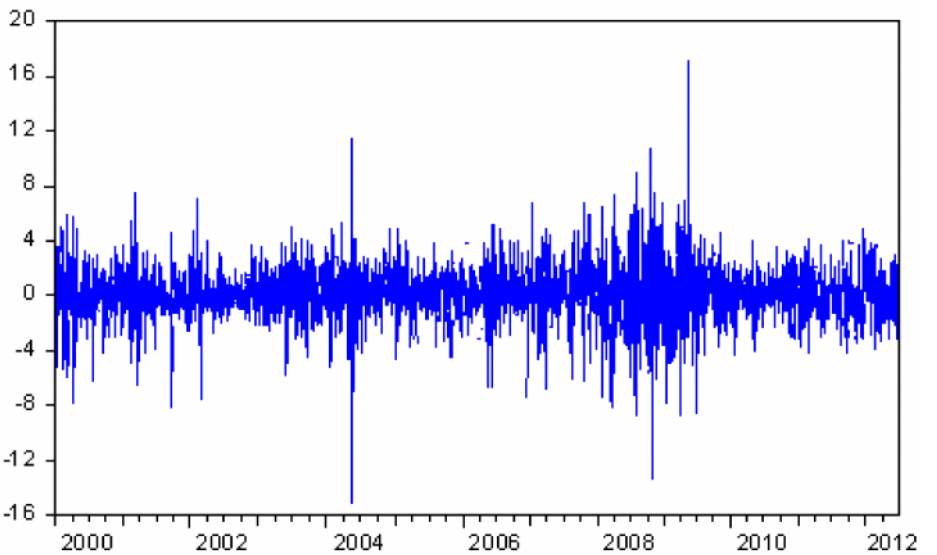

Figure 1: Daily CNX Bank Index Return

Descriptive statistics on NSE CNX Bank Index (BI) and returns (BIR) are summarized in Table 1. For bank index return (BIR), the skewness statistic is found to be different from zero indicating that the return distribution is skewed to the left. Furthermore, the relatively large excess kurtosis suggests that the underlying data is leptokurtic or heavily tailed and sharply peaked about the mean when compared with the normal distribution. The Jarque-Bera statistic calculated to test the null hypothesis of normality rejects the normality assumption. The results confirm the well-known fact that daily banking index returns are not normally distributed but are leptokurtic and skewed.

Testing of Stationarity

The non-stationary time series could produce a weak result. To avoid the spurious correlation problem, it is essential to test for unit root of each

index employed in the study. A unit root test determines whether a time series variable is non-stationary using an autoregressive model. In this study the augmented Dickey- Fuller test is used to test the existence of a unit root as the null hypothesis.

Table 1: Descriptive statistics

Statistics	Bank Index close(BI)	Natural log returns (BIR)
Study Period	January 2000 to June 2012	
Observations	3123	3122
Mean	4935.274	0.074826
Median	4315.750	0.086346
Maximum	13268.70	17.23940
Minimum	743.7000	-15.13805
Std. Dev.	3527.746	2.102930
Skewness	0.473230	-0.175904
Kurtosis	1.902359	7.953452
Jarque-Bera		3207.914
Probability		0.000
Sum		233.6083
Sum Sq. Dev.		13802.05

In this study, the Augmented Dicky-Fuller (ADF) test is proposed to examine the stationaritry (unit root) of the stock market indices for Banking sector, Table 2 shows the ADF test for stock indices for banking sector. The results of this work out, strongly confirm that at the standard 5% significance level the bank indices return series is stationary in levels, so there is no need to use any transformation on the time series BIR and BKXR.

Table 2: Unit root testing of BIR

Null Hypothesis: BIR has a unit root

Exogenous: Constant

Lag Length: 0 (Automatic - based on SIC, maxlag=28)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-49.3049	0.0001
Test critical values:	1% level	-3.43226	
	5% level	-2.86227	
	10% level	-2.5672	

Identification of ARMA orders: The ARIMA (1,0,2) model has been identified using the information criterion. As a user of these information criteria for a model selection guide, the model with the smallest information criterion (AIC) is selected.

Table 3: Optimal lag selection for ARIMA modeling

Optimal lags from hannan-rissanen model selection	
original variable:	BIR
order of differencing (d):	0
adjusted sample range:	[01/01/2000 (5), 06/30/2012 (5)], T = 3122
optimal lags p, q (searched all combinations where max(p,q) <= 3)	
Akaike Info Criterion	: p=1, q=2
Hannan-Quinn Criterion	: p=2, q=0
Schwarz Criterion	: p=0, q=1

Estimation

Estimation of ARIMA models is done by Gaussian maximum likelihood (ML) assuming normal errors. The optimization of the likelihood function requires in general nonlinear optimization algorithms and here the algorithm by Ansely (1979) is used. The maximization routine forces the AR coefficients to be invertible. The MA roots will have modulus 1 or greater. If an MA root is 1, the estimation routine will report a missing value for the MA coefficient's standard deviation, t-statistic and p-value. An MA root equal to 1 suggests that *d* may have been chosen too large.

The estimates of the constant and the coefficients of the equation are obtained by employing least squares algorithms through a combination of search routines and successive approximations to obtain final least square point estimates of the parameters. The final estimates are those that minimize the sum of squared errors to a point where no other estimates can be found that yield smaller sum of squared errors. This is known as convergence. The estimation output shows the number of iterations needed for convergence. It also shows some other statistics and the parameter estimates with standard errors, *t*-statistics and tail probabilities.

Table 4: ARIMA (1,0,2) model estimates

Final Results:			
Iterations Until Convergence: 25			
Log Likelihood	:-6720.461631	Number of Residuals: 3122	
AIC	:13450.923262	Error Variance	: 4.344656186
SBC	:13481.154407	Standard Error	: 2.084383886
DF: 3117 Adj. SSE: 13542.396131831		SSE	: 13542.293330887
Dependent Variable:	BIR		

	Coefficients	Std. Errors	T-Ratio	Approx. Prob.
AR1	0.67310852	0.21384738	3.14761	0.00166
MA1	0.54357176	0.21296640	2.55238	0.01075
MA2	0.12303398	0.02631811	4.67488	0.00000
CONST	0.09314169	0.07613016	1.22345	0.22125
TREND	-0.00001175	0.00004223	-0.27820	0.78087

Thus, the final equation for the stationary time series for the bank stock return volatility is defined as:

$$Y_t = 0.09314169 + 0.67310852Y_{t-1} + 0.543357176u_{t-1} + 0.12303398u_{t-2} \quad (14)$$

Since, the t-values for the coefficients MA(1) is insignificant, it can be dropped from the model, therefore equation becomes as follows:

$$Y_t = 0.09314169 + 0.67310852Y_{t-1} + 0.12303398u_{t-2} \quad (15)$$

Model checking

The portmanteau test statistics for residual autocorrelation tests whether any of a group of autocorrelations of the residual time series is different from zero. Looking at the tabular statistics, we conclude that the null hypothesis of white noise residuals is accepted, thus we have a decent model.

Table 5: Test statistics for model checking

Portmanteau Test		Jarque Bera Test		ARCH-LM TEST with 4 lags:	
Test statistics	27.5827	test statistic:	2928.0025	test statistic:	293.7108
p-Value (χ^2):	0.0064	p-Value(χ^2):	0.0000	p-Value(χ^2):	0.0000
Ljung & Box:	27.6745	skewness:	-0.1324	F statistic:	81.0638
p-Value (Chi^2):	0.0062	kurtosis:	7.7369	p-Value(F):	0.0000

Jarque Bera test statistics for residuals also confirms that the third and fourth moments of the standardized residuals are consistent with a standard normal distribution. The p-value of 0.000 indicates that there is a 0.0% chance that we would have obtained our estimates of the parameters if the true parameters were zero. Since the p-value is small (less than the usually chosen a-level of 0.05) the ARCH-LM test is significant; thus we reject Ho hypothesis and conclude that there is no conditional heteroskedasticity in residuals.

Table 6: Correlation matrix of the estimated parameters

	1	2	3	4
1	1.000			
2	0.996	1.000		
3	0.715	0.674	1.000	
4	-0.001	-0.001	-0.001	1.000

Furthermore, Table 6 shows the correlation matrix of the estimated parameters, the strongest correlation was found between α_2 and β_1 but the smallest correlation is between α_3 and β_2. The correlation matrix for estimated parameters provides a means for recognizing the existence of parameter redundancy. Although the estimates of the parameters of Box-Jenkins model always have some correlation. Very high correlations (r >=0.8 or 0.9) between the estimates suggest parameter redundancy. When redundancy exists, a

model of lower order should be fitted to the data. As seen in Table 6, the correlation matrix for the parameters there is no high correlation except one.

Before forecasting with the final equation, it is necessary to perform various diagnostic tests in order to validate the goodness of fit of the model. A good way to check the adequacy of a Box-Jenkins model is to analyze the residuals $(Y_1 t - \hat{Y}_1(t-1))$. If the residuals are truly random, the autocorrelations and partial autocorrelations calculated using the residuals should be statistically equal to zero. If they are not, this is an indication that we have not fitted the correct model to the data.

Chart 2 known as the four-in-one residual plot, it displayed four different residual plots together in one graph window. This layout can be useful for comparing the plots to determine whether the model meets the assumptions of the analysis.

The normal probability plot indicated whether the residuals are normally distributed, other variables are influencing the response, or outliers exist in the data. And, the fit regression line showed how the residuals are closed to the fit line. The histogram indicated that whether the data are skewed or outliers exist in the data, the histogram showed approximately the whole data centered on the mean of data.

The residuals versus fitted values indicated whether the variance is constant, a nonlinear relationship exists. The last graph showed the residuals versus order observations for Banking sector volatility.

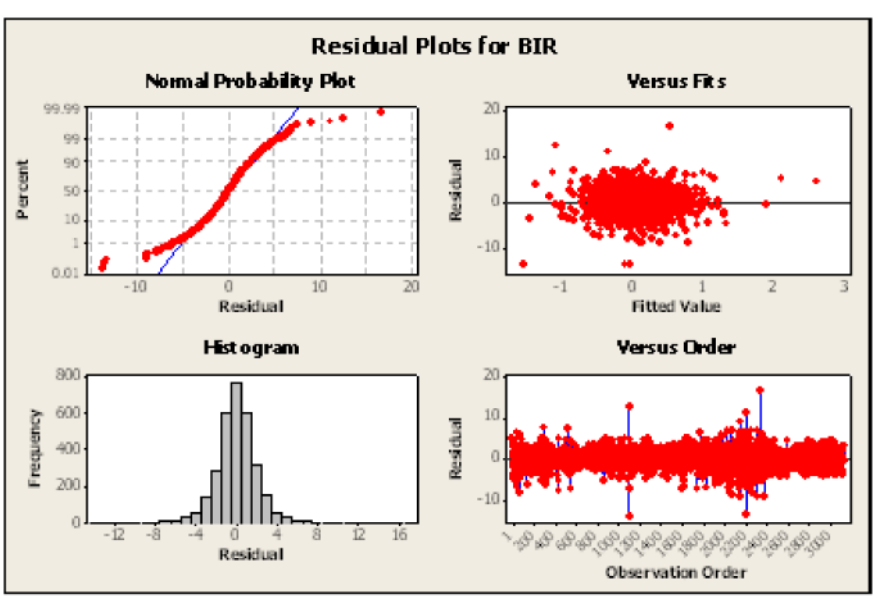

Figure 2: Residual Plots for BIR

Forecasting

At the final stage, which is forecasting, once the fitted model has been selected, it can be used to generate forecasts for future time periods for the Banks volatility sector. Although, Minitab program and most other Box-Jenkins computer programs compute the forecasts and confidence intervals for the user, the final model for the volatility banking sector is illustrated in equation 15.

Table 7: Forecasts of ARIMA (1,0,2) for BIR from period 3122

	95% Limits				95% Limits		
Period	Forecast	Lower	Upper	Period	Forecast	Lower	Upper
3123	0.49947	-3.58609	4.58502	3138	0.07433	-4.05016	4.19881
3124	-0.04339	-4.16312	4.07634	3139	0.07448	-4.05001	4.19897
3125	-0.00485	-4.12718	4.11748	3140	0.07458	-4.0499	4.19907
3126	0.02112	-4.10239	4.14463	3141	0.07465	-4.04983	4.19914
3127	0.03862	-4.08542	4.16266	3142	0.0747	-4.04979	4.19919
3128	0.05042	-4.07387	4.1747	3143	0.07473	-4.04976	4.19922
3129	0.05837	-4.06603	4.18276	3144	0.07475	-4.04973	4.19924
3130	0.06372	-4.06072	4.18817	3145	0.07477	-4.04972	4.19925
3131	0.06733	-4.05713	4.1918	3146	0.07478	-4.04971	4.19926
3132	0.06977	-4.05471	4.19425	3147	0.07478	-4.0497	4.19927
3133	0.07141	-4.05308	4.19589	3148	0.07479	-4.0497	4.19928
3134	0.07251	-4.05197	4.197	3149	0.07479	-4.0497	4.19928
3135	0.07326	-4.05123	4.19774	3150	0.07479	-4.04969	4.19928
3136	0.07376	-4.05073	4.19825	3151	0.07479	-4.04969	4.19928
3137	0.0741	-4.05039	4.19859	3152	0.0748	-4.04969	4.19928

Table 7 shows the predicted 30 days ahead of the Bank returns volatility. Since, the whole data are 3122 observations (daily observation), so it is appropriate to choose the predicted value ahead for 30 observations, because ARIMA model adequate for the short term forecasts. While, Chart 3 showed the plot of the actual and predicted values for the volatility Banks sector, the 95% percent prediction interval for the forecasts also are computed. Since, the values of the lower interval are negative sign, we can ignore these boundaries because the volatility was computed by taking the absolute value of the log difference. For example, the predicted value for the period number 3123 is (0.49947), the 95% percent prediction interval for the forecast of the 3123 time period is [‟3.58609, 4.58502], and similarly, we can compute the other intervals for the different predicted values. Furthermore the financial time series in the year 2004 and 2008-09 had high fluctuations of the CNX Bank Index in banking sector compared with less fluctuation in the other periods. There were many periods of high fluctuations, or a large high

fluctuation, while other of small fluctuations in the bank sector index (volatility clustering), sometimes there were stability.

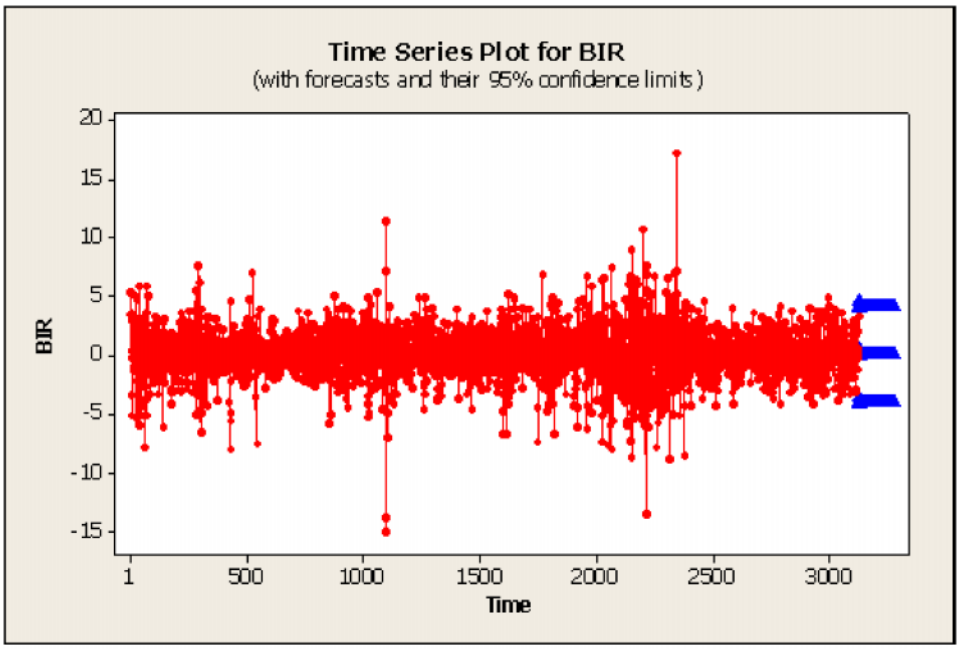

Figure 3: Bank stock returns forecasts of ARIMA (1,0,2) model

Conclusion

The plot of all volatility showed that the financial time series in the year 2004 and 2008-09 had high fluctuations of the banking sector index compared with less fluctuation in the other periods. There were many periods of a large high fluctuation, while other of small fluctuations in the banking sector indices (volatility clustering). In testing whether the financial time series of banking sector indices at 5% level are stationary at (level or differences) or not, we had concluded that the stationary exists for Banking sector. ARIMA model is chosen using the lowest information criterion (among AIC, SIC and HQ). The convenient model that fitted the data for the Banking sector is ARIMA (1,0,2), at 95% confidence interval. The final forecasting model ARIMA (1,0,2) for bank stock return volatility is-

$$Y_t = 0.09314169 + 0.6731085_2 Y_{t-1} + 0.1230339_8 u_{t-2}$$

The above equation could be used by the investors to predict about the volatility ahead to take their buying or selling decisions.

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Financial Indicators and Performance Evaluation of Banks

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The main objective of the paper is to compare and contrast economic value added with traditional performance measures as a predictor of financial health of banks under study. The study employs multiple correlation and panel regression analysis to examine whether EVA is a predictor of financial health of banks or not as compared to other traditional performance measures. The results obtained from an analysis are carried out on the secondary financial data from the year ended 2003 to 2008 for all public sector banks and top 20 private sector banks selected on the basis of market capitalization. The results reveal that among traditional performance measures EPS and RONW act as better predictor of financial health of banks followed by EVA/EC.

Introduction

The essential part of the banking system is its financial viability. It is the responsibility of RBI to monitor the financial health of every bank to ensure its conformity with the rules and regulations mentioned in different acts. The financial performance measures rest on the premise that the goal of the firm should be to maximize the financial health and wealth of its current shareholders. Many researchers have attempted to measure the productivity and efficiency of the banking industry through outputs, performance, cost and efficiency. Financial health is used to measure the bank's overall financial performance over a given period of time. The recent financial crisis has also raised question on the persistent and increasing fragility of the financial institutions. CAMEL framework is commonly used by the banks for analyzing the health of individual institutions, which looks at five major aspects of the financial institution: Capital adequacy, Asset quality, Management soundness, Earnings ability and liquidity (Hilbers et al., 2000). These indicators broadly cover various aspects of performance of banks. Earlier Return on Capital Employed, Return on Net Worth, Return on Investment, Earning per share, Profit before depreciation, interest and taxes were the most important performance measures. However, with increasing competition and presence of a policy environment facilitating tapping of economies of scale are focusing their efforts on creating shareholder value in Indian banking system. Economic Value Added, a modern measure is more than a performance measure. It is a focal point of a management system and a mindset. It has emerged as a performance measurement tools in banks.

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Economic Value Added is an excellent indicator of wealth creation. It improves capital efficiency and overall business performance. It encourages greater owner-like and entrepreneurial behaviour among employees. EVA correctly takes into consideration value creation or destruction of a company, highest correlation with shareholder value creation. It is a tool for assessing the real growth of the company which adds to the funds of the shareholders. It is the excess of profit after tax before interest over the total cost of the capital. EVA is an attempt to measure the financial performance that promotes the maximization of the firm's value and is considered to be consistent with the objective to maximize the financial health of the banks.

An appropriate performance measure should assess how material actions affect the value of the firm. It must include: the amount of invested capital; the return earned on the capital and weighted average cost of capital.

The EVA includes all these three things in its calculation.

- EVA eliminates economic distortions of GAAP to focus decisions on real economic results.
- EVA provides for better assessment of decisions that affect balance-sheet and income statement or tradeoffs between each through the use of capital charge against NOPAT.
- EVA decouples bonus plans from budgetary targets.
- EVA covers all aspects of the business cycle.
- EVA aligns and speeds decision-making and enhances communication and teamwork.

The prior studies used traditional accounting measures of performance like Net Income (NI), Earning per Share (EPS), Return on Equity (ROE), Return on Invested Capital (ROIC), Return on Capital Employed (ROCE), and Return on Assets (ROA). These measures are very common and relatively good performance measures. Even EPS and earnings can be increased simply by pouring more money into business even though the return on that money would be entirely deferred taxes which should have been viewed as equity. It fails to reflect the real picture of the company performance because it ignores time value of money and moreover, investments in working capital are excluded from the earnings calculations.

So, these performance measures do not tell how much management has increased shareholder wealth as compared to EVA. Moreover, traditional measures do not reflect risk and therefore, promote behaviour that aims to maximize earnings or prevent the dilution of returns. But in case of EVA, there is a positive correlation between EVA maximization and Wealth maximization.

EVA as a modern performance measure in banks gives recognition to the cost of equity in all managerial decisions and provides a yardstick to measure the shareholders' wealth creation and financial performance by business entity. The study analyses the financial health of the banks through financial ratios commonly used in banking research. These ratios are based on the

parameters of CAMEL by the regulators (including RBI) as well as analyst. These act as dependent variables in the study to evaluate the effectiveness of EVA in comparison to traditional performance measures.

Literature Review

Anupam (2004) tested the supremacy of EVA over traditional performance measures by examining the effectiveness of EVA as performance measure vis-a vis traditional performance measures. The study included a period of six years from the year 1997-98 to 2002-03 and limited to fifty listed Indian companies. The financial variables used in the study were EVA, ROCE, RONW, PBIT and EPS. The results showed that EVA was not superior to traditional performance measures in its association with the MVA. Malik (2004) attempted to study the nature of relationship between EVA, i.e., a new trendier value based performance measure and some traditional performance measures indicated that EPS explains EVA only up to the extent of 14%, RONW up to the extent of 61% and ROCE up to the extent of 69%. This indicated that these traditional measures do not reflect the real value of shareholders' wealth and thus, EVA has to be measured to have an idea about shareholder value. Worthington and West (2004) analyzed the three alternative formulations for pooling data, namely the common effects, fixed effects and random effects models, with the fixed effects approach found to be the most empirically appropriate. Relative information content tests revealed returns to be more closely associated with earnings than net cash flow, residual income and EVA.

Keshar (2005) examined the financial health of joint venture banks in the CAMEL framework provided that the health of joint venture banks is better than that of the other commercial banks. In addition, a perusal of indicators of different components of CAMEL indicates that the financial health of joint venture banks has not been so strong to manage the possible large scale shocks to their balance-sheet; and their health is fair. Pal (2005) assessed how the EVA measure behaves under different realistic corporate situation and compared it to the behavior of the other traditional financial variables. The present research selected fifty Indian companies from BSE-200 and approached them through a well- structured questionnaire for evaluating the realistic face of EVA in India. The results were analyzed with the help of descriptive statistics and chi-square test. As far as Indian companies were concerned, it seemed to be empirically approved evidences to support Stern Stewart's claim that EVA is superior to traditional performance measures in its association with equity market value.

Bodla and Verma (2006) made a comparative analysis of performance of SBI and ICICI Bank from 2001 to 2005 using the parameters of CAMEL model. The study has concluded that both the banks have performed excellently. In some parameters of performance SBI has outperformed ICICI Bank but on the whole ICICI Bank has performed better than SBI. It has found that SBI has an edge over its counterpart ICICI Bank in terms of Capital Adequacy. However, the vice versa is true regarding assets quality, earning quality and management quality. The liquidity position of both the banks is

sound and does not differ significantly. Ismail (2006) examined the superiority of EVA as a financial metric compared with other financial measures. The paper used a sample of 2252 firm year observations from the UK market and applied panel data regressions to test the relative information content of EVA and other accounting measures and the incremental information content of EVA components in explaining stock returns. It has been found that NOPAT and Net Income (NI) outperform EVA and RI in explaining stock return. It was also found that accruals and operating cash flow have significant incremental information content, while accounting adjustments of EVA proponents have significantly less contribution in explaining stock return.

Goyal and Kaur (2008) analyzed the performance of new private sector banks in India from the period 2001 to 2007 and revealed that there was significant difference amongst the mean ratios of the banks on all parameters except for Liquid Assets to Total Assets, Liquid Assets to Total Deposits, Net Profit to Average Assets and percentage change in NPAs. Wirnkar and Tanko (2008) studied the adequacy of CAMEL in capturing the overall performance of a bank. The findings revealed the inability of each factor in CAMEL to capture the wholistic performance of a bank. Also revealed, was the relative weight of importance of the factors in CAMEL which resulted to a call for a change in the acronym of CAMEL to CLEAM. Lee (2009),in his study, reflected that EVA is a true measurement of a firm's performance and an executive's evaluation tool because EVA reflects only incremental values added to a firm after considering cost of capital. The previous studies have examined EVA in the hospitality setting and concluded that EVA was not superior to other available measurements for accounting. However, this study contributed several improvements to Kim's (2006) study and compared the incremental explanatory power of six firm performance measures including EVA, REVA, MVA, and three traditional accounting performance measures for market adjusted returns. According to the findings, REVA and MVA were, apparently, valuable performance measures for evaluating hospitality firms.

Research Methodology

Objective

The objective of this study is to evaluate the effectiveness of Economic Value Added vis-à-vis other traditional performance measures as a predictor of financial health of Indian banks.

Hypotheses

On the basis of studies referred above, the hypotheses of the study are:

H01: EVA is not a superior measure as compared to traditional performance measures.

H02: There is no significant relationship between financial health and Economic Value Added.

H03: There is no significant relationship between financial health and other traditional performance measures.

Sample size

The present paper includes all Indian public sector banks. ie. 27 Banks and top 20 private sector banks selected on the basis of market capitalization. The banks, in respect of which the detailed information for all the years is not available (unlisted banks) has not been included in the present study. Finally, 30 banks are listed and selected for measuring the relationship of EVA vis-à-vis traditional performance measures as a predictor of financial health.

The present study covered a period of 6 years (2003-08). The secondary data has been collected from various sources like CMIE prowess data base, financial journals, annual reports of the banks and statistical tables relating to banks in India. The study employs multiple correlation and panel regression analysis to examine whether EVA is more strongly associated with financial health or not as compared to other traditional performance measures.

Table 1: CAMEL indicators

C	Capital adequacy	1.	Capital Risk adequacy ratio (CAR)
A	Asset quality	1.	Net NPAs to Net Advances ratio (NnPANA)
		2.	Gross NPAs to Gross Advances ratio (GrNPAGA)
M	Management Soundness	1.	Ratio of Burden to Total Assets (RBTA)
		2.	Ratio of Burden to Interest Income (RBII)
E	Earnings ability	1.	Return on Assets (ROA)
		2.	Return on Equity (ROE)
		3.	Ratio of Net Interest Margin to Total Assets (RNIMTA)
L	Liquidity	1.	Cash Deposit Ratio (CDR)
		2.	Credit Deposit Ratio (CRDR)

A comparison of Economic Value Added vis-à-vis Traditional performance measures like Economic Value Added, Return on Capital Employed, Return on Net Worth, Profit before Depreciation, Interest and Taxes, Profit before Interest and Taxes and Earning per Share as a predictor of financial health of banks has been made. The financial health of banks has been analyzed on the parameters of CAMEL by the regulators (including RBI) as well as analysts. The acronym CAMEL stands for Capital, Asset Quality, Management Soundness, Earnings and Liquidity (Kosmidou and Zopounidis, 2008; Goyal and Kaur, 2008, Wirnkar and Tanko, 2008; Sharma, 2006). CAMEL framework is commonly used by the banks for analyzing the health of individual institutions, which looks at five major aspects of a financial institution: capital adequacy, asset quality, management soundness,

earnings ability and liquidity (Hilbers et al., 2000). These indicators broadly cover various aspects of performance of banks. The study analyses the financial health of the banks through ratios (Table 1) commonly used in banking research.

To determine the significance of relation between dependent and the independent variables, the results have been tested at 5% (Two-tailed test) and 1% (Two-tailed test) level of significance. The backward linear regression analysis which gives the most significant variable(s) left in the regression equation has been applied to further strengthen the results.

In the present study EVA considered as modern financial measures and ROCE, RONW, PBDIT, PBIT and EPS are considered as traditional performance measures. To evaluate the effectiveness of EVA with traditional performance measures, CAMEL indicators has been considered as dependent variable and EVA, ROCE, RONW, PBDIT, PBIT and EPS as independent variables.

1. **Capital Adequacy Ratio (CAR):** Capital Adequacy Ratio = Tier-I Capital + Tier-II Capital / Risk Weighted Assets Tier-I capital includes equity Capital and Free reserves. Tier-II capital comprises of subordinate debt of 5-7 years tenure, revaluation reserves, general provisions and loss reserves.
2. **Net NPAs to Net Advances Ratio (NnNPANA):** Net NPAs to Net Advances Ratio = Net Non- performing assets / Net Advances.
3. **Gross NPAs to Gross Advances Ratio (GrNPAGA):** Net NPAs to Net Advances Ratio = Gross Non- performing assets / Gross Advances.
4. **Ratio of Burden to Total Assets (RBTA):** Ratio of Burden to Total Assets = (Operating Expenses – Operating Income) / Total Assets.
5. **Ratio of Burden to Interest Income (RBII):** Ratio of Burden to Interest Income = (Operating Expenses – Operating Income) / Interest Income.
6. **Return on Assets (ROA):** Return on Assets = Net Profit After Tax/ Total Assets.
7. **Return on Equity (ROE):** Return on Equity = Net Profit After Tax/Total Shareholders' Fund
8. **Ratio of Net Interest Margin to Total Assets (RNIMTA):** Ratio of Net Interest Margin to Total Assets = (Interest Earned – Interest Paid)/Total Assets.
9. **Cash-Deposit Ratio (CDR):** Cash-Deposit Ratio = Cash in Hand + Balances with RBI / Total Deposits.
10. **Credit-Deposit Ratio (CRDR):** Credit Deposit Ratio = Loan created by Bank/ Total Deposits.
11. **Economic Value Added** = EVA is the excess of operating profits over the cost of capital employed. It is calculated as:

    EVA = NOPAT – (WACC ×ECE)

Where:

Net Operating Profit After Tax(nopat); Invested Capital(ic); Weighted Average Cost Of Capital (Wacc)

WACC = Proportion of Equity * Cost of Equity + Proportion of debt * Cost of Debt

Cost of Equity = Rj = Rf + â(Rm – Rf)

Cost of Debt = Interest Expended (1-t) / Total Debt

11. Return on Capital Employed (ROCE)

ROCE = (PBIT/ ACE) x 100

Where, PBIT is Profit before interest and tax

ACE is Average Capital Employed

12. Return on Net worth (RONW)

RONW = [NPAT/ ANW] x 100

Where, NPAT is Net profit after tax

ANW is Average Net worth

13. Profit before Depreciation, Interest and Taxes (PBDIT)

PBDIT = PBIT + D

Where, PBIT is Profit before Interest and Taxes

D is Depreciation

14. Profit before Interest and Taxes (PBIT)

PBIT = PBI + T

Where,

PBI = Profit before interest

T = Taxes.

15. Earning per share (EPS)

EPS = NI / ESO

Where, NI is Net income after taxes and preference dividend

ESO is Number of equity shares outstanding

Results and Discussions

Results of Correlation Analysis

The analysis points out the Economic Value Added/ Economic Capital, Return on Net Worth, Return on Capital Employed, Profit before Depreciation, Interest and Taxes, Profit before Interest and Taxes, and Earning per share as the significant variables under different parameters of financial health of banks under study as shown in Table 2.

Table 2: Correlation results

	ROA	ROE	CAR	CDR	RNTMTA	GrNPAGA	RBTA	RBII	CRDR	NnPANA	EVA	PBDIT	PBIT	EPS	ROCE	RONW
ROA	1															
ROE	.740**	1														
CAR	.499**	.232**	1													
CDR	0.085	0.049	0.028	1												
RNTMTA	.362**	.373**	.285**	-0.087	1											
GrNPAGA	-0.055	0.108	-0.068	-0.027	0.08	1										
RBTA	-.362**	-.353**	-.196**	-0.097	.206**	-0.134	1									
RBII	-.423**	-.402**	-.195**	-0.085	.266**	-.212**	.832**	1								
CRDR	-0.008	-.258**	0.005	0.072	-.270**	-.496**	0.031	-0.003	1							
NnPANA	-.160*	-0.009	-.179*	-0.029	-0.136	.858**	-0.106	-.252**	-.332**	1						
EVA	0.042	-0.047	-0.016	-0.053	-0.081	-.412**	0.132	.175*	.405**	-.301**	1					
PBDIT	0.098	-0.044	0.056	0.113	-.303**	-.277**	-0.101	-.206**	.523**	-.201**	0.142	1				
PBIT	0.103	-0.04	0.061	0.106	-.290**	-.266**	-0.101	-.205**	.511**	-.195**	0.132	.993**	1			
EPS	.422**	.250**	.387**	0.058	0.127	-.168*	-.180*	-.297**	.215**	-.177*	0.14	0.13	0.129	1		
ROCE	.343**	.258**	0.122	0.065	-.282**	.150*	-.308**	-.532**	.336**	.186*	-0.038	.607**	.597**	.217**	1	
RONW	.608**	.907**	0.14	0.022	.415**	.262**	-.264**	-.295**	-.417**	0.138	-0.108	-.179*	-.164*	0.126	0.063	1

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

Among independent variables, Economic Value Added has shown a negative correlation with Asset Quality of the banks, i.e., GrNPAGA (-0.412) and NnPANA (-0.301) at 1% level of significance. This variable also shows significant positive correlation with management soundness and liquidity position of the banks. EVA does not show any significant correlation with any of the parameters of capital adequacy and earnings ability of the banks.

The variable return on capital employed has significant correlation with all parameters of earnings ability whereas negative correlation with management soundness of the banks at 1% level. It has also shown significant positive correlation with asset quality of the banks at 5% level, i.e. NnPANA (0.186) and GrNPAGA (0.150). The correlation result of return on net worth is similar to the return on capital employed. The variable RONW is significantly correlated with asset quality, Management soundness and earnings ability of the banks. Both ROCE and RONW have significant correlation with credit deposit ratio at 1% level, i.e. 0.336 and -0.417 respectively.

The independent variables PBDIT and PBIT have shown similar results. Both have negative relationship with asset quality of the banks at 1% level of significance. One of the parameter of earnings ability i.e. RNIMTA has shown significant negative correlation with PBDIT (-0.303) and PBIT (0.290) at 1% level. They have also shown a negative correlation with RBII and positive correlation with CRDR at 1% level of significance.

Capital adequacy is one of the important parameters of CAMEL indicators. Earning per share is the only independent variable which shows significant positive correlation with capital adequacy of the banks, i.e. 0.387 at 1% level. The result also shows that EPS has significant positive correlation at 1% level with ROA (0.422) and ROE (0.250). It has negative correlation with asset quality of the banks at 5% level of significance, i.e. NnPANA (-0.177) and GrNPAGA (-0.168). Also, this variable has negative correlation with management soundness of the banks.

None of the independent variables found significant in case of cash deposit ratio (one of the parameter of liquidity position) of the banks. There exists poor relationship of cash deposit ratio with EVA and traditional performance measures.

It can be said that the independent variables, EVA, EPS, PBDIT and PBIT has shown negative correlation with asset quality of the banks. ROCE and RONW show positive correlation with earning ability and negative correlation with management soundness of the banks. The variable EPS has the only positive correlation with capital adequacy whereas negative correlation with management soundness of the banks. Hence, the correlation analysis for the whole period of six years indicates that traditional performance measures act as a superior measure and predictor of the financial health of banks. Moreover, some of the banks have been able to establish a clear and positive relation with EVA along with traditional performance measures.

Table 3: Panel regression results

(Dependent variable: CAMEL Indicators, independent variable: EVA and traditional performance measures)

Independent Variables Dependent Variables	EVA	ROCE	RONW	PBDIT	PBIT	EPS	R^2	Adjt.R^2	F-Value	Durbin-Watson	Mean	Std. deviation
Capital Adequacy Ratio	0.02676 (0..9787)	1.3026 (0.1949)	-0.6808 (0.4971)	0.66355 (0.5081)	0.08574 (0.9318)	-0.1827 (0.855)	0.5180	0.3793	3.734 (0.00)	1.433	0.1244	0.0178
Net NPAs to Net Advances ratio	-1.992 (0.0483)	1.0654 (0.288)	-1.678 (0.095)	1.080 (0.282)	-0.5711 (0.569)	1.201 (0.232)	0.7814	0.7186	12.425 (0.00)	1.006	0.0215	0.0204
Gross NPAs to Gross Advances ratio	-3.174 (0.001)	0.72430 (0.470)	-0.7457 (0.457)	1.0858 (0.279)	-0.4076 (0.684)	-0.0482 (0.962)	0.8439	0.7990	18.788 (0.00)	0.7470	0.0491	0.03384
Ratio of Burden to Total Assets	0.4697 (0.6393)	-1.1446 (0.2543)	-1.618 (0.1078)	-0.4979 (0.619)	0.3737 (0.709)	-1.337 (0.183)	0.5995	0.4843	5.2023 (0.00)	1.561	0.4519	0.6492
Ratio of Burden to Interest Income	0.1146 (0.9089)	-1.1747 (0.242)	-2.463 (0.015)	-0.7676 (0.444)	0.7403 (0.460)	-1.156 (0.120)	0.6731	0.5791	7.1557 (0.00)	1.664	0.0794	0.0821
Return on Assets	1.833371 (0.0689)	1.5599 (0.1211)	10.869 (0.000)	-0.8604 (0.3911)	0.5081 (0.6122)	2.468 (0.0148)	0.8376	0.79085	17.921 (0.00)	1.204	0.0107	0.00
Return on Equity	0.9504 (0.3436)	2.433 (0.0163)	21.03 (0.000)	0.6759 (0.500)	-1.406 (0.162)	2.615 (0.009)	0.933	0.9142	48.676 (0.00)	1.60	0.185	0.08
Ratio of Net Interest Margin to Total Assets	-1.244 (0.2155)	0.3825 (0.7027)	4.435 (0.00)	-0.576 (0.5653)	1.267 (0.2073)	-0.5589 (0.5771)	0.7717	0.7061	11.749 (0.00)	1.27	0.029	0.0058
Credit Deposit Ratio	1.740 (0.0841)	-0.022 (0.982)	-0.690 (0.491)	-0.8215 (0.412)	-0.065 (0.948)	1.849 (0.067)	0.8618	0.8221	21.685 (0.00)	1.248	0.630	0.1062
Cash Deposit Ratio	-0.3893 (0.6976)	-0.495 (0.621)	0.1513 (0.88)	0.5884 (0.557)	-0.679 (0.498)	1.790 (0.0756)	0.268	0.0573	1.273	2.656	0.0754	0.0486

Relationship of EVA and other Performance Measures

Table 3 depicts the relationship of EVA and other traditional performance measures with the financial health of banks. It has been analyzed with the help of panel regression. The regression analysis points out the fact that EVA/EC along with RONW and EPS act as better predictor of the financial health of banks.

The independent variables, EVA and RONW have been found to be statistically significant under asset quality of the banks. These variables explain 84.39% variation in case of GrNPAGA and 78.15% variation in case of NnPANA. Durbin Watson value (less than two) indicates that there is no problem of autocorrelation. F-value is also significant at one percent level indicating the fitness of model.

In second model where management soundness has been taken as dependent variable, RONW is the only variable which has shown a significant variation at 1% level.

F-statistics is also significant at 1% level i.e. 7.156. No significant variable has been found under RBTA. In this case, the null hypothesis (H_{01}) has been accepted which proves that EVA is not a superior measure of performance as compared to traditional performance measures.

In case of earning ability of banks, EPS and RONW explain 83.76% variation in ROA. The table reveals that the value of R-square and adjusted R-square are high and it may be adequate for the fitness of the model. F-value is significant at 1% level. i.e. ROA= 17.92, ROE=48.67 and RNIMTA= 11.79. This suggests that the association between earning ability of banks with EPS and RONW is significant. Durbin Watson value indicates that there is no problem of autocorrelation.

The independent variables EPS and EVA found to be statistically significant at 10% level in case of credit deposit ratio under liquidity position of the banks. F -value is also significant at one percent level indicating the fitness of model i.e., 21.68. The model explains 86% variation in the dependent variable. The results regarding the association of cash deposit ratio with EVA and traditional performance measures under liquidity parameters slightly differ. The table reveals that value of adjusted R- square is very low and it may not be adequate for the fitness of the model. The t-value and F-statistics also suggest that the association between the cash deposit ratio (dependent variable) and independent variables is not significant during the study period.

None of the independent variable has been found significant under capital adequacy of the banks. Table 3 provides the values of R-square, Adjusted R-square are 0.5170, 0.3793 respectively. It sounds that there exists poor relationship between capital adequacy and performance measures (independent variables) of the banks. The t and F-statistics also give identical results and both of them lead to insignificant association between the

variables under reference. EVA and traditional performance measures do not suitably explain the capital adequacy of the banks. The overall analysis showed that EVA with traditional performance measure EPS, found to be better predictor of financial health of the banks.

The regression analysis has provided mixed results. The results are similar to Barel(2009), Dutta and Sengupta(2011) and Faizulayev(2011). Among traditional performance measures, RONW and EPS have appeared as significant variables followed by Economic Value Added. Hence, the null hypothesis (H_{01}) has been accepted which proves EVA is not a superior measure of performance in comparison with traditional measures. The second null hypothesis (H_{02}) has been rejected which proves that EVA has significant relationship with the financial health of banks. The third null hypothesis (H_{03}) has been rejected which shows that there is significant relationship of financial health of banks with other traditional performance measures.

Conclusions

There is concrete evidence to support Stern and Stewart's claim that Economic Value Added measure is better than traditional performance measures in relation to the financial health of banks. The results indicate that EVA has emerged to be the second most significant variable showing a highly positive relationship in about 45% of the total banks under study. The need of the hour for all Indian banks that they should start reporting their financial position in terms of EVA. Moreover, the banks should not discontinue the traditional performance measures entirely, especially RONW and EPS as these measures have shown a very strong relationship with financial health of the banks. Further research can also be conducted to see which component of EVA (Operating Cash Flow, Earnings, and RI), if any, contributes to the association between EVA and stock returns and firm values than accrual earnings

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Appendix

Table 4: Sample Banks

Public Sector Banks	Private Sector Banks (2002[1])
Allahabad Bank; Andhra Bank; Bank of Baroda; Bank of India; Bank of Maharashtra; Canara Bank; Central Bank of India; Corporation Bank; Dena Bank; Indian Bank; Indian Overseas Bank; Oriental Bank of Commerce; Punjab & Sind Bank; Punjab National Bank; Syndicate Bank; UCO Bank; Union Bank of India; United Bank of India; Vijaya Bank; State Bank of Bikaner & Jaipur; State Bank of Hyderabad; State Bank of Indore; State Bank of Mysore; State Bank of Patiala; State Bank of Saurashtra; State Bank of Travancore; IDBI Bank	Bank of Punjab; Bank of Rajasthan; Centurion Bank; City Union Bank; Dhanalakshmi Bank; Federal Bank; Global Trust Bank; HDFC Bank; ICICI Bank; IDBI Bank; Indusind Bank; J & K Bank; Karnataka Bank; Karur Vysya Bank; Lakshmi Vilas Bank; Nedungadi Bank; South Indian Bank; United West Bank; UTI Bank; ING Vysya Bank

Note: The year 2002 has been taken as the base year; and private banks have been selected on the basis of market capitalization of 2002.

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A Study on the Effect of Futures Trading on Price Fluctuation in Commodity Market

ARPANA.D

This paper aims at finding out if the exchanges have been successful in maintaining a stable price for the commodities or whether after the introduction of futures markets the prices have fluctuated drastically compared to before the introduction of futures. For this purpose the spot prices for four years after the introduction of futures were obtained from the NCDEX and four year prices prior to introduction of futures were obtained from the agricultural marketing websites. The Log Naturals of the data thus collected were calculated and a first difference was calculated based on the Log Naturals. Subsequently the first lag difference was used to conduct the test for stationarity. For this purpose Augmented Dickey Fuller Test of stationarity was used. Subsequently standard deviations prior and after the introduction of futures was removed and the values were subjected to a F-test. Based on the results of the above we were able to conclude that after the introduction of futures in the market there has been less fluctuations in the market.

Introduction

When the possibility of speculative bubbles is excluded and the price follows a unique path, the question remains as to whether the quality of price forecasts by rational agents improves with the introduction of a future market. Futures trading have been viewed to serve for a better distribution of commodities over time, leading to a reduction in their amplitude and frequency of price fluctuations. Since futures traders, in their capacity as speculators, usually take a long position when the spot price is expected to be higher than the delivery contract price and a short position when the spot price is expected to be lower, futures activities are considered to improve the inter temporal allocation of commodities and therefore stabilize prices. This hypothetical view might appear consistent with economists, institutions but empirical studies on price stabilizing effects of futures trading have revealed mixed results. Futures markets have been described as continuous

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auction markets and as clearing houses for the latest information about supply and demand. Clearing houses are the meeting places of buyers and sellers of an extensive list of commodities. Today, commodities that are sold include agricultural products (grains trading), metals (such as gold and silver), Energies trading (crude and petroleum), financial instruments, foreign currencies, stock indexes and more .Today's futures market has also become a major financial market. Participants in futures trading include mortgage bankers, farmers and bond dealers as well as grain merchants, food processors, savings and loan associations and individual spectators.

Indian markets have recently thrown open a new avenue for retail investors and traders to participate: commodity derivatives. For those who want to diversify their portfolio beyond shares, bonds and real estate, commodities is the best option. With the setting up of three multi-commodity exchanges in the country, retail investors can now trade in commodities futures without having physical stocks. Commodities actually offer immense potential to become a separate asset class.

Objectives of the study

- To analyse if futures trading has an impact on the price of the commodities.
- To study the present scenario of the commodity markets.
- To analyse the method of pricing agricultural commodity futures.
- To examine hedging, speculation and arbitrage in commodity futures.

Hypothesis

Ho: The volatility before and after the introduction of futures is the same

H1: The volatility after the introduction of futures is less

Methodology

Qualitative data was analyzed to find out reasons that may exist which cause any variations in the commodity futures markets. Quantitative data like the prices of the commodities for the two years preceding the date of introduction of futures and after introduction of futures was collected and analyzed.

The sample size includes the following commodities and the prices two years prior to introduction and after the introduction of futures was considered. The commodities are Barley and Soyabean. Log Natural, Augmented Dickey Fuller Test (for stationarity), Standard Deviation and F-Test are applied for the analysis.

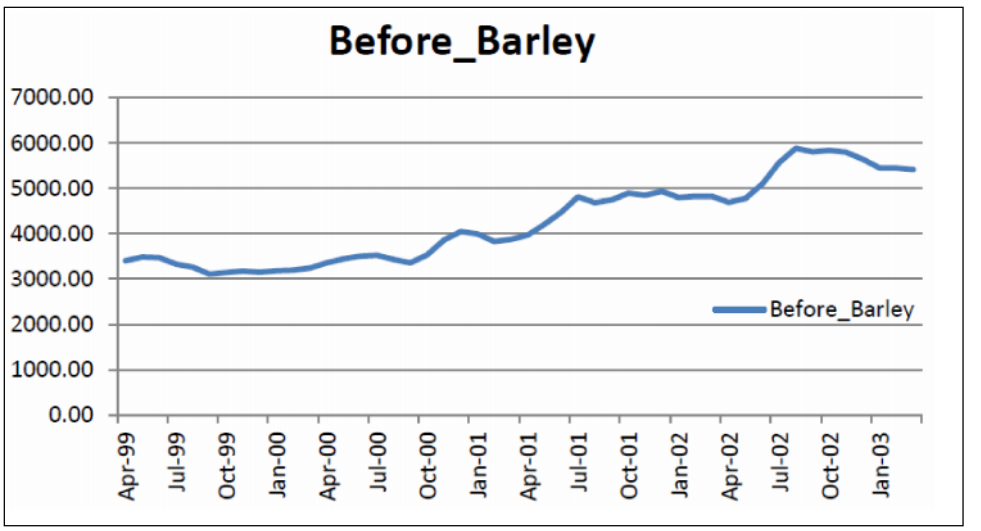

Figure 1: Barley Prices before introduction of Futures

Source: www.Mandi index.com

Augmented Dickey Fuller Test

Table 1: Barley Prices using Augmented Dickey Fuller Test

Barley before introduction of futures:

Null Hypothesis: BARLEY_BEFORE has a unit root

Exogenous: Constant, Linear Trend

Lag Length: 1 (Automatic based on SIC, MAXLAG=1)

	t-Statistic	Prob*
Augmented Dickey Fuller test statistic	-3.880542	0.0209
Test critical values:	1% level	-4.170583
	5% level	-3.510740
	10% level	-3.185512

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation

Dependent Variable: D(BARLEY_BEFORE), Method: Least Squares, Sample (adjusted): 1999M06 2003M03, Included observations: 46 after adjustment

Variable	Coefficient	Std. Error	T-statistic	Prob.
Barley_Before (-1)	-0.250271	0.064494	-3.880542	0.0004
D (Barley_Before(-1)	0.543025	0.119863	4.530376	0.0000
C	677.6356	176.2252	3.845282	0.0004
@Trend(1999m04)	16.47610	4.329954	3.805144	0.0005

Contd...

Contd...

R-squared	0.423876	Mean dependent var	41.89761
Adjusted R-squared	0.382724	S.D.dependent var	152.8608
S.E. of regression	120.0980	Akaike info criterion	12.49743
Sum squared resid	605788.2	Schwarz criterion	12.65645
Log likelihood	-283.4410	Hannan-Quinn criter.	12.55700
F-statistic	10.30033	Durbin-Watson stat	1.985772
Prob (F-statistic)	0.000033		

It is interpreted that the Unit root test is carried out under the null hypothesis Y = 0 against the alternative hypothesis of Y < 0.The value for the test statistic computed is compared to the relevant critical value for the Dickey-Fuller Test. If the test statistic is less than the critical value then the null hypothesis of Y =0 is rejected and no unit root is present.

It is inferred that the value of the test statistic is greater than the critical value for the Dickey Fuller Test. Hence accepted and unit root is present

Table 2: Barley Prices using Augmented Dickey Fuller Test

Barley after introduction of futures:
Null Hypothesis: BARLEY_AFTER has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 1 (Automatic based on SIC, MAXLAG=1)

	t-Statistic	Prob*
Augmented Dickey Fuller test statistic	-1.858152	0.6597
Test critical values:	1% level	-4.170583
	5% level	-3.510740
	10% level	-3.185512

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation

Dependent Variable: D(BARLEY_AFTER), Method: Least Squares, Sample (adjusted): 2003M06 2007M03, Included observations: 46 after adjustment

Variable	Coefficient	Std. Error	T-statistic	Prob.
BARLEY_After (-1)	-0.103194	0.055536	-1.858152	0.0702
D(BARLEY_After(-1)	0.334003	0.144779	2.306989	0.0261
C	300.9804	241.1202	1.248259	0.2189
@TREND(2003M04)	8.604153	3.266944	2.633701	0.0118

Contd...

Contd...

R-squared	0.276054	Mean dependent var	32.09891
Adjusted R-squared	0.224344	S.D.dependent var	280.6232
S.E. of regression	247.1487	Akaike info criterion	13.94080
Sum squared resid	2565463	Schwarz criterion	14.09981
Log likelihood	-316.6384	Hannan-Quinn criter.	14.00037
F-statistic	5.338461	Durbin-Watson stat	1.804059
Prob (F-statistic)	0.003307		

It is interpreted that the Unit root test is carried out under the null hypothesis Y = 0 against the alternative hypothesis of Y < 0.The value for the test statistic computed is compared to the relevant critical value for the Dickey-Fuller Test. If the test statistic is less than the critical value then the null hypothesis of Y =0 is rejected and no unit root is present.

It is inferred that the value of the test statistic is greater than the critical value for the Dickey Fuller Tdest. Hence null hypothesis of Y=0 is accepted and unit root is present.

Soyabean

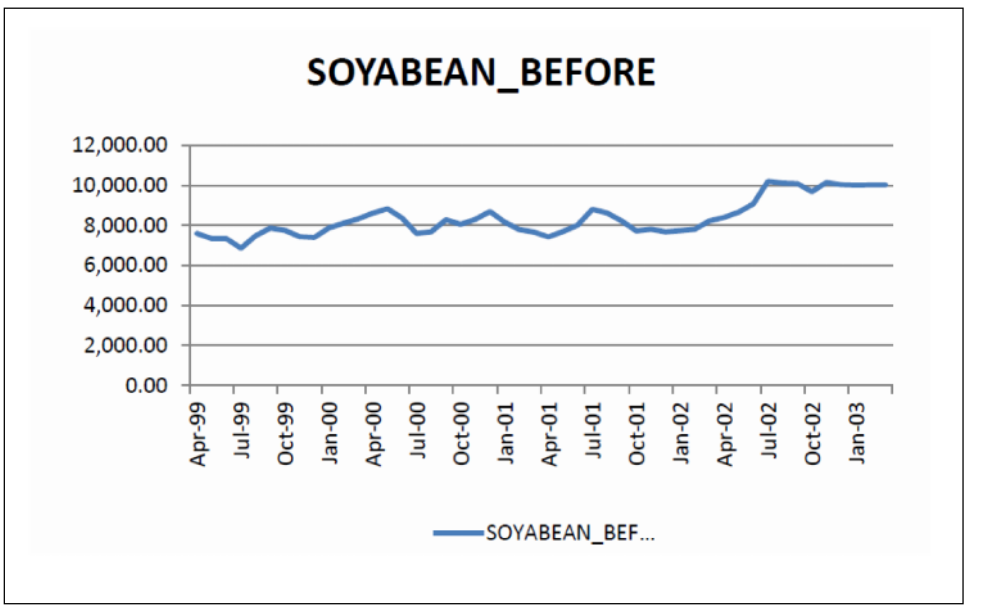

Figure 2: Soyabean Prices before introduction of Futures

Table 3: Soyabean Prices using Augmented Dickey Fuller Test
Soyabean before introduction of futures:

Null Hypothesis: soyabean _BEFORE has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 1 (Automatic based on SIC, MAXLAG=1)

	t-Statistic	Prob*
Augmented Dickey Fuller test statistic	-2.117686	0.5228
Test critical values:	1% level	-4.165756
	5% level	-3.508508
	10%level	-3.184230

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation, Dependent Variable: D(SOYABEAN_BEFORE), Method: Least Squares, Sample (adjusted): 1999M05 2003M03, Included observations: 47 after adjustments

Variable	Coefficient	Std. Error	T-statistic	Prob.
Soyabean_Before (-1)	-0.187400	0.088493	-2.117686	0.0399
C	1335.357	643.1639	2.076231	0.0437
@TREND(2003M04)	11.52639	5.841497	1.973192	0.0548
R-squared	0.099534	Mean dependent var		51.71191
Adjusted R-squared	0.058603	S.D.dependent var		379.9431
S.E. of regression	368.6420	Akaike info criterion		14.71923
Sum squared resid	5979466	Schwarz criterion		14.83733
Log likelihood	-342.9019	Hannan-Quinn criter.		14.76367
F-statistic	2.431785	Durbin-Watson stat		1.548794
Prob (F-statistic)	0.099606			

It is interpreted that the Unit root test is carried out under the null hypothesis Y = 0 against the alternative hypothesis of Y < 0.The value for the test statistic computed is compared to the relevant critical value for the Dickey-Fuller Test. If the test statistic is less than the critical value then the null hypothesis of Y =0 is rejected and no unit root is present.

It is inferred that the value of the test statistic is greater than the critical value for the Dickey Fuller Test. Hence null hypothesis of Y=0 is accepted and unit root is present.

Table 4: Soyabean Prices using Augmented Dickey Fuller Test

Soyabean After Introduction of Futures

Barley after introduction of futures

Null Hypothesis: Soyabean_AFTER has a unit root

Exogenous: Constant, Linear Trend

Lag Length: 1 (Automatic based on SIC, MAXLAG=1)

	t-Statistic	Prob*
Augmented Dickey Fuller test statistic	-2.424136	0.3629
Test critical values:	1% level	-4.170583
	5% level	-3.510740
	10% level	-3.185512

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation, Dependent Variable: D(SOYABEAN_AFTER) , Method: Least Squares, Sample (adjusted): 2003M06 2007M03, Included observations: 46 after adjustments

Variable	Coefficient	Std. Error	T-statistic	Prob.
Soyabean_After (-1)	-0.142857	0.058931	-2.424136	0.0197
D(Soyabean _After(-1)	0.538835	0.132599	4.063653	0.0002
C	1707.729	758.3914	2.251777	0.0296
@TREND(2003M04)	-6.093927	8.658242	-0.703830	0.4854
R-squared	0.309065	Mean dependent var		27.16870
Adjusted R-squared	0.259712	S.D.dependent var		825.5390
S.E. of regression	710.2936	Akaike info criterion		16.05218
Sum squared resid	21189711	Schwarz criterion		16.21119
Log likelihood	-365.2000	Hannan-Quinn criter.		16.11174
F-statistic	6.262391	Durbin-Watson stat		2.080210
Prob (F-statistic)	0.001303			

It is interpreted that the Unit root test is carried out under the null hypothesis Y = 0 against the alternative hypothesis of Y < 0.The value for the test statistic computed is compared to the relevant critical value for the Dickey-Fuller Test. If the test statistic is less than the critical value then the null hypothesis Y =0 is rejected and no unit root is present.

It is inferred that the value of the test statistic is greater than the critical value for the Dickey Fuller Test. Hence null hypothesis of Y=0 is accepted and unit root is present.

Standard deviation and F test

The monthly prices of the commodities collected for four year period prior and after the introduction of futures .Log naturals of the prices of the

commodities was removed subsequent to which a 1st difference of the log natural values was removed. Standard Deviation month wise was removed of the 1st difference. Subsequent to which a Standard Deviation of the monthly Standard Deviations was removed. Based on which an F-Test was conducted to see if the values are significant or not.

Table 5: Standard deviation of monthly standard deviation

Commodity	Standard Deviation	
	Before	After
Barley	0.092275	0.069813
Soyabean	0.046526	0.072967

$$F\text{-}Test = \frac{(Standard\ Deviation1)2}{(Standard\ Deviation2)2}$$

Table 6: F-test

Commodity	F-Test
Barley	1.747010
Soyabean	0.406572

It is interpreted that the value of the F-Test is greater than 1 therefore the Alternative hypothesis is accepted and the null hypothesis is rejected. If the value is greater than 1 it is significant. Thus it is analysed that the volatility after the introduction of futures is less.

Barley: It infers that the F-Test value of Barley is 1.747010 which is greater than 1 and it is found that after the introduction of futures the volatility in the futures market for Barley has decreased and thus the alternative hypothesis is accepted in the case of Barley.

Soyabean: It infers that the the F-Test value of Soyabean is 0.4065729 which is a very low value and thus it is not significant as it is less than1 and it is concluded that the volatility in the futures market of Soyabean after the introduction of futures has increased. Here alternative hypothesis is rejected and null hypothesis is accepted.

Findings

- The Agriculture commodities are showing a trend for the investors to hold for some time.
- Compared to equity markets the commodity markets are less volatile.
- The major factors, which include government policies weather products and supply of commodity in the market etc., are the major determinants of price fluctuation in the market.
- Commodity markets are highly speculative in nature where there is much scope for misleading the participants by few major players in the market.

- The Agriculture commodities are better means of investments.
- One can reduce risk or make gains by using the strategies like hedging, speculation and arbitrage.

Conclusion

The introduction of futures has reduced the volatility in the futures market and has helped cause speculation in the market and keep the prices of the commodities under check.

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India within BRICS Countries after 2008 Global Financial Crisis

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It is interesting to see that the share of emerging and developing economies in the global GDP has been on rise from about 20% in 2000 to 36% in 2011 in terms of US dollar. In terms of purchasing power it rose from 37% to almost 49%. The interesting thing is that emerging economies continued to grow faster than that of the advanced economies even in adverse economic condition. Thus the focus of this study is on emerging and developing economies. The major emerging and developing economies are BRICS countries and this study emphasizes to highlight India's real strength among BRICS countries during financial crisis.

Introduction

The world economy is slowly recovering which was badly affected by the contagion effect of US subprime financial crisis and the European debt crisis. The Global financial crisis 2008 engulfed the whole world which was originated in USA. The originator was the most influential economy in the world USA and the most affected countries in the crisis were the developed economies like USA, Europe, Japan etc. During the crisis the GDP came down to negative in most of the developed countries. The global financial integration and trade linkage of US and Europe with rest of the world led to spread the crisis shocks from US and Europe to all over the world. The degree of impact varied from country to country. The developed countries were most affected where as the developing countries were relatively less affected.

Now investors and researchers all over the world are attracted towards the BRICS countries. The crisis spreads to the BRICS countries through 4 channels-trade, finance, commodity and confidence channels. At the earlier stage of the crisis the shock was spread over the real economy through equity price and credit channel.

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Review of Literature

Bordo (2012) concluded that the impact of 2008 subprime financial crisis was less as compared to 1930's great depression. Chakrabarty (2012) attempted to focus on crisis preparedness in interconnected markets and concluded that prevention is better than cure. Mishra (2012) suggested that in a period of great moderation (the high growth, low inflation and modest recession), a rapid financial innovation creating a much more flexible and adoptable economic system. Mohanty and Panda (2010) mentioned that India's exports, FDI and FII's, foreign exchange reserves, value of rupee, stock prices, employment, GDP growth, IIP were affected due to global financial crisis. Mishra and Panda (2010) found that India was affected in several aspects like down of stock markets, down of BPOs, reduction of exports, unemployment etc. but India's financial institutions were not affected significantly. Mohanty (2012) found that during pre crisis period India's GDP growth rate was 8.7% and it was 7.5% in post crisis period. The fiscal deficit of India was 5.9% in 1990s which was 3.6% in 2003-08. Vanitha et al. (2011) showed that there exists a co-integration between BRIC countries stock market with the developed countries stock market. They also suggested that it is better to invest in the BRIC countries in the long run. Finally Indian market is correlated with BRIC countries markets except Russia. Samal (2011) mentioned that India is not among the worst affected countries because the nationalized banking system still dominates at greater degree of regulation in financial sector.

Research Methodology

Yearly and daily data of BRICS countries are taken from 2006 to 2012.The data are taken from different sources like-BRICS joint statistical publication 2012, yahoofinance.com, IMF WEO publication 2012, and all countries Ministry of Finance and Stock markets of respective countries. The variables used in this study are GDP (Gross Domestic Products) growth rate from 2007-2012, value of export of goods and commercial services, value of import of goods and commercial services from 2006-2010 and daily stock market indices like BOVESPA index for Brazil, RTS index for Russia, S$P CNX Nifty for India and Shanghai Composite index for China from 9th Jan 2007 to 19th march 2012 with total of 1124 observations. The entire variables are taken from each of the BRICS countries except the stock index where the study left South Africa for the unavailability of proper data. For stock indices we have taken daily data series and for all other variables yearly data series.

The daily stock prices are converted in to natural logarithm by the formula $(P_t / P_{t-1}) *100$. After that ADF test and Granger causality test were applied to know the stationarity of data and causal relationship among the BRIC stock market respectively.

P_t= closing price of the same day and

P_{t-1}= closing price of the previous day

Unit Root Test

For testing Unit root we have applied the Augmented Dickey Fuller Test (ADF Test).

The key concept underlying time series process is that of stationary. A time series is stationary when it has the following three characteristics.

i. Exhibits mean reversion in that it fluctuates around a constant long run mean

ii. Has a finite variance that is time invariant, and

iii. Has a theoretical correlogram that diminishes as the lag length increases.

The ADF test consists of estimating the following regression:

$$Y_t = \beta_1 + \beta_2 t + \sigma Y_{t-1} + \Sigma^m_{i=1} \alpha_i \Delta Y_{t-i} + \varepsilon_t \ldots\ldots\ldots\ldots\ldots\ldots (i)$$

Where ε_t is a pure white noise error term and where $Y_{t-1} = (Y_{t-1} - Y_{t-2})$, $Y_{t-2} = (Y_{t-2} - Y_{t-3})$, etc. The number of lagged difference terms to include is often determined empirically, the idea being to include enough terms so that the error term in the equation (i) get serially uncorrelated. In ADF test whether $\sigma = 0$ is tested and the ADF test follows the same asymptotic distribution as the DF statistic, so the same critical values can be used.

Granger Causality Test

The Granger causality test checked the causality between two variables. If there are two variables say X and Y then the causality result between these two variables may be in following 4 possible cases.

a. X granger causes Y

b. Y granger causes X

c. No Granger Causality exists between X and Y

d. Bidirectional causality exist from X to Y and Y to X

To test causal relations between two stationary series X_t and Y_t (in bivariate case) can be based on the following two equations:

$$Y_t = \sigma_0 + \Sigma^p_{k=1} \sigma_k Y_{t-k} + \Sigma^p_{k=1} \beta_k X_{t-k} + u_t \ldots\ldots (ii)$$

$$X_t = \varphi_0 + \Sigma^p_{k=1} \varphi_k Y_{t-k} + \Sigma^p_{k=1} \Phi_k X_{t-k} + v_t \ldots\ldots (iii)$$

Where p is a suitable chosen positive integer; σ_k's and β_k's, k = 0,1,……p are constants: and u_t and v_t usual disturbance terms with zero means and finite variances. The null hypothesis that X_t doesnot Granger cause Y_t is not accepted if the β_k's, k > 0 in equation (ii) are jointly significantly different from zero using a standard joint test (F test). Similarly *Y_t Granger causes X_t if the Φ_k's* k > 0 coefficients in equation (3) are jointly different from zero.

Discussion and Analysis

We have taken 4 macro economic variables like GDP (Gross domestic product) Growth, Value of Exports, Value of Imports and stock indices of BRICS countries. The study uses trend analysis and Granger causality test to

compare the India's strength among BRICS countries. The GDP growth rate of each of the BRICS countries are given below

Table 1: GDP growth rate

Country	2007	2008	2009	2010	2011	2012(p)
Brazil	6.1	5.1	-1.5	4	4	4
Russia	8.5	5.6	-6.5	0.8	4	4
India	9.8	9.3	6.7	8.4	8.39	5.7
China	14.2	9.6	8.7	10.4	9.4	9
South Africa	5.5	3.6	-1.5	2.9	3.1	2.5
average	8.82	6.64	1.18	5.3	5.778	5.04

Table 1 shows that though China and India suffered due to crisis during 2008 alike other BRICS countries they recovered fast. During 2009 other than these two countries rest was in negative growth rate. Even till 2011 rest of the countries were suffering with less than 5% growth rate in terms of their GDP. The average GDP of all the BRICS countries were lower than the GDP of China and India.

Table 2: Value of exports of goods and commercial services

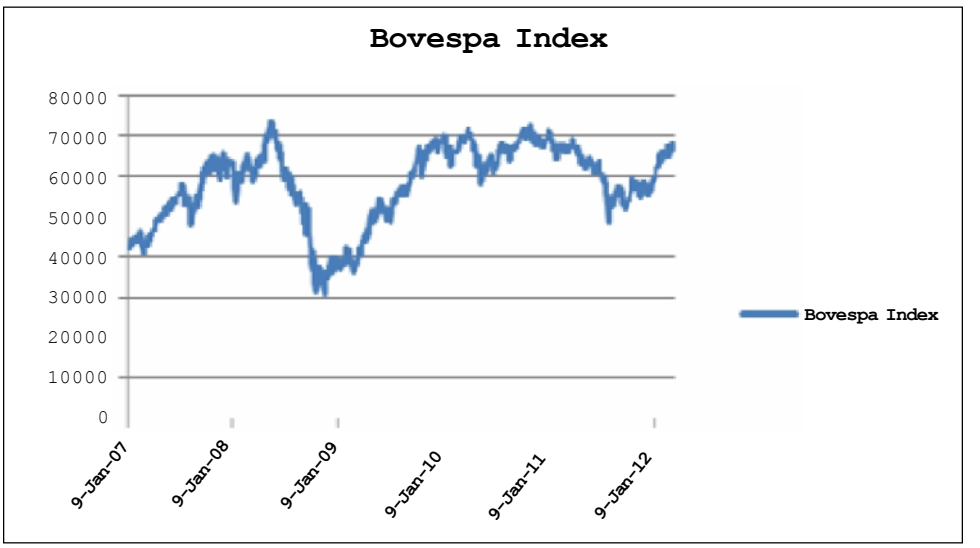
Country	2006	2007	2008	2009	2010
Brazil	157283	184603	228393	180723	233736
Russia	334652	393657	522735	344934	319515
India	185735	251439	298843	288373	352575
China	1061682	1342206	1581713	1333346	1752621
South Africa	78368	89962	98118	77892	99508
Average	348272	434782	526738	429877	532091

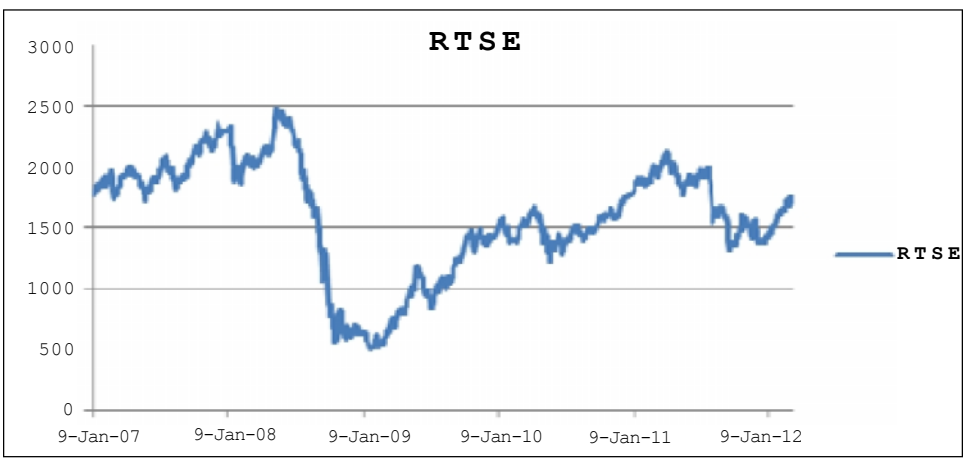
Table 2 shows the value of export of goods and commercial services of the BRICS countries. It is clear that China's export is growing and it is little bit affected in 2008 and 2009. During this period all countries have been affected at a lower rate and then they started recovering while Russia is not able to recover its export. In comparison to other BRICS countries, India is having very minor variation in its export position between 2008- 09 but overall it shows a growing tendency. In brief we can say that India's export position was less affected. Table 2 shows import position of India because the trade balance is being calculated by taking export and import position of a country.

Table 3: Value of import of goods and commercial services (Million US $)

Country	2006	2007	2008	2009	2010
Brazil	120467	157790	220427	174679	244541
Russia	208996	281631	367329	253233	224373
India	126414	162904	182799	178751	254402
China	852769	1034729	1232843	1113234	1520559
South Africa	84760	97781	106492	80395	100106
Average	278681.2	346967	421978	360058.4	468796.2

Like export position of the BRICS countries, the position of import also has behaved in the similar manner. Here china is playing major role in import than other BRICS countries. It has shown a decline in 2008-09 but again it started to recover from 2009 onwards. In this context India's condition seems to be more stable than other countries. It had a marginal effect in 2009 but it recovered soon. By looking at above graph we can say that India's Import position is not affected to the same extent as other BRICS countries.





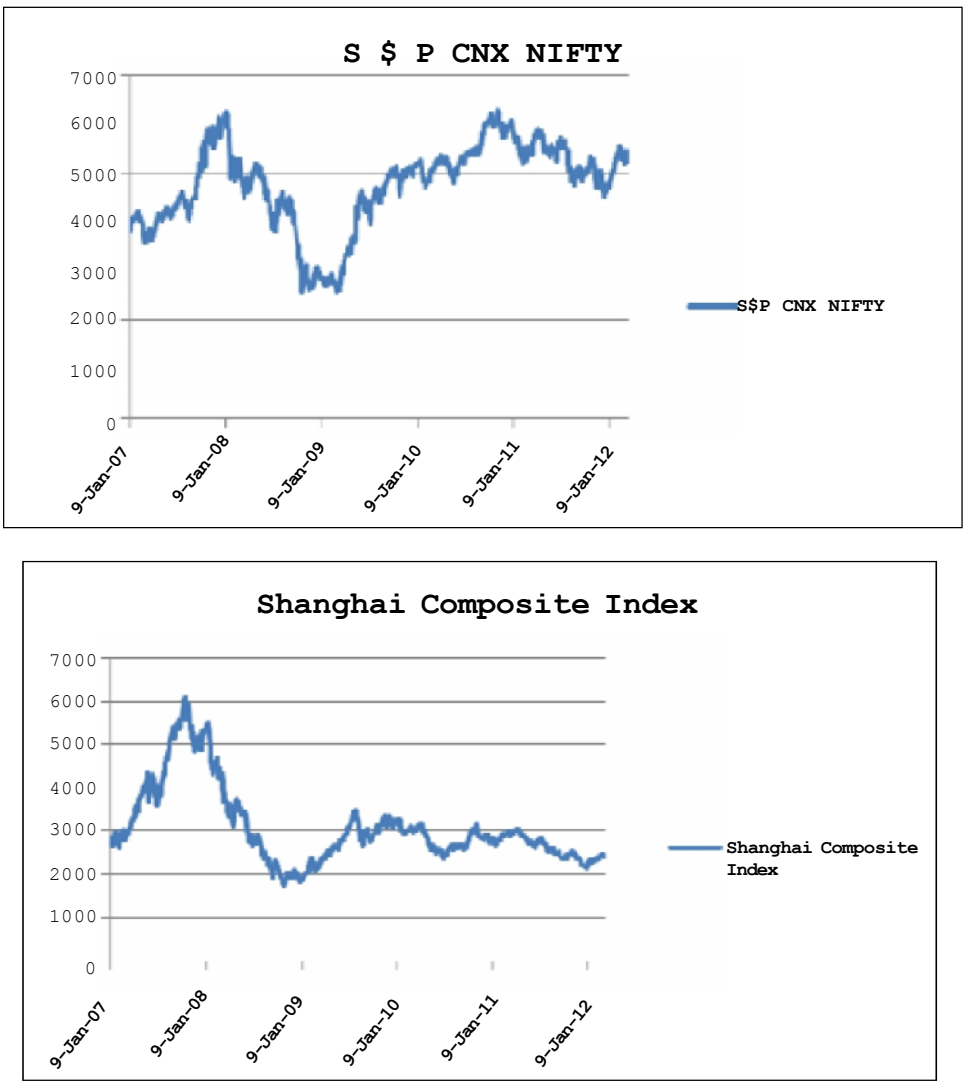


Figure 1: Trend of BRIC Stock Markets

As the performance of a stock market becomes a crucial element of every country and it is the life line of any economy; so there is a requirement to analyze the performance of BRIC countries and to test the causal relationship among them.

There are three phases in these stock prices of four countries. They are growing phase, declining phase and recovering phase. Before crisis all the countries stock indexes were bullish trend whereas after crisis they started following bearish trend after some period again they are able to recover and now all stock indices of BRIC countries are in bullish trend except China's Shanghai composite index which is still in worst situation. This indicates that 2008 financial crisis had effect on stock market of BRIC countries but it did not continue for a longer period . Looking to the trend though all were

behaving in similar manner there is a question whether these stock markets are causing each other or not. We have applied Granger causality test to know the causal relationship between these stock markets. The results of Granger causality test are shown below.

Table 4: Pair wise Granger causality test

	F-statistics
Null hypothesis	2.665**
RTSE does not Granger Cause BOVESPA	34.526#
BOVESPA does not Granger Cause RTSE	1.083#
NIFTY does not Granger Cause BOVESPA	35.494#
BOVESPA does not Granger Cause NIFTY	1.204#
SCI does not Granger Cause BOVESPA	25.259#
BOVESPA does not Granger Cause SCI	4.416*
NIFTY does not Granger Cause RTSE	7.733*
RTSE does not Granger Cause NIFTY	1.365#
SCI does not Granger Cause RTSE	8.967*
RTSE does not Granger Cause SCI	0.884#
SCI does not Granger Cause NIFTY NIFTY does not Granger Cause SCI	6.252*

**and * – indicates significant @ 10% and 1% level. # indicates insignificant

The above results of Granger causality test show that there was a unidirectional causality between Russia stock market (RTSE) and Brazil stock mark (BOVESPA) that means changes in Russian stock market is caused by the changes in Brazil stock market but the same was not true in case of Brazil stock market to Russian Stock market. There was no causality between the Brazil stock market and Indian stock market and Chinas stock market to Brazil stock market. There was a bi-directional causality between Indian stock market (NIFTY) and Russian stock market (RTSE). The unidirectional causality seen in case of Russian stock market to Chinese stock market and Indian stock market to Chinese stock market. Here it is clear that a change in China's stock market is caused by the changes in Russian stock market and Indian stock market. From this we can conclude the result that changes in BRICs stock market is significantly caused by the changes in the Russian stock market than others after financial crisis.

Conclusion

The result of Granger causality test shows that there was a unidirectional causality between Russia stock market (RTSE) to the rest of the BRIC stock market. There was no causality between the Brazil stock market to Indian stock market and China's stock market to Brazil stock market. There was bidirectional causality between Indian stock market (NIFTY) and Russian stock market (RTSE).

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