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Stock Market Development of BRIC Countries: Integration with Global Financial Markets

S. VANITHA, P. SRINIVASAN AND V. KARPAGAM

Over the past few decades, the world stock markets have grown and emerging markets have accounted for a large amount of this boom. The speed and extent of stock market development in developing countries have been unprecedented and have led to fundamental shift both in the financial structures of less developed countries and in the capital flows from developed nations. This research focuses on four emerging countries, namely the Brazil, Russia, India and China collectively called as BRIC and developed countries namely U.S, U.K, Japan and Germany. An attempt has been made in this study to analyse the integration between different BRIC countries and developed countries.

Introduction

Global Financial Market Integration is a buzzword in the modern world of finance. The speed and extent of stock market development in developing countries have been unprecedented and have led to fundamental shift both in the financial structures of less developed countries and in the capital flows from developed nations. The capitalization ratio (market capitalization as a proportion of GDP), a key indicator of stock market development, rose at an unprecedented rate in leading developing economies called BRIC than the developed countries from 2001 to 2008.

Review of the Literature

Chittedi and Krishna Reddy (2009), found that there is co-integration between BRIC countries and developed countries, namely, USA, UK and Japan. The results of error correction model reveal that SENSEX, NIKKEI, FTSE and BOVESPA are significant. It implies that these markets share the forces of short-run adjustment to long-run equilibrium. Bappaditya Mukhopadhyay (2009) found that market integration is more prominent among markets which are at development stage. In addition, it is also found that market integration is mostly done by developed markets and the emerging markets are more vulnerable than the developed markets during the times of distress. Ulaganathan Subramanian (2008) conducted an analysis of co-integration

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and casual relations among five major stock exchanges in East Asia, i.e., Shanghai Stock Exchange, Tokyo Stock Exchange, Osaka Stock Exchange, Hong-Kong Stock Exchange and Korean Stock Exchange by using Johansen Co-integration, Vector Error Correction Model and Unit Root Test. It is found that the price indices are co-integrated and perfectly correlated in the long-run and diversification among these five equity markets cannot benefit international portfolio investors. However there can be excess returns in the short-run. Ghulam Sarwar and Rafiqul Bhuyan (2008) focused on spillover effects between US stock market and the emerging stock markets by using a variant of the aggregate shock model under the GARCH framework and allow for both the mean return and volatility spillover effects. In the study, it is found that US stock market has significant mean return and volatility spillover effects on the BRIC Stock Markets. In addition, they also demonstrate that the mean and volatility spillover effects exist not only from US market to the well developed equity market but also exist from the US market to the emerging equity markets of the BRIC economies.

Objectives

The present study is proposed with the following objectives:

- To examine the integration of stock markets of BRIC countries with the developed countries, and
- To investigate the relationship of Indian Stock Market with Brazil, Russia and China Stock Markets.

Methodology

The selection of sample stock indices consists of four emerging countries such as Brazil, Russia, India and China and four developing countries such as U.S, U.K, Japan and Germany based on their market capitalization. Among the developed countries in the world only four developed countries were taken on the basis of higher turnover during the year 2009. From each of the stock exchange, one popular index was chosen for this study. The details of sample size are given in Table1.

Table 1: Stock market indices of BRIC countries and developed countries

Sl.No.	Name of the Country	Name of the Index
	BRIC Countries	
1	Brazil	Bovespa
2	Russia	RTS
3	India	S&P CNX Nifty
4	China	Shanghai Composite
	DEVELOPED COUNTRIES	
5	US	Dow Jones
6	UK	FTSE-100
7	Japan	NIKKEI-225
8	Germany	DAX

Source: www.yahoofinance.com

The present study is mainly based on secondary data collected from www.yahoofinance.com. Further, other relevant information was collected from Annual Reports, various published Research Reports and Research Magazines. The present study is mainly intended to test the co-integration of emerging countries, namely, Brazil, Russia, India, China and developed countries, namely, US, UK, Japan, Germany and correlation of Indian Stock Market with Brazil, Russia and China Stock Markets. The study period consists of nine financial years from 1st April 2001 to 31st March 2010. First monthly return is found for all the indices and the statistical tools like mean, standard deviation, skewness, and kurtosis have been used. In order to evaluate co-integration and correlation ADF Test, Johansen Co-integration test, Granger Causality test, Karl-Pearson Correlation test and Multiple Regression were used.

Hypotheses of the Study: The study tests the following hypotheses.

- There is no stationary relationship between samples at their level.
- There is no stationary relationship between samples at their first difference.

Monthly Return: The monthly returns on each security in the sample were calculated using the daily adjusted prices for dividends, bonus issue, rights issues, stock split and buy back as follows:

$$R_{jt} = \frac{p_t - P_{t-1}}{P_{t-1}} \times 100$$

Where,

R i, t = Returns on security i on time t; P t = Price of the security at time t; P t-1 = Price at time t –1

Augmented Dickey-filler Test: The Augmented Dickey-Fuller Test (ADF) is a test for a unit root in a time series sample. It is an augmented version of the Dickey-Fuller Test for a larger and more complicated set of time series models. The augmented Dickey-Fuller (ADF) statistic, used in the test, is a negative number. More the negativity, stronger the rejection of the hypothesis that there is a stationary level of confidence.

Results

Table 1 reveals the descriptive statistics of the BRIC countries. RTS has the highest returns of 2.5182 and recorded high standard deviation of 9.5186. It shows that speculators can gain from these exchanges. It is followed by SSEC with returns of -0.0042 and standard deviation of 9.4941. The standard deviation of BOVESPA is the lowest (8.1291) returns of - 0.9441. NIFTY shows consistent returns of -0.9553 with standard deviation of 8.1977. The positive skewness was obtained for all the indices except RTS. The kurtosis of NIFTY (6.4029) was greater than the other three, indicating heavier tail than standard normal distribution. NIFTY shows the maximum returns, while BOVESPA shows the minimum returns during the period. From the table, it is inferred that BRIC countries earned high returns with high amount of risk.

Table 1: Descriptive statistics of monthly returns of BRIC markets

Name of the Variables	Mean	Median	Maximum	Minimum	Standard Deviation	Skewness	Kurtosis
BOVESPA	-0.9441	-1.9014	32.9709	-15.1947	8.1291	1.0804	5.0374
RTS	2.5182	3.426	22.8203	-41.0727	9.5186	-1.0549	6.2306
NIFTY	-0.955	-2.0265	35.8885	-219152	8.1977	1.1698	6.4029
SSEC	-0.004	-1.4273	32.6812	-21.5356	9.4941	0.9734	4.548

Source: Computed from yahoo finance website and calculated by using E-views 5.1.

Table 2 depicts the descriptive statistics of developed countries' markets. Where DJIA has the highest returns (0.4409) and FTSE has the lowest returns (0.2404). The kurtosis results for all indexes are more than 3, which indicate that distribution curve is not flat and called leptokurtic. Negative skewness indicates a relatively long left tail compared to the right. DAX seemed to be more volatile as it has standard deviation (7.4882) and followed by DJIA (7.3193), NIKKEI (6.2176) and FTSE (4.5314). DOW JONES has highest returns and highest risk, NIKKEI is second in risk and returns. DAX has moderate returns and risk, while FTSE has low returns and low risk. It is clear that Kurtosis, which is more peaked for developing markets, shows higher level of returns in normal distribution curve. From Table 2 it is inferred that developed markets earned comparatively less returns with low risk.

Table 2: Descriptive statistics of monthly returns of developed markets

Name of the Variables	Mean	Median	Maximum	Minimum	Standard Deviation	Skewness	Kurtosis
DJIA	0.4409	-0.3343	28.8545	-13.0411	7.3193	1.0416	4.7846
FTSE	0.2404	-0.5387	14.9739	-7.9648	4.5314	0.962	4.0131
NIKKEI	0.4369	-0.2366	31.28	-11.3867	6.2176	1.3218	7.3633
DAX	0.3862	-1.3625	34.0881	-17.6126	7.4882	1.2634	6.4284

Source: Computed from yahoo finance website and calculated by using E-views 5.1

Augmented Dickey Fuller Test for BRIC countries are shown in the Table 3 ADF Test was done to know whether the data is stationary or not. The time series data were not stationary and hence it must be made stationary by observing the first difference. It is clear that all the countries in the BRIC, except China are significant at levels. BOVESPA, on testing the levels, recorded the result at statistical value of -8.46, which is greater than the test critical value at 1% (-3.49), 5% (-2.89), 10% (-2.58) levels. RTS on testing the levels give the result of statistical value at -6.03, which is greater than the test critical value at 1% (-3.49), 5% (-2.89), 10% (-2.58) levels. NIFTY on testing the results gives the result of statistical value at -8.90, which is greater than the test critical value at 1% (-3.49), 5% (-3.49), 10% (-2.58) levels. Finally, on testing SSEC the levels give the result of statistical value

at -2.79, which is lower than the test critical value at 1% (-3.50), 5% (-2.89), 10% (-2.58) levels. Thus the first difference was observed. SSEC is significant at the first difference.

Table 3: ADF test on levels and first difference in BRIC markets

Name of the Variables	Levels				First Difference			
	Statistic	1%	5%	10%	Statistic	1%	5%	10%
BOVESPA	-8.46	-3.49	-2.89	-2.58	-6.11	-3.50	-2.89	-2.58
RTS	-6.03	-3.49	-2.89	-2.58	-6.70	-3.50	-2.89	-2.58
NIFTY	-8.90	-3.49	-2.89	-2.58	-10.88	-3.50	-2.89	-2.58
SSEC	-2.79	-3.50	-2.89	-2.58	-6.11	-3.50	-2.89	-2.58

Source: Computed from yahoo finance website and calculated by using MS-Excel.

Table 4 reveals the Augmented Dickey Fuller Test for developed markets. ADF Test is done to know whether the data is stationary or not, but the time series data were not stationary and hence it must be made stationary by observing the first difference. While analyzing the Table 4 it is clear that all the developed countries are significant at levels. DJIA on testing the levels, give the result of statistical value at -7.24, which is greater than the test critical value at 1% (-3.49), 5% (-2.89), 10% (-2.58) levels. FTSE, on testing the levels, gives the result of statistical value at -3.55, which is greater than the test critical value at 1% (-3.50), 5% (-2.89), 10% (-2.58) levels. NIKKEI, on testing the results, gives the statistical value at -8.05, which is greater than the test critical value at 1% (-3.49), 5% (-2.89), 10% (-2.58) levels. Finally, on testing DAX, the levels give the result of statistical value at -9.11, which is greater than the test critical value at 1% (-3.49), 5% (-2.89), 10% (-2.58) levels.

Table 4: ADF test on levels and first difference in developed markets

Name of the Variables	Levels				First Difference			
	Statistic	1%	5%	10%	Statistic	1%	5%	10%
Statistic	1%	5%	10%	Statistic	1%	5%	10%	
DJIA	-7.24	-3.49	-2.89	-2.58	-5.44	-3.50	-2.89	-2.58
FTSE	-3.55	-3.50	-2.89	-2.58	-4.60	-3.50	-2.89	-2.58
NIKKEI	-8.05	-3.49	-2.89	-2.58	-9.61	-3.50	-2.89	-2.58
DAX	-9.11	-3.49	-2.89	-2.58	-4.60	-3.50	-2.89	-2.58

Source: Computed from yahoo finance website and calculated by using MS-Excel.

From the Tables it is proved that sample indices are stationary at levels. Thus, the first hypothesis, “There is no stationary relationship between samples at their levels” is rejected and the second hypothesis, “There is no stationary relationship between samples at their first difference” is also rejected.

Table 5: ADF test for monthly share price returns of BRIC countries' markets and developed markets

Sl.No.	Name of the Index	Levels Significance	First Difference Significance
1	BOVESPA	✓	✓
2	RTS	✓	✓
3	NIFTY	✓	✓
4	SSEC	×	✓
5	DJIA	✓	✓
6	FTSE	✓	✓
7	NIKKEI	✓	✓
8	DAX	✓	✓

Source: Computed from yahoo finance website.

Conclusion

The test results revealed that the returns of the BRIC Countries were higher during the period, which gives better place for investment by consistent returns. Moreover, BRIC countries move along with the developed markets and there is co-integration with developed markets. Therefore it is better to invest long term in the BRIC countries. Among the BRIC countries' markets, Indian Market is correlated with Brazil and China Markets. This shows a positive relationship among the BRIC countries except Russia. The study reveals that investing in BRIC Countries for the long-run will be beneficial.

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Impact of Dividend Announcement on Share Price Movements: A Study of Milanka Companies in Colombo Stock Exchange

PUWANENTHIREN PRATHEEPKANTH

This paper takes the sample of Dividend announcements from Milanka Companies in Colombo Stock Exchange (CSE) firms in Sri Lanka over the period 2006 to 2010. Empirical results indicate that the announcement of dividend and earning per share changes has a positive influence on share prices, but such results only partly support the hypothesis.

Introduction

Stock exchange of a country is a most important in the country's economic growth. In the stock exchange, one of the most fundamental research issues is the market efficiency. This is an important concept both in terms of an understanding of working capital market, and in their performance and contribution to the development of a country's economy. This study examines the relationship between share prices and dividend announcement.

Literature Review

A number of studies found that stock price has a significant positive relationship with the dividend payment and earning per share (Gordon, 1959, Ogden, 1994, Stevens and Jose, 1989, Kato and Lowenstein, 1995). While others found negative relationship (Laughlin, 1989 and Easton and Sinclair, 1989). The dividend information hypothesis postulates that cash dividend carries information regarding the future cash flows of firm that is to be reflected in the market price of stock after announcement of dividend, particularly when dividend increases [Bhattacharya (1979) Bar-Yosef and Huffman (1986) and Yoon and Starks (1995). In previous surveys, there was strong evidence that stock prices followed mean reversion process in several stock markets such as U.S., Spanish, and Singapore stock markets, which have been defined in various ways. The dividend-to-price ratio (Fama and French, 1988) and earnings-to-price ratio (Campell and Shiller, 1988) are found to contribute significantly to the explanation of long-term stock price variation. Chiang et al (1995) use earnings and dividends as proxies of fundamental values found that stock returns follow a mean-reversion process and their findings are consistent with those of Campbell and Shiller (1988).

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Ansotegui and Esteban (2002) established a long-run relationship between the Spanish stock market and its fundamentals, and checked to which extent this relationship helps in forecasting. Singetal (2002) examined the relationship between the stock price and the fundamentals for Singapore and found that the mean-reversion of stock prices towarosQ fundamental value.

The empirical literature regarding the market reaction to dividend announcements is abundant and began with the conflicting studies by Pettit (1972) and Watts (1973). Later studies by Ahorny & Swary (1980), Kane, Lee & Marcus (1984), Chang & Chen (1991), and Leftwich & Zmijewski (1994) attempt to more explicitly control for the confounding effect of contemporaneous earnings announcements. In a similar vein Penman (1983) recognizes the possible impact of management's forecasts of earnings as a confounding event, and attempts to asses whether management's earnings forecasts or dividend announcements have greater information content. The results from the studies are conclusive in that they all find a market reaction to dividend announcements, and therefore conclude that there is information content in dividends. These studies on US data, however, suffer from the possible bias that management has deliberately selected contemporaneous announcement dates in an attempt to influence the impact on returns. Supporting this possibility Penman (1984) and Kalay Loewenstein (1986) find evidence which suggests that management attempts to affect the stock market's reaction to the announcement of earnings and dividends through their choice of announcement dates. To overcome this bias Easton (1991) and Lonie, Abeyratna, Power & Sinclair (1996) utilized the consistent simultaneous announcement of dividends and earnings in Australia and the UK, respectively. Their results are consistent with the above in that both studies find evidence of information content.

Among the earlier studies, Aharony and Swary (1980) document that stock prices drop during the month of an unexpected dividend decrease, while they rise during the month of an unexpected dividend increase. Other studies that obtain similar results are Pettit (1972), Kwan (1981) and Eades (1982),Bajaj and Vijh (1990) present empirical evidence to support a view that the positive market reaction to dividend increases as a signal of higher firm value is mediated by a negative reaction due to a marginal aversion to dividend income. Bajaj and Vijh (1990) allow for a signaling effect; however, they argue that there is a clientele effect in addition to the signaling effect. Prabhala (1993) shows that the results of Bajaj and Vijh (1990) and Lang and Litzenberger (1989) may be spurious, and due to the fact that the martingale dividend change model that they used was misspecified.

A significant stream of prior research in the United States has empirically documented that unexpected increases (decreases) in regular cash dividends generally elicit a significantly positive (negative) stock market reaction (Fama et at., 1969, Petit, 1972). Moreover, this finding persists even after controlling for contemporaneous earnings announcements (Aharony and Swary 1980). In the same vein, Asquith and Mullins (1983) find that, like dividend increases, dividend initiations have a significant positive impact on share

price. Stock dividends (referred to as bonus issues in Cyprus) effectively award existing shareholders a free share of common stock for every X shares currently owned. Strictly speaking, bonus issues constitute finer slicing of a given firm value and should have no direct wealth effects to shareholders if they have no cash flow implications.

Researchers largely accepted that dividend per-share has no impact on the shareholders' value in an ideal economy. However, in a real world, dividend announcement is important to the shareholders because of its tax effect and information content. Further Miller and Modigliani in 1961 advance a theory that the dividend policy to firm is irrelevant to the value of the firm as it does not affect the wealth of the shareholders what they stress is the company has a duty to maximize the value of the firm and that the company has a duty investing in all positive net present value projects those are the investments of which the present value, hence the value of the firm accounting to them depends on the returns generated by investment in real assets. Thus, when the investment decision of the firms given dividend decision the spit of earnings between dividends and retained earnings is of significance in determining the value of the firm.

Objectives

This research is intended to achieve the following objectives:

- To analyse, the impact of dividend announcement on share price of Milanka movements companies.
- To find out, is there any other significant relationship between the dividend announcement and share price.

Hypotheses

Based on the assumed casual relationship given in the conceptual model the following hypotheses were developed for testing.

H_1 There is a significant relationship between share price and dividend announcement on the dividend announcement day.

H_2 There is information effect on the dividend announcement day.

Methodology

The study is based on the secondary data and the samples include:

Banks, Finance & Insurance 08, Beverage, Food & Tobacco 01, Chemical & Pharmaceuticals 01, Diversified 04, Health care 02, Hotels & Travels 01, Land & Property 01, Manufacturing 05, Tele communions 02, Total 25.

This study takes the samples of 25 Milanka companies in the 1st half of 2010 and uses Market-Adjusted Abnormal Return (MAAR) to estimate the stock price reaction to dividend announcement and employs the correlation analysis to observe the stock price reaction to earnings per share. As well as, 5 years details of dividend announcement, earnings per share and price of shares are observed by the researcher for the period starting from 2006 to 2010 for those analyses.

Market Adjusted Abnormal Return (MAAR) Methodology: This study uses the Market-Adjusted Abnormal Return (MAAR) methodology to estimate the stock price reaction to dividend announcements. The MAAR indicates the relative daily percentage price change in the dividend paying stock compared to the change in average market Price.

The MAAR model is specified as follows.

$$MAAR_{it} = R_{it} - R_{mt}$$

Where,

$MAAR_{it}$ = the market adjusted abnormal return for security I over time t.

R_{it} = the time t returns on security i, calculated as $(P_{it}-P_{it-1})/P_{it-1}$.

Where, Pit is the market closing price of stock i on day t. P_{it-1} is the market closing price of stock i on day t -1

R_{mt} = the time t return on the Milanka Price Index calculated as $(I_t-I_{t-1})/I_{t-1}$

Where, I is the MPI on day t. It-1 is the MPI on day t-1

The MAAR shows the change in individual stock's price due to the dividend announcement. The percentage change in Milanka Price Index is deducted; the remainder gives us the unsystematic portion of the price change. So the change is due to the dividend announcement for the particular stock. The MAAR is calculated over a period starting ten days before dividend announcement to ten days after ex-dividend date to be at normal price. The event day (day 0) is the calendar date on which the dividends are announced to the market. Information on dividend announcements is conveyed to the market primarily through the stock market daily, which is the official daily publication of the Colombo stock exchange. Therefore, the event date is taken as the date on which a specific dividend announcement appears in the stock market daily.

Cumulative Abnormal Return: The second tool used is the CAR, which measures the investor's total return over a period starting from well before the announcement of the dividend to after ex-dividend date. The CAR is computed the way following way:

$$CAR_{it} = MAR_{it}$$
$$CAR_{t} = CAR_{it}$$

Where, CAR_{it} is cumulative abnormal return for any security i and CAR_t is cumulative abnormal return for all securities. Similarly $MAAR_{it}$ is market adjusted abnormal returns for security i for window period.

Results

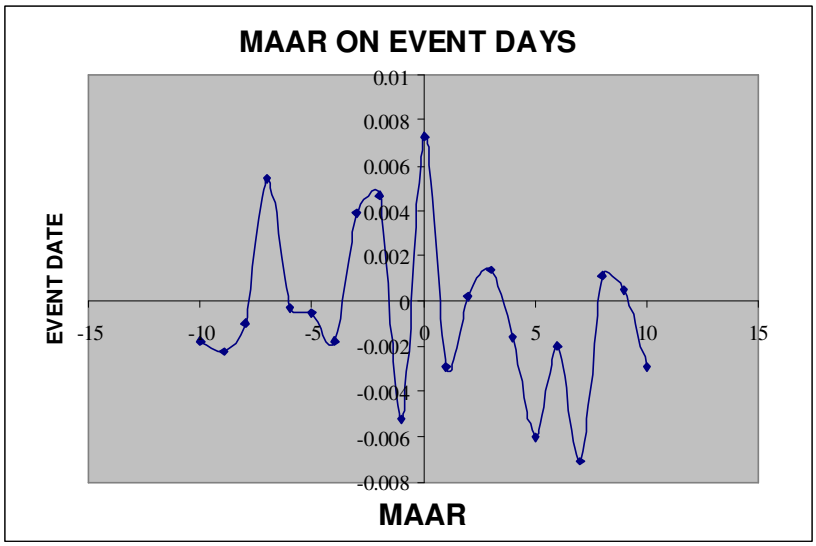
Market - Adjusted Abnormal Return (MAAR): First the researcher moves to analyse the details of the dividend announcement and share price under MAAR methodology to find out the nature of the significance between divided announcement and share price. According to it, the following Table I shows the window period of 21 days and associated MAAR with these days. This table clearly shows the MAAR of each year from 2006 – 2010, total MAAR of the five years and the final average figure of MAAR for five (2006- 2010) years.

Table 1: Market-adjusted abnormal return (MAAR)

Event date	MAAR-2006	MAAR-2006	MAAR-2008	MAAR-2009	MAAR-2010	MAAR (2006 to 2010)	MAAR 5 years) (average for
-10	(0.0051)	(0.0038)	(0.0001)	(0.0008)	0.0010	(0.0088)	(0.0018)
-9	(0.0028)	(0.0052)	(0.0015)	(0.0004)	(0.0012)	(0.0111)	(0.0022)
-8	(0.0042)	0.0021	(0.0067)	(0.0008)	0.0045	(0.0051)	(0.0010)
-7	0.0028	0.0022	0.0108	0.0061	0.0052	0.0271	0.0054
-6	0.0001	0.0015	(0.0012)	0.0044	(0.0062)	(0.0014)	(0.0003)
-5	0.0042	0.0005	(0.0039)	(0.0022)	(0.0011)	(0.0025)	(0.0005)
-4	(0.0063)	(0.0045)	(0.0010)	0.0023	0.0003	(0.0092)	(0.0018)
-3	0.0042	0.0023	0.0089	0.0009	0.0031	0.0194	0.0039
-2	0.0141	0.0026	0.0056	(0.0026)	0.0038	0.0235	0.0047
-1	(0.0030)	(0.0002)	(0.0244)	0.0023	(0.0005)	(0.0258)	(0.0052)
0	0.0112	0.0036	0.0182	(0.0063)	0.0100	0.0367	0.0073
1	(0.0008)	(0.0039)	(0.0065)	(0.0006)	(0.0029)	(0.0147)	(0.0029)
2	0.0022	(0.0036)	0.0014	(0.0014)	0.0022	0.0008	0.0002
3	0.0056	0.0030	(0.0033)	0.0021	(0.0006)	0.0068	0.0014
4	(0.0025)	(0.0021)	(0.0005)	0.0005	(0.0032)	(0.0078)	(0.0016)
5	0.0024	(0.0106)	(0.0040)	(0.0034)	(0.0144)	(0.0300)	(0.0060)
6	(0.0022)	(0.0029)	0.0013	0.0023	(0.0086)	(0.0101)	(0.0020)
7	(0.0171)	(0.0023)	(0.0082)	(0.0012)	(0.0069)	(0.0357)	(0.0071)
8	(0.0013)	(0.0023)	0.0005	0.0049	0.0039	0.0057	0.0011
9	0.0094	(0.0038)	(0.0006)	0.0015	(0.0042)	0.0023	0.0005
10	(0.0051)	0.0013	(0.0110)	(0.0032)	0.0035	(0.0145)	(0.0029)

The following diagram is derived to show the MAAR direction.

Figure 1: Market-adjusted abnormal return (MAAR) on event days



According to the above diagram, it shows the overall Market Average Abnormal Return (MAAR) for the Milanka comapnies at each and every event day. The MAAR before 10 days was -0.0018, like that MAAR after 10 days also is in negative, i.e. -0.0029. It shows that there is no positive effect on dividend announcement. However, when the event date 0 (announcement date), MAAR is in high proportion i.e., 0.0073 as well as when the event date -2, -3 (before 2, 3 days) and the event date 2, 3 (after 2, 3 days) the MAAR is in positive moderate level as compared with 0 date. It suggests that market react according to the dividend announcement on those dates highly.

The final calculated standard deviation (SD) is as 0.00366. Then, the five years' (from 2006-2010) average MAAR will be divided by this standard deviation (SD) amount of 0.00366 to get the T(MAAR) amount. The following table shows the T(MAAR) amount for each and every event days.

Table 2: T(MAAR)

Event date	MAAR(average for 5 years)	Standard Deviation(SD)	T(MAAR)
-10	(0.0018)	0.00366	(0.48)
-9	(0.0022)	0.00366	(0.61)
-8	(0.0010)	0.00366	(0.28)
-7	0.0054	0.00366	1.48
-6	(0.0003)	0.00366	(0.08)
-5	(0.0005)	0.00366	(0.14)
-4	(0.0018)	0.00366	(0.50)
-3	0.0039	0.00366	1.06
-2	0.0047	0.00366	1.29
-1	(0.0052)	0.00366	(1.41)
0	0.0073	0.00366	2.00*
1	(0.0029)	0.00366	(0.80)
2	0.0002	0.00366	0.04
3	0.0014	0.00366	0.37
4	(0.0016)	0.00366	(0.43)
5	(0.0060)	0.00366	(1.64)
6	(0.0020)	0.00366	(0.55)
7	(0.0071)	0.00366	(1.95)
8	0.0011	0.00366	0.31
9	0.0005	0.00366	0.12
10	(0.0029)	0.00366	(0.79)

* indicates the level of significance (based on the t-values) at respectively the 5% level.

The above table 2 shows the t- value or on the event day zero (i.e. announcement day) significant at 5% level. However, at significant level 5%, there is no any other significant event day within the event window period, which means that the market reacts significantly only in the actual announcement date and there is no information leaks out to the markets a few days before the announcement made by the company.

Table 3: Market-adjusted abnormal return (MAAR)

Window Period	MAAR
(-10,-1)	0.0012
(0,+10)	(0.0121)
(-2,+2)	0.0041
(-1,+1)	(0.0008)
(0,+1)	0.0044

According to the above diagram, it shows the overall Marketed Average Abnormal Return (MAAR) for the Milanka companies at each and every event day. The MAAR before 10 days was -0.0018, like that MAAR after 10 days also is in negative, i.e. -0.0029. It shows that there is no positive effect on dividend announcement. However when the event date 0(announcement date), MAAR is in high proportion i.e. 0.0073 as well as when the event date -2, -3 (before 2, 3 days) and the event date 2, 3 (after 2, 3 days) the MAAR is in positive moderate level as compared with 0 date. It suggests that market react according to the dividend announcement on those dates highly.

According to the result, the MAAR for the period of (0, +10) is - 0.0121%, which shows there is no good market response after the announcement date and the MAAR for the period of (-2, +2) and (0, +1) is nearly to 0.004, which is associated with the good market response.

Table 4: Direction of market-adjusted abnormal return (MAAR) on day 0

Direction	Number	percentage(%)
Positive	92	57.5 %
Negative	68	42.5 %
Total	160	100 %

Above the table represent that 57.5% of events have positive MAARs on the dividend announcement date, which represents 92 events, while, 42.5% of the events have negative MAARs, which represents 68 events.

Cumulative Abnormal Return (CAR): Cumulative Abnormal Return (CAR),which measures the investor's total return over a period starting from well before the announcement of the dividend to after ex- dividend date.

Results in the Table 5 show that investors do not gain value from dividend announcement. Evidence depicts that CAR had risen from 0.0018 percent on day -10 to a level of 0.008 percent on the day of dividend announcement, but the gained value was lost over the next 10 days after dividend announcement, as CAR dropped to –0.0109 percent on the day 10. Although results tends to suggest that investors may have overreacted to the dividend announcement, the evidence generally consistent with the dividend irrelevance. Findings also show that investors lost more value in the ex-dividend period than the value gained in the pre-dividend period. This finding tends to suggest that dividend announcement does not carry information about the future earnings and cash flow of the companies.

Table 5: Cumulative abnormal return (CAR)

Window Period	MAAR(average for 5 years)	AVERAGE-CAR
-10	(0.0018)	(0.0018)
-9	(0.0022)	(0.0040)
-8	(0.0010)	(0.0050)
-7	0.0054	0.0004
-6	(0.0003)	0.0001
-5	(0.0005)	(0.0004)
-4	(0.0018)	(0.0022)
-3	0.0039	0.0017
-2	0.0047	0.0064
-1	(0.0052)	0.0012
0	0.0073	0.0085
1	(0.0029)	0.0056
2	0.0002	0.0058
3	0.0014	0.0071
4	(0.0016)	0.0056
5	(0.0060)	(0.0005)
6	(0.0020)	(0.0025)
7	(0.0071)	(0.0096)
8	0.0011	(0.0085)
9	0.0005	(0.0080)
10	(0.0029)	(0.0109)

In Sri Lanka CSE generally rate the performance of the listed companies based on their regular dividend payments. Hence, companies may like to retain their good standing by paying regular dividends. In the presence of a kind of indirect pressures from the regulatory authorities, the companies may not be able to effectively signal the future earning prospects through their dividend announcement.

However, there is a positive high value of average Cumulative Abnormal Returns (CAR)on the announcement day, which means that there is a high information signaling effect on the dividend announcement day. Further there is a low level of positive Cumulative Abnormal Return(CAR) during the period of -3 to +4, which also represents that there is a low level of information signaling effect from 3 days before the announcement date to after 4 days of the announcement date.

Findings

- I47.83 % of Milanka companies have positive relationship between dividend announcement and share price movements within the overall event window period.
- 52.17 % of Milanka companies have positive relationship between dividend announcement and share price movements within the overall event window period.

- 57.5% companies have high positive relationship between dividend announcement and share price movements in the dividend announcement day.
- 42.5% companies have negative relationship between dividend announcement and share price movements in the dividend announcement day.
- There is a significant relationship between the dividend announcement and share price movements in the dividend announcement day.
- There is no significant relationship between the dividend announcement and share price movements in other days except the dividend announcement day within the window period.

Conclusion

Dividend announcement has significant influence on the stock price of Milanka companies at the time of actual announcent day. However, there are lot of variables, which may be internal or external to affect the share price of the firms. Present and future investors should consider the dividend announcement, when they invest in the Colombo Stock Exchange. Shareholders identify the dividend announcement in order to make alternative decision about buying and selling of shares.

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Effectiveness of the Skewness and Kurtosis Adjusted Black–Scholes Model in Pricing Nifty Call Options

VANITA TRIPATHI AND SHEETAL GUPTA

This paper tests the predictive accuracy of the Black-Scholes (BS) model in pricing the Nifty index option contracts and examines whether the skewness and kurtosis adjusted BS model of Corrado and Su (1996) gives better results than the original BS model. It also examines whether volatility smile in case of NSE Nifty options, if any, can be attributed to the non normal skewness and kurtosis of stock returns. The results show that BS model is misspecified as the implied volatility graph depicts the shape of a 'Smile' for the study period. There is significant underpricing by the original BS model and that the mispricing increases as the moneyness increases.

Introduction

There have been significant developments in the securities market in India during the past few years particularly with the introduction of derivative products since June 2000. India's experience with the launch of equity derivatives market has been extremely positive and there has been massive growth in the turnover of index options. The futures and options segment (F&O) segment of NSE reported an index option turnover (based on NSE Nifty) of Rs. 3,766 crores (call index option: Rs.2466 crores; put index option: Rs.1300 crores) during the year 2001-2002 as against Rs. 3,731,501 crores (call index option: Rs.2,002,544 crores; put index option: Rs.1,728,957 crores) during the year 2008-09. Since 2001, the product base has been increased subsequently which now include trading in options on S&P CNX Nifty, CNX IT, Bank Nifty, CNX Nifty Junior, CNX 100, Nifty Midcap 50, S&P CNX Defty indices as of March 2009.

The Black-Scholes (1973) model for pricing of European options assumes constant volatility and Gaussian log-returns. However, both the assumptions of constant volatility and Gaussian returns are violated in financial markets. In practice, implied volatility of the underlying asset varies across various exercise prices and/or time to maturity. Thus market does not price all options according to Black-Scholes (BS) model (Mac beth and Merville, 1979, Rubinstein, 1985, Verma, 2002, Misra and Kannan, 2006, Kakati, 2006, Tiwari and Saurabha, 2007). The picture obtained by plotting the implied volatility with different exercise prices (observed at the same time, with similar

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maturity and written on the same asset) is known as volatility smiles. The pattern of implied volatility across time to expiration is known as term structure of implied volatilities. The combination of volatility smiles and volatility term structures produces a volatility surface. Moreover, it has been recognized that stock return distributions tend to be leptokurtic and negatively skewed.

Given the possible misspecifications of the BS model, a substantial literature has been devoted to the development of option pricing models which account for the observed empirical violations, such as the skewness and kurtosis in the stock return distribution, time dependent volatility function, etc. The BS constant volatility assumption is relaxed in stochastic volatility models such as Hull and White (1987) and Heston (1993a), in deterministic volatility models by Dupire (1994), Derman and Kani (1994), and Rubinstein (1994), and in ARCH models of Engle and Mustafa (1992), Duan (1995), and Heston and Nandi (2000). The assumption of lognormal terminal price distribution is relaxed, e.g., in skewness and kurtosis adjusted models of Jarrow and Rudd (1982), and Corrado and Su (1996), log-gamma model of Heston (1993b), lognormal mixture model by Melick and Thomas (1997), and hyperbolic model of Eberlein et al. (1998). Hull (1993) and Nattenburg (1994) attributed the volatility smile to the non normal skewness and kurtosis of stock returns.

Skewness and Kurtosis Adjusted Black- Scholes Model of Corrado and Su (1996)

Volatility smile has been attributed to the skewness and kurtosis in the stock return distribution. Corrado and Su (1996) have developed a method to incorporate effects of non-normal skewness and kurtosis of asset returns into an expanded BS option pricing formula. Their method adopts a Gram-Charlier series expansion of the standard normal density function to yield an option price formula which is the sum of the BS option price plus two adjustment terms for non-normal skewness and kurtosis. Their method is based on fitting of the first four moments of stock return distribution on to a pattern of empirically observed option prices. The skewness and kurtosis adjusted price of a call option is:

$$C_{GC} = C_{BS} + \mu_3 Q_3 + (\mu_4 - 3) Q_4 \quad \ldots\ldots (1)$$

Where

$C_{BS} = S_O e^{-\delta t} N(d) - X e^{-r t} N(d - \sqrt{t})$

$Q_3 = S_O e^{-\quad t} \sqrt{t} ((2\sqrt{t} - d) n(d) + \quad ^2t N(d))$

$Q_4 = S_O e^{-\quad t} \sqrt{t} ((d^2 - 1 - 3\sqrt{t} (d - \sqrt{t})) n(d) + \quad ^3t^{3/2} N(d))$

$$d = \frac{\ln(S_O e^{-\quad t}/X) + rt + \quad ^2t * 0.5}{\sqrt{t}}$$

μ_3 is the skewness coefficient, μ_4 is the kurtosis coefficient, N(d) denotes the cumulative standard normal distribution function, and n(d) is the standard normal density function. S_O is the price of the underlying asset, X is the exercise price of the option, s is the volatility of the underlying asset, r is the risk-free interest rate, and T is the time to maturity of the option. Q3 and Q4

represent the marginal effect of non-normal skewness and kurtosis, respectively in the option price. For the normal distribution curve the values of these coefficients are: skewness $\mu_3 = 0$; and kurtosis $\mu_4 = 3$. In the adjusted formula, the terms $\mu_3 Q_3$ and $(\mu_4-3)Q_4$ measure the effects of the non-normal skewness and kurtosis on the option price $C_{GC,}$ respectively.

Objectives

The objectives of the present study are:

- To test whether BS model is misspecified by investigating the existence of volatility smile in case of S&P CNX Nifty options traded at NSE.
- To investigate the predictive accuracy of the BS model in pricing the Nifty index option contracts.
- To examine whether the skewness and kurtosis adjusted BS model of Corrado and Su (1996) gives better results than the original BS model
- To test whether volatility smile in case of NSE Nifty options, if any, can be attributed to the non normal skewness and kurtosis of stock returns.

Hypotheses

The following hypotheses have been tested in the study:

- BS model is not misspecified as implied volatility smile does not exists in case of NSE Nifty options.
- The error in prediction of option prices for various exercise prices by the original BS model is not statistically significantly different from zero.
- Skewness and kurtosis adjusted BS model of Corrado and Su (1996) does not give better results than the original BS model in the prediction of option prices.
- Volatility smile in case of NSE Nifty options cannot be attributed to the non normal skewness and kurtosis of stock returns.

Methodology

We use near-the-month S&P CNX NIFTY call options for the period January 1, 2003 through December 24, 2008. The data includes: (i) Daily transaction data for the near month S&P CNX Nifty call options consisting of: trading date; expiration date; strike price/or exercise price; closing price (premium); number of contracts traded each day; daily closing values of S&P CNX Nifty, and (ii) Daily dividend yield on S&P CNX Nifty. 91-day T.Bill rates are used as the proxy for risk free rate. The data have been collected for each trading day of the study period from 1st January 2003 to 24th December 2008. The data for near-month call options after filtering consist of 11856 observations. The daily closing values of S&P CNX Nifty have been collected for the period from 1st June 2002 to 24th December 2008. The data have been collected from www.nseindia.com, the website of National Stock Exchange of India Ltd. 91-day T.Bill rates have been collected from RBI website (www.rbi.org.in). Data have been analysed using *Microsoft Excel Goal Seek function, Microsoft Excel Solver function* and *EViews software*.

Test of Normality: Jarque-Bera test of normality has been applied on the distribution of continuously compounded Nifty returns for determining whether they follow normal distribution or not for the study period.

Calculation of Theoretical Premium Prices: Implied volatility is the value of volatility needed to be used in the BS option pricing formula for a given exercise price to yield the market price of that option. Theoretical prices of call options have been computed using implied volatility using equation (3) which gives the dividend adjusted BS model of Robert Merton (1973).

$$c = Se^{-\ t} N(d_1) - X e^{-r\,t} N(d_2) \quad \text{.....} \quad (3)$$

where,

$$d_1 = \frac{\ln(Se^{-\ t}/X) + rt + \ ^2t * 0.5}{\sqrt{\ t}}$$

$$d_2 = d_1 - \ \sqrt{\ t}$$

c is the price of a call option, $Se^{-ät}$ is the adjusted price of the underlying asset , X is the exercise price of the option , t is the time remaining until expiration, expressed as fraction of a year, r is the continuously compounded risk- free interest rate, ó is the annual volatility of price of the underlying asset, ln represents the natural logarithm of a number, N( ) is the standard normal cumulative distribution function, e is the exponential function, ä is the continuous dividend rate on the stock.

Implied Volatility: Using option prices for all contracts within a given maturity series observed on a given day, we estimate a single implied standard deviation to minimize the total error sum of squares between the predicted and the market prices of options of various exercise prices. This has been calculated by minimizing function (1) by iteratively changing the implied standard deviation:

.....function (1)

where BISD stands for the BS Implied Standard Deviation, N stands for the number of price quotations available on a given day for a given maturity series, C_{OBS} represents a market-observed call price, and C_{BS}(BSISD) specifies a theoretical BS call price based on the parameter BSISD. Initially predicted prices have been computed using historical volatility. Using a prior-day, out-of-sample BSISD estimate, we calculate theoretical BS option prices for all contracts in a current-day sample within the same maturity series.

Comparison of Theoretical Prices with the Actual Prices: The theoretical premium prices are compared with the actual market premium prices and then the pricing errors are calculated for each day of the sample for the Nifty contracts. The pricing errors are mean error, mean absolute error and mean squared error. The closer these values are to zero, the better is the forecast.

Mean Error (ME): It is computed by adding all error values and dividing total error by the number of observations.

$$ME = 1/N \sum_{J=1}^{N} (Y_J'' - Y_J) \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \quad (4)$$

Mean Absolute Error (MAE):

$$MAE = \frac{1}{N} \sum_{J=1}^{N} \left| \left(Y_J'' - Y_J \right) \right| \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \quad (5)$$

It is the average absolute error value. The neutralization of positive errors by negative errors can be avoided in this measure.

Mean Squared Error (MSE):

It is computed as the average of the squared error values. As compared to the MAE value, this measure is very sensitive to large outlier as it places more penalties on large errors than MAE.

$$MSE = \frac{1}{N} \sum_{J=1}^{N} \left(Y_J'' - Y_J \right)^2 \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \quad (6)$$

Where, Y''_J = the theoretical price of the option

Y_J = actual price for observation j

N = no. of observations

Investigating the existence of volatility smile in case of S&P CNX Nifty options and testing the predictive accuracy of the Black-Scholes model: Here we divide the entire study period into two subperiods (1.1.03 to 31.12.06 and 1.1.07 to 24.12.08) to see the pattern of relationship between IVVs and moneyness. Moneyness of an option determines the profitability of immediately exercising an option, leaving aside the premium charges. Moneyness (M) is defined as: $\frac{S_A}{X} - 1$ where S_A is the Nifty index value adjusted for the continuously compounded known and constant dividend yield on Nifty ä and X is the exercise price of the option. There are eight moneyness categories defined: deep out-of-the-money call options (M<-.15), not so deep out-of-the-money call options (-.15d"M<-0.10 and -.10d"M<-0.05), near-the-money call options (-0.05d"M<0 and 0d"Md"0.05), not so deep in-the-money call options (0.05<Md"0.10 and 0.10<Md"0.15) and deep in-the-money call options (0.15<M).

The average IVVs have been plotted against moneyness to investigate the existence of volatility smile in case of S&P CNX Nifty options. Also the average pricing error (pricing error calculated as the difference between the theoretical option price, calculated using t-1 day's single implied volatility estimate as explained before, and the market price) has been computed for each of the above moneyness categories to examine the predictive accuracy of the BS model. t-test has been applied to check whether these pricing errors are significantly different from zero or not.

The Corrado and Su Model (Skewness and Kurtosis Adjusted Black-Scholes Model)*:* Corrado and Su (1996) model (given in equation 1) has been used to obtain theoretical prices of call options using t-1 day's implied volatility, skewness and excess kurtosis. On a given day, we estimate a single implied standard deviation, a single skewness coefficient and a single excess kurtosis coefficient by minimizing once again the error sum of squares given by function (2):

...function (2)

where ISD, ISK and IKT represent estimates of the implied standard deviation, implied skewness and implied kurtosis parameters based on N price observations respectively. Initially predicted prices have been computed using historical volatility, skewness and kurtosis on the basis of continuously compounded Nifty returns for immediately preceeding six months. We then use these three parameter estimates as inputs to the formula to calculate theoretical option prices corresponding to all option prices within the same maturity series observed on the following day. These have been compared with the actual call option prices observed on that day in a similar manner as mentioned before. Two sample t-test has been applied to check whether these individual pricing errors are significantly different from each other or not. Also t-test has been applied to check whether these pricing errors are significantly different from zero or not.

In order to investigate whether *volatility smile*, if any, in case of NSE Nifty options can be attributed to the non normal skewness and kurtosis of stock returns, following method has been followed:

Skewness and kurtosis have been kept constant and equal to the one obtained upon reducing the total error in pricing of options of all strikes for a given maturity for that day (as explained above), and then the volatilities have been calculated as those required to be inserted into the modified BS formula so that it gives the market price of the option.

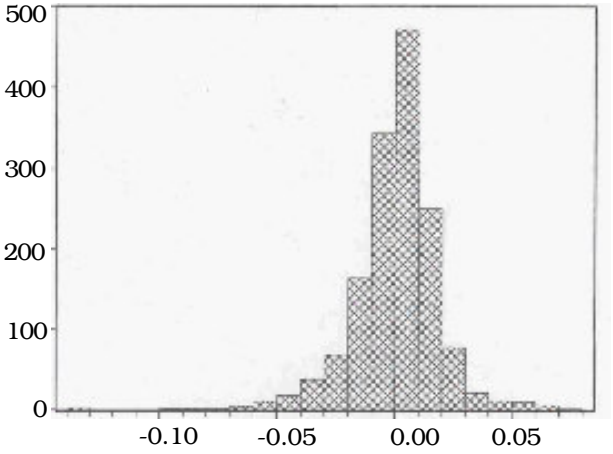
Results

Test of Normality: Figure 1 shows the result given by the Jarque-Bera test for the period 1st January 2003 uptil 24th December 2008. The JB statistic turns out to be 2455.487. The p value of obtaining such a value from the chi-square distribution with degrees of freedom two is about 0.0000, which is quite low. The figure shows that the distribution of the returns has a negative skew and positive kurtosis. Hence the null hypothesis that the continuously compounded Nifty returns are normally distributed is rejected at 1% and 5% level of significance for the sample period 1st January, 2003 to 24th December, 2008.

Model (Mis) Specification: The results of implied volatility smile pattern and pricing errors are given below.

Implied Volatility Smile Pattern: As can be seen from the figures 2, 3 and 4, the implied volatility graphs depict the shape of a 'Smile' which indicates

Fig. 1: Results of the Jarque-bera Test of Normality



Series: NIFTY RETURNS	
Sample 2 1501	
Observations 1500	
Mean	0.000654
Median	0.001714
Maximum	0.079691
Minimum	-0130539
Std. Dev.	0.017812
Kurtosis	9.053247
Jarque-Bera	2455.487
Probability	0.000000

that out-of-the money options and in-the-money options are having high volatility values while near-the-money options are having low volatility values**.** The differences among the implied volatility values across exercise prices indicates that the BS model is not correct. These differences raise a question concerning the source of the BS model's deficiency. The assumptions underlying the model are often violated in real life. One possibility is that the constant volatility assumption is violated and thus IVVs change as time to maturity changes.

Pricing Errors: Table 1 shows the pricing errors for the near month call options. Positive figures show overpricing and negative figures show underpricing by BS model. The results do not provide support for pricing accuracy of the BS model. Table 1 shows that deep in-the-money and out-of-the-money options are highly underpriced by the BS model. Not so deep in-the-money call options and not so deep out-of-the-money call options too are underpriced. The minimum mispricing is for near-the-money call options. The smallest mean errors for the predicted prices are Rs. 0.11 (0-0.05) and Rs. 0.36 (-.05d"M<0) for near-the-money call options. Moreover near-the-money call options too are underpriced by the BS model.

Fig.2: Implied volatility graph for the total period from 1st January, 2003 to 24th December, 2008

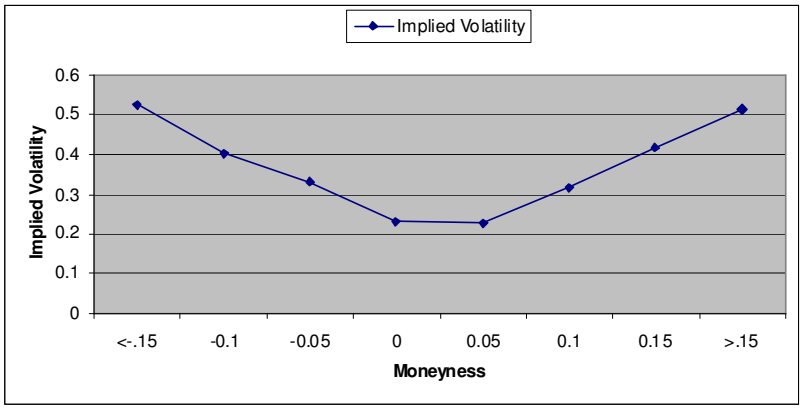


Fig.3: Implied volatility graph for first sub period rrom 1st January, 2003 to 31st December, 2006

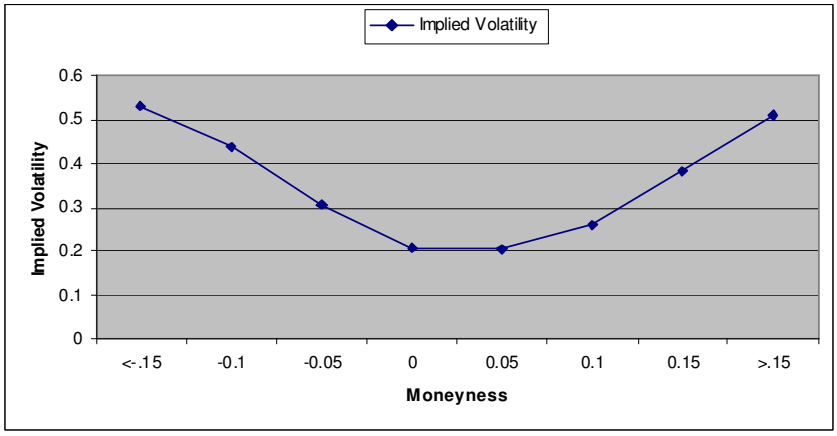


Fig.4: Implied volatility graph for second sub period from 1st January, 2007 to 24th December, 2008

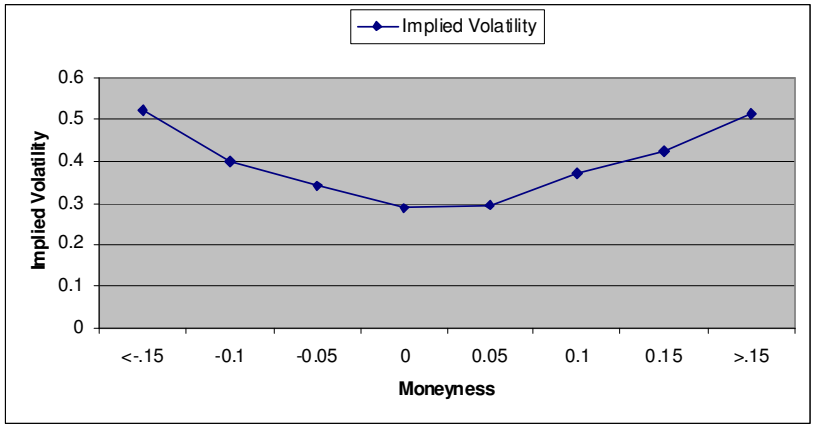
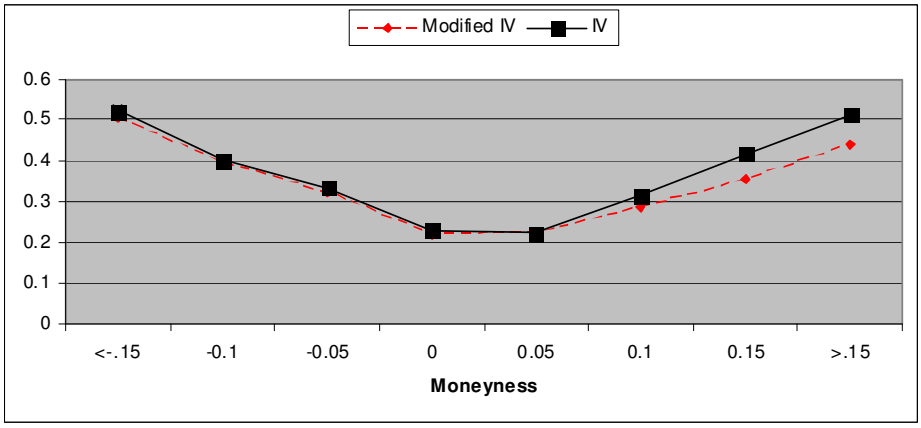


Fig. 5: Implied volatility graph for the total period from 1st January, 2003 to 24th December, 2008 using implied volatility and modified implied volatility



However, t test shows that the pricing error is not statistically significantly different from zero in case of option contracts where moneyness lies between 0 to 0.05. The pricing efficiency of the BS model is questionable in case of near-the-money options too as the model significantly underprices those near the money options where moneyness is less than 0 but greater than or equal to -.05. This is in contrast with the international findings (Black, 1975) on the predictive capability of the BS model that it is extremely accurate for pricing at-the-money options. In rest of the cases, there is significant underpricing by the BS model and that the mispricing increases as the moneyness increases. In other words, mispricing worsens with the increased moneyness.

Performance of the Skewness and Kurtosis adjusted Black-Scholes Model of Corrado and Su (1996): Table 1 shows the pricing errors in case of call options before and after taking into account the effect of non-normal skewness and kurtosis in the stock return distribution. It shows that when option prices are calculated using the modified BS model of Corrado and Su(1996), it entails less pricing error than when option prices are calculated using the BS model. The t-test shows that there is no significant difference between the MSEs calculated under the two methods. But there is a significant difference between MAEs at 5% level. Hence we can conclude on the basis of MAE as well as t test that the modified BS model is performing better than the BS model.

Figure 5 depicts that the volatility smiles observed for both the BS model and the modified BS model are significant. Therefore, the volatility smile in case of NSE Nifty options cannot be attributed to the non normal skewness and kurtosis of stock returns for the said sample period. The result is in contrast with the study of Tiwari and Saurabha (2007) conducted on Indian options market. This implies that there are other factors like moneyness of an option, time to maturity of an option, number of contracts traded, etc which can explain the variation in implied volatility values over different exercise prices for the contracts having same time to maturity.

Table 1: Pricing errors for the near month call pptions

	Moneyness							
	<-.15	**-.15≤M <-.10**	**-.10≤M <-.05**	**-.05≤M <0**	**0-0.05**	**.05<M ≤10**	**.10<M ≤.15**	**>.15**
N	390	655	1355	4346	3744	918	247	111
PE	-4.95	-1.51	-0.92	-0.36	-0.11	-1.85	-5.13	-5.63
t stats	-4.42*	-5.47*	-3.88*	-3.0002*	-0.77	-4.08*	-5.08*	-3.64*

*significant at 1% level. N stands for number of observations, PE stands for pricing error.

Table 2: Pricing errors for the near month call options using Bs model and The modified Bs model

	Mean Absolute Error(MAE)	Mean Squared Error(MSE)
Black-Scholes Method	5.57 (81.66)*	86.07 (23.24)*
Modified Black-Scholes Method	5.32 (78.43)*	83.004 (21.1004)*
t statistic	2.51**	0.57

*Figures in parentheses show t-value, *significant at 1%, **significant at 5%*

Conclusion

In India, according to the BS model, deep out-of-the money options and in-the-money options have high volatility values while near-the-money options have low volatility values for the study period from January 1, 2003 till December 24, 2008. This can be taken as an indication of the BS model's misspecification. The resulting pricing errors also do not provide support for accuracy of the BS model in pricing the Nifty index option contracts. The results conclude that mispricing worsens with increased moneyness. The modified BS model of Corrado and Su (1996) performs better than the original BS model on the basis of MAE. However even the modified BS model misprices options significantly but pricing errors are less than that in original BS model. The volatility smile in case of NSE Nifty options cannot be attributed to the non normal skewness and kurtosis of stock returns for the study period.

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Risk Adjusted Performance Evaluation of Selected Indian Mutual Fund Schemes

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The objective of this paper is to evaluate the performance of selected mutual fund schemes in the framework of risk and return during the period January, 2008 to December, 2010. The performance of measures used are Treynor ratio, Sharpe ratio, Jensen measure and Fama's components of performance. The results indicate Failure of many selected schemes in infrastructure schemes and Index schemes outperforming the market, low average beta, disproportionate unsystematic risk, miss-match of the risk and return relationship in some schemes, failure of some other schemes in generating mandated return and negative net selectivity in more number of schemes.

Introduction

Mutual fund industry started in India with the establishment of Unit Trust of India (1964), which was the only player in the mutual fund industry up to 1987. In 1987, the government permitted public sector banks and financial institutions to join the fray. From 1993 onwards the industry was opened up for private sector and foreign players have started setting up mutual funds in India. Mutual funds have all come forward with a varying schemes suitable to the need of saving populace. By December, 2010 there were 41 mutual funds and over 976 schemes in India with Assets under Management of Rs.675,377 crores. Performance evaluation of mutual funds has been done extensively by Sharpe (1966) Treynor (1965), Jenson's (1968), Fama (1972), Barua et.al (1991), Jaideep and Sudip Majumdar (1994), Gupta and Sanjay Sehgal (1997), Gupta and Sanjay Sehgal Nalini Prava Tripathy' (2002) (1997), Amitabh Gupta (2000), Ramesh Chander's (2000), Nalini Prava Tripathy' (2002), Sindu (2004),Sinadhi and Jain (2005), etc.

Methodology

The present study made an attempt to analyse the performance of 20 mutual fund schemes which consists of four sectors Viz. Banking Sector Funds, FMCG Sector Funds, Index Funds and Infrastructure sector Funds. Each sector comprises of five schemes were selected for detailed study during the

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period of 2008-2010. The study is based on the secondary data. For evaluating the performance of the sample schemes the adjusted monthly NAV data during January 2008 – December, 2010 have been collected from various Websites like www.Mutualfundsindia.com, www.valueresearhonline.com, www.amfiindia.com and www.nseindia.com. The data also drawn from the respective websites of the selected mutual funds. The 91-day Treasury Bill rate has been collected from ICRA Money and Finance Bulletin.

Performance Evaluation Measures: The idea behind the performance evaluation is to compare the returns obtained by the portfolio (or a mutual fund schemes) through active management by the investment manager. Such portfolio chosen for comparison are often referred as 'benchmark portfolio'. Such random portfolios can be many. Hence, a stock market index can be selected as a benchmark portfolio. To carry on this exercise, two types of techniques are applied- measures that consider total risk and measures that consider systematic risk. The performance of selected mutual fund schemes has been evaluated by using six performance measures: (a) Rate of Return (b) Sharpe measure (c) Treynor measure (d) Jensen differential return measure, (e) Sharpe differential return measures, (f) Fama's Components of Investment Performance.

Results

It can be observed from the Table 1 that all selected schemes are posted negative returns due to financial meltdown, where as all the five FMCG schemes are better than other schemes as well as market in 2008. In the year 2009 all the selected banking sector schemes having higher Monthly average return (6.1236) than other schemes and market return and its bank nifty return. Interestingly FMCG sector schemes monthly average returns (4.344) are less than the market return (5.216) and higher than the CNX FMCG index return (3.1156). In 2010, out of 20 selected schemes 11 are given higher return than the market and all the Infrastructure schemes are posted less return than the market return. On the whole, banking sector schemes and FMCG sector schemes are better performers than the Index funds and Infrastructure schemes during the study period 2008-2010.

Table 2 presents the risk in terms of standard deviation of returns of the four selected sectors Viz., Banking Sector Schemes, FMCG Sector schemes, Index Funds and Infrastructure sector Funds. In 2008, out of 20 selected schemes all the five FMCG schemes are less riskier than the market. In the year 2009 banking sector schemes monthly average risk (13.7502) is less than the Bank nifty (16.1428) and higher than the Market (9.8470) . Whereas, FMCG schemes having monthly avgerage risk (6.3966) is less than the market and its CNX FMGC schemes. In 2010, it can be observed that in terms of risk in FMCG schemes Viz., ICICI Prudential FMCG Growth , Franklin FMCG Fund-Growth, UTI India Lifestyle fund-Growth, SBI Magnum Sector Umbrella-FMCG and Kotak Lifestyle Fund-Growth had less variation in returns as compared to the other three sectors and the market. On the whole, out of 20 selected schemes all five FMCG schemes are less riskier than the other during the study period 2008-2010.

Table 1: Sector-wise returns on selected mutual fund schemes

Banking Sector Funds	Avg. Monthly Return 2008	2009	2010	3 Years Avg.
ICICI Prud Banking &Financial Service Fund-Retail-G	-	5.4829	2.5215	4.0022
Kotak PSU bank ETF	-2.9909	5.8203	2.7827	1.8707
Reliance Banking Fund-Growth	-3.2302	5.9780	3.3539	2.0339
Sahara Banking & financial Service fund-Growth	-	7.7393	2.6531	5.1962
UTI Banking Sector Fund-Growth	-4.1616	5.5973	2.7546	1.3968
Avg.Return of Selected Schemes	-3.4609	6.1236	2.8132	2.9000
Avg. Return of BankNifty	-4.4541	6.0771	2.2921	1.3050
FMCG Sector Funds				
Franklin FMCG Fund-Growth	-2.3181	4.1154	2.6935	1.4970
ICICI Prudential FMCG Growth	-4.5086	4.4500	1.9846	0.6420
Kotak LifeStyle Fund-Growth	-6.6569	4.3118	2.3717	0.0089
SBI Magnum Sector Umbrella-FMCG	-2.9516	4.4203	3.2849	1.5845
UTI India Lifestyle fund-Growth	-4.9919	4.4224	1.7994	0.4100
Avg. Return of Selected Schemes	-4.2854	4.3440	2.4268	0.8285
Avg. Return CNX FMCG Index	-1.4951	3.1156	2.3396	1.3201
Index Funds				
Birla Sunlife Index -Growth	-5.4396	5.1966	1.4629	0.4066
HDFC Index fund Nifty Plan	-5.5809	5.3844	1.4100	0.2622
LIC MF Index Fund Nifty Plan Growth	-5.4342	4.7141	1.4944	0.3436
TATA MF index sensex plan	-5.3721	5.1113	1.4584	0.3992
Tata MF Index Nifty plan	-5.5530	5.3784	1.4326	0.4193
Avg.Return of Selected Schemes	-5.4760	5.1569	1.4517	0.3662
Avg.Return of S&P CNX Nifty	-5.2811	5.2160	1.4879	0.4743
Infrastructure sector Funds				
ICICI Prudential Infrastructure Fund-G	-5.1231	4.7070	0.8767	0.1535
L&T Infrastructure fund-G	-7.3386	5.1496	0.5961	-0.5309
SBI Infrastructure Fund-Series I-G	-6.7977	5.3545	0.2300	-0.4044
TATA Infrastructure fund-G	-6.3042	5.3180	0.8163	-0.0566
UTI Infrastructure Fund-G	-6.1886	4.6711	0.1535	-0.4547
Avg.Return of Selected Schemes	-6.3504	5.0400	0.5345	-0.2586
Avg. Return CNX Infrastructure Index	-5.9625	3.4397	-0.2188	-0.9139
Market Return (S&P CNX Nifty)	-5.2811	5.2160	1.4879	0.4743

Table 3 clearly shows that an average beta of both FMCG and Index schemes having defensive beta values is less than the market beta i.e., one during the study period. However, the selected FMCG Schemes had been more defensive than the other three sectors schemes. In 2009, all the selected banking sector scheme and three of infrastructure schemes having their beta values more than market beta. Interestingly, in 2010 year out of 20 selected schemes only three schemes Viz., Birla Sunlife Index –Growth, LIC MF Index Fund Nifty Plan Growth and TATA MF index sensex plan had beta value more than one. In total, out of four selected sector schemes banking and Infrastructure schemes had more aggressive beta.

Table 2: Sector-wise risk of selected mutual fund schemes

Banking Sector Funds	2008	2009	2010	3 Years Avg.
ICICI Prud Banking &Financial Service Fund-Retail-G	-	11.6608	5.4432	9.1461
Kotak PSU bank ETF	15.322	15.7396	6.7436	13.4042
Reliance Banking Fund-Growth	11.7189	14.3400	5.7275	11.5555
Sahara Banking & financial Service fund -G	-	14.0598	5.0751	10.6587
UTI Banking Sector Fund-Growth	12.9855	12.9508	5.4106	11.4971
Avg. Risk of Selected Schemes	13.3421	13.7502	5.6800	11.2523
Avg .Risk of Bank Nifty	14.7587	16.1428	6.0622	13.4693
FMCG Sector Funds				
Franklin FMCG Fund-Growth	6.9838	5.6326	3.3294	6.0511
ICICI Prudential FMCG Growth	8.2930	6.5471	1.9846	7.6060
Kotak LifeStyle Fund-Growth	9.9195	7.4846	3.9209	8.7669
SBI Magnum Sector Umbrella-FMCG	8.2781	4.4700	3.8869	6.5854
UTI India Lifestyle fund-Growth	8.0869	7.8488	3.6721	7.7678
Avg.Risk of Selected Schemes	8.3123	6.3966	3.3588	7.3555
Avg. Risk CNX FMCG Index	7.9177	6.3858	4.5914	6.5820
Index Funds				
Birla Sunlife Index -Growth	11.3024	9.7564	4.8490	9.8702
HDFC Index fund Nifty Plan	10.9041	10.0264	4.7940	9.8221
LIC MF Index Fund Nifty Plan Growth	11.0757	9.8265	4.8227	9.7517
TATA MF index sensex plan	11.1140	9.7430	4.8265	9.7669
Tata MF Index Nifty plan	10.6253	9.9761	4.8867	4.8867
Avg.Risk of Selected Schemes	11.0043	9.8657	4.8358	8.8195
Avg.Risk of S&P CNX Nifty	11.0969	9.8470	4.8023	9.7898
Infrastructure sector Funds				
ICICI Prudential Infrastructure Fund-G	12.3716	8.0254	4.2232	9.5282
L&T Infrastructure fund-G	14.6532	13.5309	4.3880	12.5882
SBI Infrastructure Fund-Series I-G	11.9605	11.9481	4.1335	10.9872
TATA Infrastructure fund-G	10.8754	11.2955	4.4903	10.3516
UTI Infrastructure Fund-G	9.85120	9.4293	4.2234	9.1900
Avg.Risk of Selected Schemes	11.9424	10.8458	4.2917	10.5290
Avg. Risk CNX Infrastructure Index	13.1001	12.17169	5.1774	11.1501
Market Risk (S&P CNX Nifty)	11.0969	9.8470	4.8023	9.7899

Table 4 gives the results pertaining to the Treynor Index for the sample schemes as well as benchmark portfolios. It can be observed in 2008 majority of the schemes (11 schemes) underperformed the market. In 2009 top five performers are SBI Magnum Sector Umbrella-FMCG, ICICI Prudential FMCG Growth, Franklin FMCG Fund-Growth, HDFC Index fund Nifty Plan and Sahara Banking & financial Service fund –G, out of five top performers three schemes belongs to FMCG sector. Surprisingly, all banking sector schemes are underperformed to compare the sectorial benchmark. Whereas only ICICI Prudential Infrastructure Fund-G schemes outperformed both sectoral benchmark and market benchmark. In 2010, out of 20 schemes selected 11 are underperformed the market; interestingly all selected banking sector

schemes outperformed the market and underperformed its sectorial bench mark. In total during the study period 2008-10 out of 20 schemes 11 are underperformed the market.

Table 3: Sector-wise beta values of selected mutual fund schemes

Banking Sector Funds	2008	2009	2010	3 Years Avg.
ICICI Prud Banking &Financial Service Fund-Retail-G	-	1.11	0.88	1.05
Kotak PSU bank ETF	1.14	1.44	0.89	1.16
Reliance Banking Fund-Growth	0.94	1.37	0.74	1.05
Sahara Banking & financial Service fund -G	-	1.35	0.61	1.11
UTI Banking Sector Fund-Growth	0.97	1.23	0.81	1.03
Avg.Beta of Selected Schemes	1.02	1.30	0.79	1.08
FMCG Sector Funds				
Franklin FMCG Fund-Growth	0.58	0.18	0.47	0.46
ICICI Prudential FMCG Growth	0.68	0.17	0.68	0.56
Kotak LifeStyle Fund-Growth	0.85	0.72	0.66	0.84
SBI Magnum Sector Umbrella-FMCG	0.66	0.15	0.49	0.50
UTI India Lifestyle fund-Growth	0.71	0.77	0.70	0.77
Avg.Beta of Selected Schemes	0.70	0.40	0.60	0.62
Index Funds				
Birla Sunlife Index -Growth	1.02	0.99	1.01	1.01
HDFC Index fund Nifty Plan	0.98	0.71	0.25	0.81
LIC MF Index Fund Nifty Plan Growth	1.00	0.99	1.01	0.99
TATA MF index sensex plan	1.00	0.99	1.00	1.00
Tata MF Index Nifty plan	0.94	1.01	1.02	0.99
Avg .Beta of Selected Schemes	0.99	0.94	0.86	0.96
Infrastructure sector Funds				
ICICI Prudential Infrastructure Fund-G	1.10	0.80	0.84	0.95
L&T Infrastructure fund-G	1.30	1.28	0.85	1.24
SBI Infrastructure Fund-Series I-G	1.06	1.17	0.75	1.09
TATA Infrastructure fund-G	0.97	1.11	0.86	1.03
UTI Infrastructure Fund-G	0.87	0.93	0.83	0.92
Avg.Beta of Selected Schemes	1.06	1.06	0.83	1.05

Table 5 represents the Sharpe's index for the selected schemes and for their sectoral schemes and bench mark portfolios. The top five performers are Kotak PSU bank ETF, Reliance Banking Fund-Growth, UTI Banking Sector Fund-Growth, Franklin FMCG Fund-Growth and SBI Magnum Sector Umbrella-FMCG in 2008. Interestingly selected index schemes and Infrastructure schemes are underperformed the market. In 2009, all five banking sector schemes are outperformed their sectorial bench-mark as well as market bench mark. In the year 2010, majority of the selected schemes are outperformed the market. On the whole, during the study period 2008-10 all the selected schemes (except Birla Sunlife Index –Growth) are outperformed their sectoral benchmark and the market.

Table 4 : Sector-wise Treynor Index and its benchmarks values of selected mutual fund schemes

Banking Sector Funds	Treynor index 2008	2009	2010	3 Years Avg.
ICICI Prud Banking &Financial Service Fund-Retail-G	-	4.5088	2.2858	3.3457
Kotak PSU bank ETF	-3.0592	3.6852	2.5648	1.1842
Reliance Banking Fund-Growth	-3.9769	3.9947	3.8618	1.4598
Sahara Banking & financial Service fund-Growth	-	5.3536	3.5277	4.2284
UTI Banking Sector Fund-Growth	-4.8112	4.1551	2.7994	0.8683
Sectoral Treynor index	-4.9541	5.5771	7.2462	0.8050
FMCG Sector Funds				
Franklin FMCG Fund-Growth	-4.8323	19.5558	2.1315	2.1818
ICICI Prudential FMCG Growth	-7.3570	22.6223	0.2095	0.2549
Kotak LifeStyle Fund-Growth	-8.4507	5.3245	-0.7423	-0.5858
SBI Magnum Sector Umbrella-FMCG	-5.2059	26.4720	2.2017	2.1703
UTI India Lifestyle fund-Growth	-7.7771	5.0794	-0.1294	-0.1173
Sectoral Treynor index	-2.4951	2.1156	0.3201	0.3201
Index Funds				
Birla Sunlife Index -Growth	-5.8342	4.7411	0.9543	-0.0927
HDFC Index fund Nifty Plan	-6.2090	6.8492	3.5946	-0.2923
LIC MF IndexFund Nifty Plan Growth	-5.9473	4.2377	0.9825	-0.1575
TATA MF index sensex plan	-5.8636	4.6611	0.9540	-0.1011
Tata MF Index Nifty plan	-6.4233	4.8536	0.9179	-0.0817
Sectoral Treynor index	-5.7811	4.7160	0.9879	-0.0257
Infrastructure sector Funds				
ICICI Prudential Infrastructure Fund-G	-5.1198	5.2581	0.4508	-0.3649
L&T Infrastructure fund-G	-6.0386	3.6193	0.1133	-0.8331
SBI Infrastructure Fund-Series I-G	-6.8935	4.1326	-0.3579	-0.8300
TATA Infrastructure fund-G	-7.0178	4.3454	0.3659	-0.5392
UTI Infrastructure Fund-G	-7.6466	4.5060	-0.4169	-1.0404
Sectoral Treynor index	-6.4625	2.9397	-0.7188	-1.4139
Benchmark Treynor index (S&P CNX Nifty)	-5.7811	4.7160	0.9879	-0.0257

Table 6 presents the results of Jenson's measure of the sample schemes. Out of 20 selected schemes only six schemes alpha values are positive thereby indicating superior performance in 2008. In 2009, out of the four selected sectors, all FMCG schemes Viz.. Franklin FMCG Fund-Growth, ICICI Prudential FMCG Growth, Kotak LifeStyle Fund-Growth, SBI Magnum Sector Umbrella-FMCG and UTI India Lifestyle fund-Growth having positive alpha values. Surprisingly in 2010 year all selected banking and FMCG schemes alpha values are positive. None of the selected schemes in both Index funds and Infrastructure funds not having the positive alpha.

Table 5: Sector wise Sharpe's Index and its benchmarks values of selected mutual fund schemes

Banking Sector Funds	Sharpe's Index 2008	2009	2010	3 Years Avg.
ICICI Prud Banking &Financial Service Fund-Retail-G	-	0.4273	0.3714	0.3829
Kotak PSU bank ETF	-0.2278	0.3380	0.3385	0.1023
Reliance Banking Fund-Growth	-0.3183	0.3820	0.4983	0.1327
Sahara Banking & financial Service fund -Growth	-	0.5149	0.4243	0.4406
UTI Banking Sector Fund-Growth	-0.3590	0.3936	0.4167	0.0780
Sectoral Sharpe's index	-0.3357	0.3455	0.2956	0.0598
FMCG Sector Funds				
Franklin FMCG Fund-Growth	-0.4035	0.6419	0.6588	0.1648
ICICI Prudential FMCG Growth	-0.6040	0.6033	0.7481	0.0187
Kotak LifeStyle Fund-Growth	-0.7215	0.5093	0.4774	-0.0560
SBI Magnum Sector Umbrella-FMCG	-0.4170	0.8770	0.7165	0.1647
UTI India Lifestyle fund-Growth	-0.6791	0.4998	0.3539	-0.0116
Sectoral Sharpe's index	-0.2520	0.4096	0.4007	0.1246
Index Funds				
Birla Sunlife Index -Growth	-0.5255	0.4814	0.1986	-0.0095
HDFC Index fund Nifty Plan	-0.5577	0.4871	0.1898	-0.0242
LIC MF IndexFund Nifty Plan Growth	-0.5358	0.4289	0.2062	-0.0160
TATA MF index sensex plan	-0.5284	0.4733	0.1986	-0.0103
Tata MF Index Nifty plan	-0.5697	0.4890	0.1908	-0.0165
Sectoral Sharpe's index	-0.5210	0.4789	0.2057	-0.0026
Infrastructure sector Funds				
ICICI Prudential Infrastructure Fund-G	-0.4545	0.5242	0.0892	-0.0364
L&T Infrastructure fund-G	-0.5349	0.3436	0.0219	-0.0819
SBI Infrastructure Fund-Series I-G	-0.6101	0.4063	-0.0653	-0.0823
TATA Infrastructure fund-G	-0.6257	0.4265	0.0704	-0.0538
UTI Infrastructure Fund-G	-0.6790	0.4424	-0.0820	-0.1039
Sectoral Sharpe's index	-0.5736	0.4186	0.0080	-0.0720
Benchmark Sharpe's index (S&P CNX Nifty)	-0.5210	0.4789	0.2057	-0.0026

Fama's measures, whose positive value indicates superior stock selection skills of the managers is presented in table 7 for the selected schemes. In 2008, all managers of the schemes portrayed superior stock selection skills. During the study period 2008-10, all the selected baking sector schemes and FMCG sector schemes managers possess superior stock selection ability as the selectivity measure was positive. Other two sectors, viz., Index schemes and Infrastructure schemes managers of none of the schemes portrayed superior stock selection skills.

Table 6: Sector-wise Jensen's Alpha of selected mutual fund schemes

Banking Sector Funds	Jenson's Alpha 2008	2009	2010	3 Years Avg.
ICICI Prud Banking &Financial Service Fund-Retail-G	-	-0.28	1.21	0.49
Kotak PSU bank ETF	3.04	-1.71	1.46	1.32
Reliance Banking Fund-Growth	1.72	-1.17	2.25	1.54
Sahara Banking & financial Service fund -Growth	-	0.69	1.74	1.11
UTI Banking Sector Fund-Growth	0.96	-0.80	1.56	0.91
FMCG Sector Funds				
Franklin FMCG Fund-Growth	0.76	3.15	2.00	1.28
ICICI Prudential FMCG Growth	-0.91	3.54	0.98	0.38
Kotak LifeStyle Fund-Growth	-2.18	0.58	1.39	-0.39
SBI Magnum Sector Umbrella-FMCG	0.55	3.65	2.55	1.35
UTI India Lifestyle fund-Growth	-1.26	0.39	0.76	0.05
Index Funds				
Birla Sunlife Index -Growth	-0.06	0.03	-0.04	-0.07
HDFC Index fund Nifty Plan	-0.41	1.54	*1.76*	-0.03
LIC MF IndexFund Nifty Plan Growth	*-0.16*	-0.47	0.00	-0.21
TATA MF index sensex plan	-0.08	-0.05	-0.04	-0.07
Tata MF Index Nifty plan	-0.58	0.14	-0.08	-0.05
Infrastructure sector Funds				
ICICI Prudential Infrastructure Fund-G	0.68	0.53	-0.37	-0.30
L&T Infrastructure fund-G	-0.48	-1.55	-0.67	-1.12
SBI Infrastructure Fund-Series I-G	-1.21	-0.77	-0.89	-0.92
TATA Infrastructure fund-G	-1.18	-0.47	-0.47	-0.55
UTI Infrastructure Fund-G	-1.57	-0.16	-1.08	-0.89

Table 7: Sector-wise Fama's net portfolio return for selected mutual fund schemes

Banking Sector Funds	Net Portfolio Return due to Selectivity 2008	2009	2010	3 Years Avg.
ICICI Prud Banking &Financial Service Fund-Retail-G	-	-0.23	1.15	3.53
Kotak PSU bank ETF	2.29	-1.49	1.40	1.40
Reliance Banking Fund-Growth	2.05	-0.99	2.12	1.56
Sahara Banking & financial Service fund-Growth	-	0.86	1.55	4.72
UTI Banking Sector Fund-Growth	1.12	-0.69	1.46	0.92
FMCG Sector Funds				
Franklin FMCG Fund-Growth	5.23	2.74	1.73	1.01
ICICI Prudential FMCG Growth	4.86	3.13	0.81	0.16

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Kotak LifeStyle Fund-Growth	5.12	0.44	1.22	-0.47
SBI Magnum Sector Umbrella-FMCG	5.20	3.22	2.30	1.10
UTI India Lifestyle fund-Growth	4.68	0.28	0.61	-0.07
Index Funds				
Birla Sunlife Index -Growth	5.23	0.02	-0.03	-0.07
HDFC Index fund Nifty Plan	4.86	1.52	0.66	-0.22
LIC MF IndexFund Nifty Plan Growth	5.12	-0.48	-0.01	-0.13
TATA MF index sensex plan	5.20	-0.05	-0.03	-0.08
Tata MF Index Nifty plan	4.68	0.14	-0.07	-0.06
Infrastructure sector Funds				
ICICI Prudential Infrastructure Fund-G	6.01	0.43	-0.45	-0.32
L&T Infrastructure fund-G	4.95	-1.41	-0.74	-1.00
SBI Infrastructure Fund-Series I-G	4.10	-0.69	-1.02	-0.88
TATA Infrastructure fund-G	4.08	-0.41	-0.54	-0.53
UTI Infrastructure Fund-G	3.65	-0.19	-1.17	-0.93

Conclusion

The monthly Net Asset Values of 20 mutual fund schemes which consist of four sectors i.e.,Banking Sector Funds, FMCG Sector Funds, Index Funds and Infrastructure sector Funds for the three years period i.e., from January 2008 to December 2010 are used to calculate the rate of return of selected schemes, which are compared with the market return represented by S&P CNX Nifty, and risk free rate of return represented by 91-days Treasury Bills. The empirical results indicate that failure of many selected schemes in outperforming the market, low average beta, disproportionate unsystematic risk, miss-match of the risk and return relationship in some schemes, failure of Infrastructure and Index schemes are the other significant observation in the study.

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Spot and Futures Market Relationship: A Study of Silver

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The present study has been undertaken to examine the relationship between spot and futures prices of silver. Closing spot price and the price of near futures contract have been studied for a period of five and a half years. It has been found that spot and futures prices are significantly correlated, both these series of prices are non stationary in level form and are stationary after first differencing, implying that spot return and futures return are stationary, the series of prices are cointegrated and there is a unidirectional causal relationship from the futures return to spot return.

Introduction

Silver has been classified as a precious as well as an industrial metal. It has many unique properties like strength, malleability, electrical and thermal conductivity, high reflectance of light etc. At present there are more than 20 recognized commodity exchanges in India. Of which, Multi Commodity Exchange of India Ltd. (MCX), National Commodities and Derivatives Exchange Ltd. (NCDEX), National Multi Commodity Exchange Ltd. (NMCE) and Indian Commodity Exchange Limited (ICEX) work at national level and other exchanges work at regional level. The national level commodity exchanges are demutualised; trade in many commodities with economies of scale and follow strong risk management practices. These have also set up 'Trade Guarantee Funds' and contracts traded on these commodities exchanges are marked to market on daily basis. After the establishment of national level commodity exchanges in India in 2002-03, futures' trading has been increasing continuously and many futures contracts traded on these exchanges find place among the top traded futures contracts worldwide.

Review of Literature

Many studies have been conducted to examine the relationship between spot and futures market and most of the studies concluded that there is a causal relationship between these two markets. Oellermann Charles M., Brorsen Wade B., & Farris Paul L. (1989) examined the price leadership among cash and futures prices for feeder cattle and live cattle for two periods

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from 1979 to 1982 and from 1983 to 1986. By applying Granger causality test and a dynamic regression model they reached the conclusion that the relationship changed significantly over the two periods and futures price generally leads cash price for feeder cattle but the strength of the lead was found less for the latter years.

Koontz Stephen R., Garcia Philip and Hudson Michael A. (1990) studied lead lag relationship between major cash markets; and between cash markets and the live cattle futures market over the three time periods between 1973 and 1984. and found that cash markets have decreased their reliance on the futures market as an overall price discovery mechanism and the price discovery is dynamic. Chan Kalok (1992) studied lead-lag relationship between intraday futures and cash index prices for two sample periods – August 1984 to June 1985 and January 1987 to September 1987. The MMI and an index comprising of 20 actively traded stocks have been studied. Lead-Lag relationship (a) under bad news and good news (b) under different intensities of trading activity (c) under market wide movement has been examined and the conclusion reached is that there is an asymmetric lead-lag relationship between the two markets. Quan Jing (1992) investigated causal relationship between spot and futures prices of crude oil by using monthly data from January 1984 to July 1989. On the basis of results of cointegration test, Granger causality test and the error correction models, it was found that the spot price generally leads the futures price in incorporating new information.

Min Jae H. and Najand Mohammad (1999) investigated lead-lag relationship between futures and spot markets, both in terms of return and volatility. By applying Dynamic Simultaneous Equation Models and Vector Auto Regression Models on 10-minute intraday data from 3 May 1996 to 16 October 1996 for the KOSPI 200 index and its nearby futures contract, they reached the conclusion that in case of return series futures market strongly leads the cash market whereas in case of volatility there exists bilateral causality relationship. Gupta Kapil and Singh Balwinder (2007) studied Price Discovery and Hedging Efficiency by applying Granger Causality and Vector Auto Regression (based on VECM) on daily closing values of 24 stocks and one index future (S&P CNX Nifty) from 12 June 2000 to 30 June 2006. They observed that there exists long run relationship of futures price with cash price of underlying asset price and futures market significantly leads the spot market. Chaihetphon Piyamas and Pavabutr Pantisa (2008) by applying Vector Error Correction Models on daily futures prices and spot prices from November 2003 to December 2007 for standard contract as well as mini contracts of gold traded on Multi Commodity Exchange of India Limited, concluded that futures price leads spot price in both the contracts and despite of low trading volume of mini contracts as compared to standard contract, mini contracts contribute to over 30% price discovery in gold futures trade. Kumar Narender and Arora Sunita (2011) studied relationship between spot and futures price of gold by applying Johansen's cointegration test and Granger causality test on daily closing values of spot and the nearby futures contract traded on Multi Commodity Exchange of India Limited from

June 2005 to December 2009. The study concluded that the series of spot and futures prices are cointegrated and there exists unidirectional causality from futures market to spot market.

Objectives

The present study has been undertaken with an attempt to examine the relationship between spot and futures market of silver. Therefore, the specific objectives are:

- To study the correlation between spot and future price of silver.
- To analyse the integration of spot and future prices of silver.

Methodology

The present study is based on the spot and futures prices of silver for a period of five and a half years, starting from June 2005 and up to December 2010. Both the price series have been collected from the website of Multi Commodity Exchange of India Limited. To achieve the objectives of the study following three sets of hypotheses have been tested.

H_{01}: Spot and futures price of silver are not correlated.

H_{02}: Spot and futures price of silver are not cointegrated.

H_{03}: There is no causal relationship between spot and futures return.

Closing value of futures price for the near month contract has been taken into account. A series of 1649 spot and futures prices has been analyzed with the help of EViews 6. Log values of both the price series have been used for the study purpose, because if the values are to be differenced for applying econometric models the first difference of log values is the continuous return. Thus return has been calculated as:

Return= Ln (Pt / P_{t-1})

Where Ln is the Natural log, P_t is the price for period t and P_{t-1} is the price for period t-1.

Statistical and Econometric Techniques Applied: To test the hypotheses following statistical tests and econometric models have been applied to the data. In the present study, correlation is computed with the help of Concurrent Deviation Method. This method determines the relationship of direction of movement of two series with the preceding values of the respective series.

Testing for Stationarity of Data: As the data used in the present study is time series data and it must be tested for stationarity before applying any econometric technique on it. In the present study stationarity has been tested by graphically presenting the data as well as by applying Unit Root Test. Many unit root tests are available for the purpose of testing the stationarity. Augmented Dickey-Fuller (ADF) test has been applied in the present study.

Co integration: The regression of a non stationary time series on another non stationary time series may produce a spurious regression. If two time

series are not stationary in level but they are I (1) i.e. these contain a unit root and both are stationary after first differencing, and if their linear pair is stationary i.e. residuals obtained from the regression equation of these series are stationary i.e. I (0), then the two series are termed as co integrated. Economically speaking, two variables will be co integrated if they have a long run or equilibrium relationship between them.

Causality Test: After making the series stationary causality test may be applied to the stationary data. Granger causality test analyses causality between two variables i.e. out of the two variables which variable contains useful information to predict the other variable.

Results

Before applying any statistical test or econometric model, basic characteristics of data have been analysed with the help of descriptive statistics.

Table 1: Basic Statistics of Data

Statistic	Logspot	Logfutures	Spotreturn	Futuresreturn
Mean	9.916841	9.922511	0.000869	0.000877
Median	9.897268	9.901836	0.000896	0.001479
Maximum	10.74430	10.74110	0.112461	0.080237
Minimum	9.235033	9.226607	-0.127199	-0.183764
Skewness	-0.113194	-0.146530	-0.576684	-1.329100
Kurtosis	3.248232	3.237484	10.02840	16.34714
Jarque-Bera	7.755137	9.776003	3483.372	12717.90
Probability	0.020701	0.007536	0.000000	0.000000
Observations	1649	1649	1648	1648

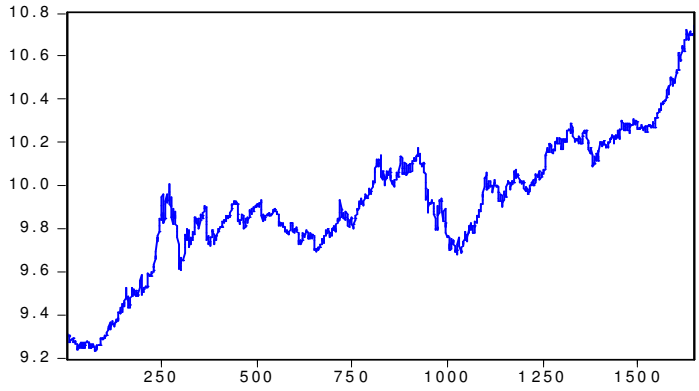
In the above table logspot is the natural logarithm of closing spot prices and logfutures is the natural logarithm of futures prices, spot return is the first difference of logspot and futures return is the first difference of logfutures. The mean of logspot is almost equal to the mean of logfutures and same is true in case of spot return and futures return. Median of logspot and logfutures is almost equal but it is not same in case of spot return and futures return. Median of spot return is less than that of futures return. Maximum and Minimum values of logspot and logfutures are almost equal but maximum and minimum values of spot return is higher than the corresponding value of futures return. All the four series are negatively skewed implying that all these have long left tails and out of these four the maximum negative skewness is in futures return. The value of kurtosis near to 3 in case of logspot and logfutures show that distributions may be mesokurtic but Jarque-Bera test shows that whereas logspot distribution is normally distributed, the same is not the case with log futures. The values of kurtosis in case of spot return and futures return show that the distribution are Leptokurtic and Jarque-Bera test also fails to accept the null hypothesis of normal distribution in case of both these series.

Coefficient of Correlation: While calculating the concurrent deviations on the series of the logspot and logfutures it was found that out of the 1648 deviations 951 deviations have the same direction. Thus about 58% of total observations have the same direction. The value of r_c is equal to 0.39. This value of correlation coefficient is significant because t value is 18.77663 and for a large sample if it is more than 1.96 it is significant at 5% level.

Graphical Presentation of Data

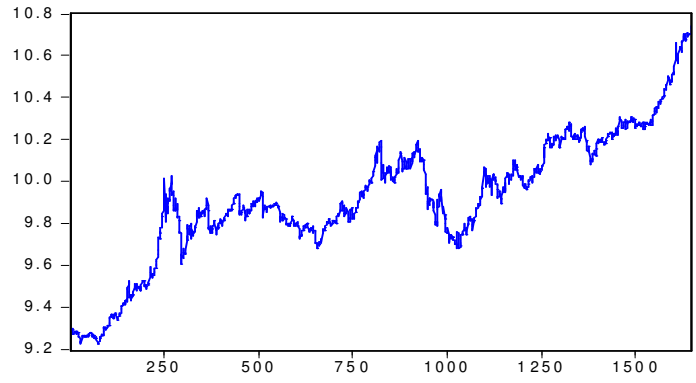
Data for natural log values of spot prices, log values of futures prices, spot prices return and futures prices return has been presented graphically to test whether the data series are stationary or not. It is clear from the following graphs that the series in level form i.e. log spot and log futures are not stationary but the series are stationary after first differencing i.e. spot return and futures return are stationary.

Figure 1: Log values of spot price series



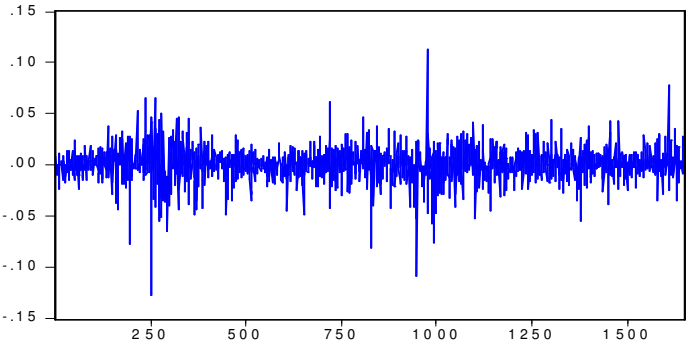
Source: Collected from www.mcxindia.com accessed on 21.04.2011

Fig. 2: Log Values of future price series



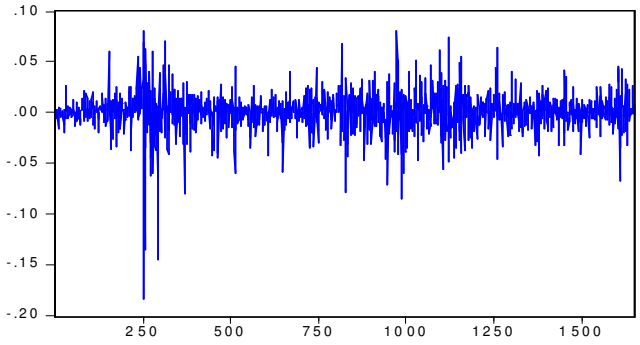
Source: Collected from www.mcxindia.com accessed on 21.04.2011

Fig. 3: Spot Returns



Source: Collected from www.mcxindia.com accessed on 21.04.2011

Fig. 4: Future Returns



Source: Collected from www.mcxindia.com accessed on 21.04.2011

Results of Augmented Dickey-Fuller test have been shown in the following table.

Table 2: Augmented dicky-fuller test for the four series of data

LogSpot		
Null Hypothesis: LOGSPOT has a unit root		
Exogenous: Constant		
Lag Length: 0 (Automatic based on SIC, MAXLAG=24)		
	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-0.328768	0.9182
*MacKinnon (1996) one-sided p-values.		
Logfutures		
Null Hypothesis: LOGFUTURES has a unit root		
Exogenous: Constant		
Lag Length: 1 (Automatic based on SIC, MAXLAG=24)		
	t-Statistic	Prob.*

contd...

contd...

Augmented Dickey-Fuller test statistic	-0.413075	0.9046
*MacKinnon (1996) one-sided p-values.		
Spot Return		
Null Hypothesis: SPOTRETURN has a unit root		
Exogenous: Constant		
Lag Length: 0 (Automatic based on SIC, MAXLAG=24)		
	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-41.38914	0.0000
*MacKinnon (1996) one-sided p-values.		
Futures Return		
Null Hypothesis: FUTURESRETURN has a unit root		
Exogenous: Constant		
Lag Length: 0 (Automatic based on SIC, MAXLAG=24)		
	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-44.26787	0.0001
*MacKinnon (1996) one-sided p-values.		

Results of Dicky-Fuller test confirm the results of above graphs showing that the series in level form i.e. logspot and logfutures are not stationary because the null hypothesis of having a unit root can not be rejected (probability = 0.9182, 0.9046 respectively) but the series are stationary after first difference because the null hypothesis of having a unit root has been rejected (Probability = 0.0000, 0.0001 respectively). (Spot return and futures return are the first difference of the logspot and logfutures).

Johansen's Cointegration Test: From the above discussion it is clear that the series of logspot and logfutures are not stationary whereas first difference of both these series is stationary. So both the series are I(1). These two I(1) series may be cointegrated. To test whether these series are cointegrated or not Johansen's Cointegration test has been applied. The test has been applied on the series of logspot and logfutures because this test is applied on the data in level form. The results have been shown in Table V.

Table 3: Johansen's Cointegration Test

Sample (adjusted): 6 1649
Included observations: 1644 after adjustments
Trend assumption: Linear deterministic trend
Series: LOGSPOT LOGFUTURES
Lags interval (in first differences): 1 to 4
Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.060870	103.3055	15.49471	0.0001
At most 1	3.69E-05	0.060642	3.841466	0.8055

Trace test indicates 1 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

It is clear from the above table that there is one cointegration equation in these variables because null hypothesis of none cointegration equation can not be accepted. (Probability= 0.0001) but the null hypothesis of at most 1 cointegration equation has been accepted (probability= 0.8055). This shows that there is a long term relationship in these two variables.

Granger Causality Test: After establishing cointegration relationship causality test may be applied to the series of data. Granger causality test is always applied on stationary data. So the test in the present study has been applied on spot return and futures return. (From Table IV it is clear that series of logspot and logfutures are not stationary whereas series of spot return and futures return are stationary). Results of Granger causality test have been shown with the help of Table VI.

Table 4: Pair wise granger causality test

Pair wise Granger Causality Tests Sample: 1 1649 Lags: 2 Null Hypothesis:	Obs	F-Statistic	Probability
Futurereturn does not Granger Cause Spotreturn	1646	690.947	2.E-218
Spotreturn does not Granger Cause Futurereturn	1646	1.79059	0.16719

From the results of Pair wise Granger causality test it can be concluded that there is univariate causality from futures return to spot return because null hypothesis of futures return not causing the spot return can not be accepted. (Probability=2.E-218) where as the null hypothesis of spot return not causing futures return has been accepted. (Probability=0.16719). Thus it can be said that futures return contains useful information for predicting the spot return.

Conclusion

In case of precious metals, gold as well as silver, mini contracts are traded more in comparison to their standard counterparts. Therefore, while designing the futures contracts the needs of market players must be well considered by the commodity exchanges. Spot return and futures return are significantly correlated. Spot prices and futures prices are cointegrated implying long term relationship between them. There is a unidirectional causality from futures return to spot return i.e. futures return contains useful information for predicting the spot return. Market players may get benefit from this information. Policy makers may also justify futures trading in silver on the basis of this relationship because this relationship implies that futures market in silver is doing well in its main role of price discovery and futures market in silver is an efficient price discovery vehicle.

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A Comparative Analysis of Output Growth, Factor Substitution and Technical Progress in the Manufacturing Industries of India and USA

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The rate of growth of output of the manufacturing sector is primarily determined by the rate of expansion in the productive resources, the relative factor productivity levels and the economies of scale. Many studies have examined the role of technical progress on output expansion. Since, there are constraints on resource expansion in developing economies, studies have stressed the need to improve factor use patterns and technical efficiency in the use of resources in accelerating the phase of output expansion in the industrial manufactures. An attempt is made in this paper to trace the sources of output growth, factor substitution and estimates of Hicks' neutral technical progress for twenty-four three digit level disaggregation of industries for India and the USA during the period 1985-86 to 2006- 2007.

Introduction

During the post World War II period, world economy has entered into an era of rapid economic growth and studies have shown that the growth of GNP (Gross National Product) per capita and per worker Manufactured Value Added were faster during the post war period, than any other preceding period of comparable duration (Cornwall, 1977). But, the rates of growth were found not uniform across different nations. For example, in the late 1950's the United States of America stood far above the rest of the major countries of the world as regards GNP per capita terms. The UK, Germany and France tended to cluster in their productivity levels at about half that of the USA. Japan and Italy have lagged far behind (Nelson, 1981). This has led a number of studies to examine the sources of output growth as it assumed special analytical and empirical significance for both developed and developing nations.

While a few studies have attempted to analyze the standard patterns of growth in major economic sectors and across different industry categories with in the manufacturing sector, some have examined sources of aggregate output growth and tended to isolate the factors contributing for raising the levels of productivity (World Development Report, 1987). Accumulation of the factor inputs and their deployment in productive uses, as a necessary condition for achieving faster and stable rates of growth came to be

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highlighted in the subsequent studies undertaken for India vis-à-vis the USA (Richard Oliker, 1991).

Application of Sources of Output Growth: The rate of manufacturing industrial growth is determined by the rate of expansion in the productive resources employed in the industrial sector and the rate of improvement achieved in factor productivity levels. Numerous studies have shown that the primary source of economic growth in the past has been improvements in the manufacturing technique that allows realisation of increased quantities of value addition from given quantities of capital and labour. Such an industrial system would provide opportunities to guarantee improvements in factor productivity levels, realization of economies of scale and harnessing full potentials in the use of a given technology (Syrquin, 1986). Besides, the manufacturing sector also would permit producers to achieve the benefits of competitive advantage in the world commodity trade.

Empirical studies have shown that the initial acceleration of growth comes largely due to faster input growth and that too primarily on account of capital accumulation. It is at this stage, that most of the increase in the net investment takes place in the industrial economy of the nations. But, since the elasticity of capital normally declines, the contribution of capital accumulation to growth either stabilizes or tends to register a decline. This has led Kuznets (Kuznets, 1971) to expect the factor productivity growth in most countries to be higher during the post war decades than during the pre-war period.

Factor Productivity: In an industry, diverse resources like raw materials, labour, capital, plant, machinery, and management are employed. Each of these resources is called input and helps to achieve the final production or output. Productivity represents the relationship that exists between the output and the input or in other words it is the amount of output per unit of input. Productivity aims at the maximization of output by the most efficient and economic use of input and minimization of wastes. If an increase in production is affected by a corresponding increase in the quantum of input, there will be no increase in productivity. It brings out the cumulative effect of a number of inter-related influences such as technological change, motivation, effort of workers, substitution of factors and organizational ethos (Dhananjayan, Anubumani and Muniyandi, 2005). Therefore, productivity is the ratio of what comes out of business to what goes into the business i.e. it is the ratio of "outcome" to the efforts. However, this relationship should not be interpreted to imply a mere engineering ratio, since a wide range of socio-economic and managerial factors influences productivity as well (Sankar and Lakshmanswany, 1993). The growth of factor productivity for the whole economy often includes a structural component that arises when resources are reallocated from activities of lower productivity to activities of higher productivity, resulting in different sectoral characteristics of growth in the economy. During the process of industrialization, productivity growth is expected to be higher in the manufacturing sectors than in other sectors (Silver, 1984).

Scale Coefficient: The relationship between output change and proportionate changes in both inputs is referred to as returns to scale (Petersen and Lewis, 2002). Scale coefficient is an important factor responsible for output growth. It refers to a situation in which any given level of input can produce a larger output. Economies of scale indicate the relative increase in output resulting from a proportional increase in all inputs or after adjusting the use of all inputs optimally (Dension, 1962). In order to infer this logic, the modified and generalized models of Cobb-Douglas production without imposing the restriction that sum of the coefficient of capital and labour are equal to one is used. In this case, if the sum of the exponents of capital and labour is greater than one i.e. $\beta_1 + \beta_2 > 1$ it indicates increasing returns to scale, if it would imply a constant returns to scale and if , then decreasing returns to scale. This scale effect could be observed from the movement of iso-quants from one to another along the production surface.

Application of Factor Substitution

In the past, many growth models were developed for analyzing the sources of output growth at both aggregate and disaggregate sectoral levels, with the help of production function models. It provided a simple estimation procedure with built in assumptions viz., the exponents of inputs add to unity and the substitution elasticity of factors equal to one. 'Hicks'(Hicks, 1932), in his 'Theory of Wages' and Joan Robinson (Robinson, 1933) in her 'Economics of Imperfect Competition' have examined the significance of input substitutability and have shown non-negative characteristics. The elasticity of substitution can be defined as the percentage change in the capital labour ratio with respect to a given percentage change in the marginal rate of technical substitution between factors, given the state of technology. While the approach provided by Walras-Leontief-Harrod-Domar have assumed constant input coefficients (Hicks, 1932) that of the Cobb-Douglas Function, assumed unitary elasticity of substitution between capital and labour.

The concept of elasticity of substitution was introduced to economic theory by J.R, Hicks in 1932. According to him, the elasticity of substitution is a measure reflecting the "ease with which the factors can be substituted for one another". Almost simultaneously Joan Robinson (Robinson, 1993) also provided a definition for the concept of elasticity of substitution. 'It appears appropriate', she said that 'the concept of elasticity of substitution would equal to the proportionate change in the ratio of the amounts of the factors employed divided by the proportionate change in the ratio of their prices'. Let P= w/i, where 'w' and 'i' represent the prices of labour and capital respectively and 'K' the capital-labour ratio. Then, the elasticity of substitution (ó) can be denoted by:

(or)

The above formulation ensures that the elasticity of substitution is non-negative as 'w' increases relative to 'i', that is, as 'w/i' increases the optimum input ratio of capital to labour will also increase. The extent of increase in the optimum input ratio associated with an unchanged level of output is given by the measure of elasticity of substitution. Joan Robinson substituted for the denominator in the definition, the ratio of the marginal products of the respective inputs. This is a more fundamental definition of the elasticity of substitution. The ratio of the marginal product of labour to the marginal product of capital is the marginal rate of technical substitution of labour for capital. In general, greater the value of the curvature of the iso-quant will be steeper implying, lower degree of elasticity of substitution.

Symbolically, we may express elasticity of substitution as:

Where K/L is factor proportion, is the change in factor proportions. The slope of the iso-quant is and the rate of change in the slope of the iso-quant in the expansion path equals to $d\ \mathrm{dK}/\mathrm{dL}$.

The point to be noted here is that for cost minimization, the slope of the iso-quant dK/dL must equal the relative factor prices P_2 / P_1. This means, we could infer the condition to secure cost minimization by redefining the elasticity of substitution as the ratio of change in factor proportions $[d(K/L)/K/L]$ to a given change in relative factor prices $[d(P_2/P_1) / P_2/ P_1]$, where P_1 = wages rate, P_2 = price of capital.

Application of Technical Progress

Hicks' pioneering work may be considered as the starting point of modern analysis on technological progress. Hicks' defined technological progress using a two-input (capital and labour) model. A neutral technological growth is the one, which for a given capital-labour ratio raises the marginal product of capital in the same proportion as the marginal product of labour (or, the marginal rate of technological substitution remains unchanged over time). This definition is more suited as a short run definition of technological change since the relative input supplies are held fixed.

Technology is an omnipotent and all pervasive element that affects comprehensively all dimensions of a socio-economic system. Although, technology is a static concept at any given point of time, the critical importance of technology is lodged in the dynamic properties of technological change over a period of time. Technological change is viewed as a change in an existing mode of production or the introduction of a new type of production process or of products (Scherer, 1965). The essential quantitative effect of technical progress is the shift it causes in the production function enabling greater output to be produced with the same volume of inputs or the same volume of output with less of inputs (Chen, 1977). Production function corresponds to a specific level of technological knowledge and any change in this can be captured by a shift in the production iso-quant. If 'y' is the

vector of net output, then 'technology' at any point of time may be expressed by a transformation frontier (Goldar, 1986).

t (Q) =0 (1)

If we have Q1 and Q2, then the movement from one point to another may be broken down into the movement from one frontier to another. The crucial measurement problem, while studying technological progress, is how do we separate these two movements? Let 'Q' denote a single homogenous output and 'X' the vector of inputs. Technically, a production function can be employed to express the relationship as:

Q= f (X) (2)

Overtime, the output-input points change from ($Q_{1,}$ X_i) to (Q_2, X_2). This movement can be broken down into three parts: i) the movement along the iso-quant of a given production function (substitution) ii) movement from one iso-quant to another along the same production function (scale-effect) and iii) movement from one production function to another (technological change).

Technical change involves the shifting of the instantaneous production function, so that the full production function may be written as

q = g(x, a) (3)

Where, 'a' is the vector of knowledge and if the time path a (t) for knowledge is known, we obtain the form

q= F(x, t) (4)

Where, 't' denotes time. Differentiating equation (4) totally with respect to time and rearranging terms, we obtain

F/F=" ($F_i X_i$ / F) + (F_t / F). ..... (5)

Where dot denotes the derivative operator d/d_t. F_i denotes dF /dX_i and F_t denotes "F /"T. If we write âi for $F_i X_i$ / F) which is the distributive share of the i_{th} factor. Then we obtain

F/F = q /q -" $â_i X_i /X_i$ (6)

This is the basic growth accounting equation. The rate of technical progress is given by F_t /F.

Neutral and Non-neutral Technical Progress

Hicks (Hicks, 1932) have distinguished technical progress into neutral and non-neutral, depending upon its effects on the rate of substitution between the factor inputs. Technical progress is said to be Hicks' neutral if the ratio of the marginal product of capital to that of labour remains unchanged at a constant K/L ratio, when the production function shifts. In other words, it does not change the marginal rate of substitution between factor inputs. Neutral technical progress shifts the iso-quant of the production function uniformly away from the origin, leaving unchanged the slope of the iso-quant along any ray from the origin (Harrod, 1947).

The technical progress is non-neutral when it alters the elasticity of substitution between capital and labour. Technological progress is capital-deepening if at a constant K/L ratio, the $MRTS_{L,K}$ declines. Technological progress is labour-deepening, if at a constant K/L ratio, the $MRTS_{L,K}$ increases (Koutsoyiannis, 1979). Hicks' neutral technical progress can be represented by the following production function:

$$Q = A(t)\, f(K, L) \qquad (7)$$

Where A (t), measures the efficiency index, Q is the output and K and L are capital and labour respectively.

Disembodied and Embodied Technical Change

Another method of categorizing technical progress is based on the nature of factors, which are responsible for technical progress. These are distinguished as embodied /endogenous or disembodied / exogenous technical progress. When the technical progress is embodied in factor inputs, it is called embodied or endogenous technical progress. When the technical progress is not embodied in factor inputs or rather it is involved in the reorganization of the inputs, it is called disembodied or exogenous technical progress. It can occur with or without increases in inputs. A change in output due to disembodied technical progress is reflected by a shift in the production function.

Arrow assumed technical progress to be endogenous in nature and took the cumulative gross capital stock as an index to represent this. Each new capital good introduced into production can change the environment of production, so that learning will be a continuous process. Treating technical progress as endogenous/embodied, gives greater importance to capital accumulation in the process of output growth. In relating technical progress to experience, Arrow considered the cumulative gross investment as the index of experience, while the previous studies have mostly favored the use of cumulative gross output as an index (Sivakumar, 1989). The notion of learning by doing is incorporated on the assumption that labour efficiency indicates a strictly increasing function of cumulative gross investment. Such a relationship is expressed as,

$$A_t = A_o {}^{c}G_t$$

Where,

A_t - the level of technology of time't'

A_o – the initial level of technology

G_t - the index of learning, measured by cumulative capital

And c – the learning coefficient or in other words it is the elasticity of A_t with respect to the index of G.

Review of Literature

Arrow, K.J. et al. (1961), in their cross-country study concluded that the elasticity of substitution between labour and capital in manufacturing was typically less than unity. Soon after the publication of the ACMS seminal

work, most economists attempted to study the factor substitution for the manufacturing sectors and arrived at similar conclusions. For example, Fuchs (1963), pointed out that the Cobb-Douglas Hypothesis could not be rejected if, the country sample was subdivided between developed and less developed economies. Zarembk's cross state regressions for the American manufacturing industries also has shown less than unitary elasticity of substitution (Zarembka, 1970). Kelly,et.a1. found that in the American industrial sector the elasticity of substitution of efficiency of labour for efficiency of capital is less than one (Kelly, 1972). Abramovitz and David, in their study of the elasticity of factor substitution in the American economy found the elasticity of substitution assuming values less than unity (Abramovitz, and David 1973).

Banerji attempted to study the productivity growth and factor substitution in the Indian manufacturing industries during 1946-1964 (Banerji, 1971). The elasticity of substitution between capital and labour was found not significantly different from unity on the whole. The study has pointed out a capital deepening process characterising the Indian industries and have exerted a great deal of influence in the process of output growth.

Methodology

The industries identified for the present study is based on the uniform data availability for the study period in the select nations. The sub industrial categories are included under the above classifications of the UNIDO. But, such variations are not fundamental in nature to obscure the industry characteristics at the three digit industry classification. Hence, uniformity and compatibility is ensured in this study. While, defining the monetary variables in US$ terms, we have taken the official exchange rate reported in the International Financial Statistics of the International Monetary Fund(IMF) for the period of the 1985-86 to 2006-2007. This exchange rate might be slightly different from the actual exchange rate at which commercial trade has been carried out by the nations during the reference period.

Adequate care has been taken to ensure that the methodology adopted in the present study enables uniformity of data and definition of variables, so that, the emerging conclusions becomes comparable. Mathematical and statistical tools like Simple ratios, Percentage, Compound Growth Rate, Mean, Standard deviation and coefficient of variation are appropriately used for the purpose of analyzing the data and examine the objective proposed in the study. Simple and Multiple regression models based on the principle of Ordinary Least Square(OLS), in both linear and log-linear forms are employed for the purpose of estimating the coefficients of the various econometric models used in this study.

Results and Discussions

This section discusses the consolidated results of all the three production functions viz., Cobb-Douglas, Variable Elasticity and Constant Elasticity Production Function respectively.

CDPF, CESPF and VESPF without Hicks' Neutral Technical Progress: The $\hat{a}_1$ co-efficient that measures the elasticity of output growth on account of capital productivity has emerged statistically significant in 37.50 percent of manufacturing industries in India viz. the Food products(311), the Beverages(313), the Wearing apparel except footwear(322), the Wood products except furniture(331), the Printing and publishing(342), the Industrial chemicals(351), the Non–ferrous metals(372), the Machinery except electrical(382) and the Transport equipment(384). While, a similar characteristic was found in 83.33 percent of manufacturing industries in the USA viz. the Food products(311), the Beverages(313), the Tobacco(314), the Wearing apparel except footwear(322), the Leather products(323), the Footwear except rubber or Plastic(324), the Wood products except furniture(331), the Paper and products(341), the Printing and publishing(342), the Industrial chemicals(351), the Other chemicals(352), the Rubber products(355), the Other non-metallic mineral products(369), the Iron and steel(371), the Non–ferrous metals(372), the Fabricated metal products(381), the Machinery except electrical(382), the Machinery electric(383), the Transport equipment(384) and the Professional and scientific equipment(385).

The regression coefficient $\hat{a}_2$, measuring the elasticity of output growth on account of labour productivity has yielded theoretically specified positive sign in 54.16 percent of manufacturing industries in India. These include the Tobacco(314), the Textiles(321), the Wearing apparel except footwear(322), the Footwear except rubber or plastic (324), the Paper and products (341), the Other chemicals(352), the Rubber products(355), the Plastic products (356), the Other non-metallic mineral products(369), the Fabricated metal products(381), the Machinery except electrical(382), the Machinery electric(383) and the Professional and scientific equipment(385). In the USA, the labour input emerged statistically significant in 62.50 percent of manufacturing industries viz. the Beverages(313), the Tobacco(314), the Textiles(321), the Wearing apparel except footwear(322), the Leather products(323), the Footwear except rubber or plastic (324), the Wood products except furniture(331), the Paper and products (341), the Printing and publishing(342), the Other chemicals (352), the Plastic products (356), the Non-ferrous metals (372), the Fabricate metal (381), the Machinery electric (383) and the Transport equipment(384).

CDPF, CESPF and VESPF with Hicks' Neutral Technical Progress: When we analyse the coefficient of capital and labour, we find with high contribution, the capital productivity emerging significant in eight manufacturing industries in India viz. the Wearing apparel except footwear(322), the Wood products except furniture(331), the Industrial chemicals(351), the Other chemicals(352), the Non – ferrous metals (372), the Machinery except electrical(382), the Machinery electric(383) and the Transport equipment (384). A similar trend was observed in the USA in 14 manufacturing industries viz. the Tobacco(314), the Textiles(321), the Leather products(323), the Paper and products(341), the Industrial chemicals(351), the Other chemicals(352), the Plastic products(356), the Other non-metallic

mineral products(369), the Iron and steel(371), the Non – ferrous metals(372), the Machinery except electrical(382), the Machinery electric(383), the Transport equipment(384) and the Professional and scientific equipments(385). In India, the labour input had emerged statistically significant in seven industry categories viz. the Textiles(321), the Printing and publishing(342), the Other chemicals(352), the Miscellaneous petroleum(354), the Non-ferrous metals(372), the Fabricate metal(381), and the Professional and scientific equipment(385). Similarly in the USA, the $\hat{a}_2$ emerged statistically significant in 14 manufacturing industries viz. the Textile(321), the Wearing apparel except footwear(322), the Footwear except rubber or plastic(324), the Wood products except furniture(331), the Printing and publishing(342), the Industrial chemicals(351), the Miscellaneous petroleum and coal products(354), the Plastic products(356), the Iron and steel(371), the Fabricated metal products(381), the Machinery except electrical(382), the Machinery electric(383), the Transport equipment(384) and the Professional and scientific equipment(385).

Estimates of Scale coefficient using fit CDPF, CESPF and VESPF without Time Trend: In India, the scale parameter obtained magnitude greater than one in 50.0 percent manufacturing industries viz. the Total manufacturing(300), the Tobacco(314), the Textiles(321), the Footwear except rubber or plastic(324), the Paper and products(341), the Other chemicals(352), the Rubber products(355), the Plastic products(356), the Other non-metallic mineral products(369), the Fabricated metal products(381), the Machinery except electrical(382), the Machinery electric(383) and the Professional and scientific equipment(385). In the USA, increasing returns to scale was observed in the industries engaged in the manufacture of the Textiles(321), the Wood products except furniture(331), the Printing and publishing(342), the Other chemicals(352), the Miscellaneous petroleum and coal products(354), the Plastic products (356) and the Professional and scientific equipment(385).

The scale coefficient estimates using fit CDPF, CESPF and VESPF with Time Trend: In India, the scale coefficient assumed well behaved estimates in 20.83 percent of industries viz. the Textiles(321), the Paper and products(341), the Other non-metallic mineral products(369), the Fabricated metal products(381) and the Professional and scientific equipment(385). Diminishing returns to scale characterized in 45.83 percent of manufacturing industries in India. In the USA, the μ outlined a better economies of scale by obtaining values more than unity in the Textiles(321), the Footwear except rubber or plastic(324), the Wood products except furniture(331), the Printing and publishing(342) and the Plastic products(356) industry categories. The magnitude of μ was around unity closely associated with Cobb-Douglas production function specification in 10 manufacturing industries.

Elasticity of Factor Substitution

Regression Estimates of CESPF and VESPF Production Function(s_1): In India, s_1 obtained an average value of 0.67 and characterized the factor

substitution offering a proximate explanation of capital augmentation in the place of labour for the overall industries under study. The positive factor substitution was obtained in 21 manufacturing industries, of which eight industries observed a high degree of substitution above unity between capital and labour. These include the Beverages(313), the Leather products(323), the Wood products except furniture(331), the Printing and publishing(342), the Petroleum refineries(353), the Miscellaneous petroleum and coal products(354), the Rubber products(355) and the Non-ferrous metals(372) industry categories. In the USA, the s_1 obtained an average value of 1.46 depicting overall high substitutability between capital and labour. A positive factor substitution was obtained in 23 industries, of which 21 assumed values more than 0.50 depicting proximate explanation of capital substituted for labour. In the Tobacco(314) industry, the s_1 assumed theoretically implausible negative magnitude during the reference period.

Regression Estimates of CESPF and VESPF Production Function with Hicks' Neutral Technical Change (s_2): In India, the positive value in s_2 was obtained in 21 manufacturing industries. Of these 21, nine manufacturing industries characterized high factor substitution obtaining values greater than unity viz. the Total manufacturing(300), the Beverages(313), the Leather products(323), the Wood products except furniture(331), the Industrial chemicals(351), the Miscellaneous petroleum and coal products(354), the Rubber products(355), the Plastic products(356), the Fabricated metal products(381) and machinery except electrical(382). The s_2 in the USA obtained overall mean value of 0.142 and remained unidentified in six manufacturing industries. A positive value for s_2 was observed in the Food products(311), the Beverages(313), the Leather products(323), the Paper and products(341), the Printing and publishing(342), the Industrial chemicals(351), the Other chemicals(352), the Rubber products(355), the Other non-metallic mineral products(369), the Non-ferrous metals(372), the Transport equipment(384) and the Professional and scientific equipment(385) industry categories.

Hicks' Neutral Technical Progress

CDPF, CESPF and VESPF with Hicks' neutral technical progress (l_1): The b_3 co-efficient which measures the contribution made by Hicks' neutral technical change (l_1), by obtaining positive sign in 95.83 percent of manufacturing industries in India, provide empirical support that a part of the output growth is due to exogenous technical change. It can be seen that in all the 23 industry categories, even if the growth in output on account of capital and labour inputs were to be to remain constant, neutral technical change could explain output growth in the Indian manufacturing industries in reference during 1885-86 to 1999-2000. In the USA, the l_1 have yielded average productivity growth in output for the study period around 0.038. The l_1 coefficient emerged statistically significant in 22 out of 24 manufacturing industries.

Conclusion

Among the 24 manufacturing industries, the present study clearly identifies the Non-ferrous metals(372) as a well performing industry in India vis-à-vis the manufacturing industries of the US. On the whole, the industries engaged in the manufacture of viz., the Beverages(313), the Tobacco(314), the Printing and publishing(342), the Industrial chemicals(351), the Other chemicals(352), the Rubber products(355), the Other non-metallic mineral products(369), the Fabricated metal products(381), the Machinery except electrical(382), the Transport equipment(384) and the Professional and scientific equipment(385) have emerged as predominant industries having sound economic fundamentals in terms of all aspects examined viz. output growth, factor productivity, scale of returns and factor substitution.

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Management Ownership: Interrelation with Corporate Performance in Selected Indian Companies

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This study is proposed to explore the link between top management-ownership through the executive directors' shareholding and performance of listed private sector companies in India. Thus, the selected performance measures, viz., market-value to book-value ratio, PAT/total assets, PAT/sales, growth in sales and growth in PAT have been examined in a multiple regression analysis by some selected explanatory variables like directors' shareholding, debt-equity ratio, R&D cost, advertisement expenses, size of total assets and size of total sales.

Introduction

The separation of ownership and control in the modern corporation was brought to the fore by Berle and Means ninety years ago, retains a central position in recent writings about the corporate performance. Agency problems, as originally exposed by Berle and Means (1932) and later elaborated by Ross (1973), and Jensen and Meckling (1976), have been advised to be solved in two principal ways: first, by more top managerial supervision of the activities of the professional managers by the non-executive directors (specially the dominant owners' representatives) and secondly, by remunerating the managers partly in stocks and shares. In widely-held companies, the second way has been found to be more effective by the researchers.

Objectives

The objectives of the study are:

- To assess the corporate ownership structure of the selected listed private-sector companies in India with special reference to top management ownership, and
- To find out the relationship between top management ownership (as represented by executive directors' shareholding) and corporate performance in these companies.

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is positively related in case of other non-financial firms, but relationships except foreign holding turn out to be insignificant.

In Indian Studies, Roy (1991) observed that the performance of owner-controlled firms was far better than that of management-controlled firms. Panchali, J.N. and Desai, N. (1997) have observed as follows: (i) ownership of corporate bodies is negatively related to growth variables; (ii) directors' and top 50 shareholders' ownership revealed no significant relationship with growth variables but these had a negative relationship with only one profitability ratio i.e., asset utilization (PBIT/Assets); (iii) ownership of financial institutions showed significant and positive relationship with asset creation; etc.. Ramachandran, G. (1998), while reviewing the trends in corporate governance, refers the changing pattern of shareholding in Indian private corporate sector by assembling the results of various studies from the year 1959 to 1996.

Sarkar and Sarkar (1999) reported negative relationship of market to book value ratio with low levels of insider ownership, but positive relationship with insider ownership above 25%. Panchali, Jinesh N. (2000), found that of all the ownership categories, only managerial ownership reveals significant relationship with the performance. The study of ownership pattern and its relationship with performance suggests a closer link between insider ownership and performance. Phani, B.V., Reddy, V.N., Ramachandran, N., and Bhattacharya, A.K. (2005) found that the insider ownership has no influence on the performance of the firm in a majority of industries irrespective of the time-period of the study. Mittal, Sanjeev and Kansal, Ruchi (2007) interpreted that there is no major reallocation of ownership rights among the four shareholder groups (e.g., Indian promoters, foreign promoters, institutional investors and others). They found that amongst the determinants, institutional investor shareholding, shareholding of others, and leverage are significant.

Methodology

In the first part, the study has considered the Capitaline Plus database population of 3286, 3497, 3576, 3508, 3433 and 3317 BSE-listed companies disclosing the shareholding pattern for the years 2000-01, 2001-02, 2002-03, 2003-04, 2004-05 and 2005-06 respectively. In the second part, 139, 115, 153, 170, 174 and 111 companies disclosing the executive directors' shareholding for the years 2000-01, 2001-02, 2002-03, 2003-04, 2004-05 and 2005-06 respectively have been considered (Table 2). Finally, a sample of 29 (2000-01 and 2001-02), 26 (2001-02 and 2002-03), 59 (2002-03 and 2003-04), 76 (2003-04 and 2004-05) and 83 (2004-05 and 2005-06) companies which disclose the necessary information during any two subsequent years could only be subjected for finding out the final relationship.

The study period has been selected as the year-end 31st March, 2001 to the year-end 31st March, 2006, i.e., a span of six years. 'Prowess', a corporate database maintained by Centre for Monitoring Indian Economy (CMIE), Mumbai and 'Capitaline Plus', a corporate database maintained by Capital Market Publishers India Pvt. Ltd., Mumbai, have been the data sources.

Scheme of Investigation

I. To assess corporate ownership structure, different ranges of ownership categories, such as, '0-5%', '5-25%', '25-50%' and 'above 50%' have been considered[3]. Different such ranges have been classified up to 50%, since it signifies the arithmetic control by shareholding.

II. A time lag of one year has been used to find out the relationship between executive directors' shareholding and corporate performance on the basis of a rationale that at least one-year time is required to find out any such effect.

III. All the values of the dependent and independent variables including the control variables have been either obtained or calculated for the sample companies.

IV. The annual equity holding data of all classes of owners have been extracted and arranged according to the ranges of ownership one by one. Since only a minor percentage of companies in the database discloses executive directors' equity holdings, the study is repeated for these sample companies to get a picture of executive directors' shareholding pattern.

V. In order to avoid the variability of data within a particular year, if any, the shareholding data for the last quarter ending 31st March of that year has only been considered.

VI. The study has considered natural logarithm values of the two size variables, Total Assets and Total Sales, because the distribution then conforms to the properties of symmetry and normality.

VII. The study has also considered factor analysis in order to avoid high multicollinearity among two homogeneous explanatory variables like of total assets and of total sales.

VIII. The study has conducted multiple regression analysis in two stages as described above.

Findings

The findings of the study are divided into different categories like (1) results of the study of the shareholding pattern of the sample companies, (2) descriptive statistics of the dependent and independent variables, (3) bivariate analysis with the help of calculating correlation coefficients between one dependent variable and an explanatory variable at every attempt, (4) factor analysis, and (5) multivariate analysis with the help of multiple regressions.

Shareholding Pattern: Results show that among the initial sample companies, only a minor percentage of companies disclose the (executive) directors' shareholding pattern. Here, it is found that the number of companies disclosing such directors' equity holding increased gradually over the years although it was not mandatory for the companies to disclose directors' equity holding as per SEBI's guidelines. The ownership is concentrated in the hands of promoters followed by the Indian public. The

Table 2: Shareholding pattern of BSE listed companies disclosing the Executive Directors' shareholdings : 2001 – 05

Year end & No. of Companies	Range of Ownership (%)	No. of companies (in %)						
		Pro-moters	Insti-tutional Investors	Private Bodies Corp.	Indian Public	NRIs/ OCBs	Any Other	
							Total	Directors
	0 - 5	5.76	66.91	58.27	7.92	82.01	85.61	79.14
2001	5 - 25	15.11	26.62	32.37	33.81	16.55	10.79	15.83
(139 cos.)	25 - 50	30.93	6.47	7.92	40.29	1.44	0.72	3.60
	> 50	48.2	0	1.44	17.98	0	2.88	1.43
	0 - 5	0.03	70.44	55.65	6.09	80.89	77.39	78.27
2002	5 - 25	14.78	26.09	33.04	35.65	19.13	16.52	15.65
(115 cos.)	25 - 50	32.2	0.03	10.43	41.74	0	0.03	4.35
	> 50	49.57	0	0.87	16.52	0	2.62	0.02
	0 - 5	3.92	58.17	47.06	4.58	83.66	79.08	83.66
2003	5 - 25	11.76	33.33	45.1	40.52	15.69	13.07	11.11
(153 cos.)	25 - 50	32.03	8.5	7.19	44.44	0.65	5.23	3.92
	> 50	52.3	0	0.65	10.46	0	0.02	1.32
	0 - 5	5.88	63.53	52.94	2.35	84.71	84.12	88.24
2004	5 - 25	5.88	26.47	37.65	48.82	14.71	11.18	9.41
(170 cos.)	25 - 50	31.76	9.41	7.65	41.76	0.58	3.53	2.35
	> 50	56.48	0.59	1.76	7.06	0	1.17	0
	0 - 5	5.78	60.69	43.93	2.31	83.24	82.08	87.86
2005	5 - 25	8.67	26.59	45.67	49.71	15.03	15.03	10.98
(174 cos.)	25 - 50	31.21	12.14	9.25	41.04	1.73	2.31	1.16
	> 50	54.34	0.58	1.15	6.94	0	0.58	0

Performance and Growth of the Sample Companies

In Table 3, the mean and standard deviation of variable y_5 (growth in PAT) show the maximum values for all six years, 2000-01 to 2005-06. For measures of all five variables, it can be seen that 2000-01 represents the strongest year having the highest mean and standard deviation values while 2001-02 represents the weakest year having the lowest mean and standard deviation values. After 2001-02, these values start rising. The maximum and minimum values for each performance and growth measures indicate that performance and growth vary substantially among the companies.

In Table 4, the mean and standard deviation of variable x_5 (Total Assets) show the maximum values in the years 2000-01, 2003-04 and 2004-05 while that of x_6 (Total Sales) show the maximum values in the years 2001-02 and 2002-03. In this case, x_5 (Total Assets) and x_6 (Total Sales) have been considered at their original values (i.e., in Rs. billion). In all other cases, figures of natural logarithm of these variables have been considered.

Table 4: Descriptive statistics for 'x' variables during 2001-05 (considering Directors' shareholdings)

	Mean	Std. Dev.	Minimum	Maximum
2001				
Directors' Shareholding (x1)	2.89	6.71	0	26.12
Debt to Equity Ratio (x2)	0.45	0.42	0	1.69
Total R & D Cost (x3)	4.66	17.61	0	95.28
Advertisement Expense (x4)	1.9	4.28	0	20.29
Total Assets (x5)	890.72	2062.7	7.16	7847.61
Sales (x6)	553.4	1046.33	0.65	3700.75
2002				
Directors' Shareholding (x1)	2.51	7.71	0	27.39
Debt to Equity Ratio (x2)	0.44	0.34	0	1.21
Total R & D Cost (x3)	7.94	20.6	0	83.02
Advertisement Expense (x4)	2.58	5.35	0	21.08
Total Assets (x5)	785.54	1829.31	7.33	8577.79
Sales (x6)	993.03	993.03	4.61	3795.85
2003				
Directors' Shareholding (x1)	0.98	3.83	0	29.18
Debt to Equity Ratio (x2)	0.7	1.03	0	5.49
Total R & D Cost (x3)	8.55	17.73	0	85.28
Advertisement Expense (x4)	2	4.01	0	17.49
Total Assets (x5)	346.58	3645.46	13.11	17423.44
Sales (x6)	542.21	7288.77	8.62	55336
2004				
Directors' Shareholding (x1)	0.93	2.24	0	14.47
Debt to Equity Ratio (x2)	0.76	1.31	0	8.45
Total R & D Cost (x3)	12.3	27.67	0	151.88
Advertisement Expense (x4)	1.88	4.03	0	19.17
Total Assets (x5)	1796.87	5324.44	7.52	33910.17
Sales (x6)	1629.37	7116.03	0.82	59386.49
2005				
Directors' Shareholding (x1)	0.9	2.22	0	14.46
Debt to Equity Ratio (x2)	0.85	1.47	0	9.43
Total R & D Cost (x3)	20.14	50.38	0	364.78
Advertisement Expense (x4)	1.9	3.81	0	16.72
Total Assets (x5)	2872.26	9907.1	11.57	72819.7
Sales (x6)	2080.55	8253.95	1.77	67928.22

Bivariate correlation results as found in Table 10 with the dependent variable, y_1 (MV/BV Ratio), are indicated as follows:

2001-02 : positively correlated with x_4 (Advertisement Expense).

2002-03 : positively correlated with x_5 (Total Assets) and x_6 (Total Sales).

Detection of Multi-collinearity Problem

In Table 5, year-wise significant correlations among explanatory variables have been presented. The executive directors' shareholdings have positive correlation with log natural (Ln) of assets and Ln of sales in all years except in 2003-04. In 2004-05, D/E ratio has positive correlation with Ln of assets and in 2005-06 it has a positive correlation with advertisement expense. In 2002-03, R & D cost has positive correlation with executive directors' shareholding and in 2005-06 it has negative correlation with Ln of assets and Ln of sales. In 2001-02 and 2004-05, advertisement expense has positive correlation with Ln of assets and Ln of sales, and in 2005-06, it has positive correlation with D/E ratio and Ln of assets.

Table 5. Year-wise significant correlation between explanatory variables (2001-02 to 2005-06)

	DS (x_1)	D/E (x_2)	R & D (x_3)	AdC (x_4)	LnA (x_5)	LnS (x_6)
2001-02	LnA**			LnA***	DS**	DS***
(n=29)	LnS***			LnS**	AdC***	AdC**
					LnS*	LnA*
2002-03	LnA***		DS**		DS***	DS***
(n=26)	LnS***				LnS*	LnA*
	R & D**					
2003-04					LnS*	LnA*
(n=59)						
					DS*	DS*
2004-05	LnA*	LnA**			D/E**	AdC**
(n=76)	LnS*			LnA**	AdC**	LnA*
				LnS**	LnS*	
					DS**	DS*
2005-06	LnA**	AdC**	(LnS)**	LnA***	AdC***	(R & D)**
(n=83)	LnS*		(LnA)*	D/E**	LnS*	LnA*
					(R & D)*	

Variables in parenthesis indicate negative correlation,

*, ** and *** indicate significant correlation respectively at 1%, 5% and 10% respectively.

Factor Analysis of Inter-correlated Independent Variables

Table shows the results of factor analysis. In this study, two factors (f_1 and f_2) have been chosen so that the total variation of the components like Ln of assets and Ln of sales can be explained by these factors. Here, executive directors' shareholding has not been considered because it is not homogeneous with the other correlated variables and advertisement expense has not been considered as it is not highly correlated with other variables.

Table 7: Multiple Regression during 2001-02

	x_1 (DS)		x_2 (D/E)		x_3 (R & D)		x_4(AdC)		f_1		f_2	
	Coeff	t-value	Coeff	t-value	Coeff	t-value	Coeff	t-value	Coeff	t-value	Coeff	t-value
y_1 (MV/BV) $R^2 = 0.126$	-.003	-.026	-.653	-.382	-.023	-.721	-.113	-.695	.903	1.266	-.597	-.866
y_2 (PAT/TA) $R^2 = 0.486$	.000	.105	-.083	-3.024*	-.000	-1.511	-.002	-.901	.022	1.952***	-.039	-3.550*
y_3 (PAT/Sales) $R^2 = 0.385$	.005	1.036	-.100	-.1.300	-.002	-1.067	-.000	-.052	-.011	-.328	.076	2.443**
y_4 (Gr in Sales) $R^2 = 0.083$	-.960	-.682	-3.401	-.149	-.194	-.460	-.827	-.383	-7.069	-.743	4.658	.506
y_5 (Gr in PAT) $R^2 = 0.034$	.968	.516	8.032	.264	-.025	-.044	-1.093	-.379	5.283	.416	-3.950	-.322

*, ** and *** indicate significant correlation respectively at 1%, 5% and 10% respectively.

Table 8: Multiple Regression during 2002-03

	x_1 (DS)		x_2 (D/E)		x_3 (R & D)		x_4(AdC)		f_1		f_2	
	Coeff	t-value	Coeff	t-value	Coeff	t-value	Coeff	t-value	Coeff	t-value	Coeff	t-value
y_1 (MV/BV) $R^2 = 0.367$	-.014	-.287	-1.762	-1.943***	.005	.247	-.070	-1.067	.854	2.528**	.368	1.109
y_2 (PAT/TA) $R^2 = 0.482$	-.002	-1.081	-.078	-2.998*	-.000	-.024	-.003	-1.806***	.015	1.527	.023	2.398**
y_3 (PAT/Sales) $R^2 = 0.460$	-.001	-.866	-.090	-2.875*	-.000	-.602	-.004	-1.732***	.018	1.560	-.012	-1.015
y_4 (Gr in Sales) $R^2 = 0.246$	-.425	-.968	16.110	1.943***	-.069	-.346	-.074	-.123	-3.160	-1.023	2.455	.809
y_5 (Gr in PAT) $R^2 = 0.079$	-.527	-.356	13.758	.492	-.205	-.307	-.521	-.256	-6.628	-.636	-6.143	-.600

*, ** and *** indicate significant correlation respectively at 1%, 5% and 10% respectively.

Table 11: Multiple Regression during 2005-06

	x_1 (DS)		x_2 (D/E)		x_3 (R & D)		x_4(AdC)		f_1		f_2	
	Coeff	t-value	Coeff	t-value	Coeff	t-value	Coeff	t-value	Coeff	t-value	Coeff	t-value
y1 (MV/BV) $R^2 = 0.153$	.923	3.007*	-.837	-1.169***	.004	.111	.314	1.786***	1.083	1.531	.673	.967
y2 (PAT/TA) $R^2 = 0.259$	.008	2.400**	-.022	-4.109*	-.000	-.449	.006	2.898*	.001	.144	-.000	-.019
y3 (PAT/Sales) $R^2 = 0.370$	.009	1.231	-.032	-2.504*	-.000	-.840	.003	.695	-.021	-1.149	.106	5.907*
y4 (Gr in Sales) $R^2 = 0.184$	3.068	1.528	-2.280	-.704	-.197	-.730	-.526	-.452	-6.411	-1.386	13.108	2.878*
y5 (Gr in PAT) $R^2 = 0.234$	6.515	1.063	-10.081	-1.020	.026	.031	2.013	.568	-36.228	-2.566*	45.673	3.286*

*, ** and *** indicate significant correlation respectively at 1%, 5% and 10% respectively.

Table 12: Multiple Regression during 2001-02 to 2005-06

	x_1 (DS)		x_2 (D/E)		x_3 (R & D)		x_4(AdC)		f_1		f_2	
	Coeff	t-value	Coeff	t-value	Coeff	t-value	Coeff	t-value	Coeff	t-value	Coeff	t-value
2001-02 $R^2 = 0.207$	.174	.381	1.274	.333	.096	1.463	-.058	-.171	-1.938	-1.304	-.608	-.403
2002-03 $R^2 = 0.226$	-.121	-.243	.403	.088	.146	1.453	-.150	-.457	-1.506	-.875	1.062	.640
2003-04 $R^2 = 0.185$	-.015	-.165	.115	.999	-.011	-1.265	-.040	-1.399	-.299	-2.412**	-.072	-.621
2004-05 $R^2 = 0.140$	.052	.516	.225	1.057	.003	.167	-.036	-.534	-.829	-3.004*	-.065	-.236
2005-06 $R^2 = 0.152$	-.035	-.285	.407	1.706***	.025	1.254	.014	.161	-.772	-2.284**	.024	.071

*, ** and *** indicate significant correlation respectively at 1%, 5% and 10% respectively.

Table 15: Multiple Regression during 2001-02 to 2005-06

	x_1 (DS)		x_2 (D/E)		x_3 (R & D)		x_4(AdC)		f_1		f_2	
	Coeff	t-value	Coeff	t-value	Coeff	t-value	Coeff	t-value	Coeff	t-value	Coeff	t-value
2001-02 $R^2 = 0.204$	-.007	-.220	.727	.203	.089	1.378	-.106	-.293	-1.595	-1.085	-.784	-.525
2002-03 $R^2 = 0.228$	-.024	-.317	1.015	.220	.143	1.418	-.160	-.482	-1.609	-.989	1.087	.656
2003-04 $R^2 = 0.211$	.007	1.328	.119	1.068	-.009	-1.097	-.042	-1.495	-.276	-2.399**	-.070	-.623
2004-05 $R^2 = 0.137$	-.000	-.029	.222	1.041	.002	.105	-.300	-.451	-.803	-2.954*	-.036	-.133
2005-06 $R^2 = 0.154$	.002	.520	.418	1.755***	.025	1.259	.010	.115	-.764	-2.285**	.025	.072

*, ** and *** indicate significant correlation respectively at 1%, 5% and 10% respectively.

Table 16: Multiple Regression during 2001-02 to 2005-06

	x_1 (DS)		x_2 (D/E)		x_3 (R & D)		x_4(AdC)		f_1		f_2	
	Coeff	t-value	Coeff	t-value	Coeff	t-value	Coeff	t-value	Coeff	t-value	Coeff	t-value
2001-02 $R^2 = 0.249$	-.007	-1.176	2.577	.676	.107	1.670	-.110	-.336	-1.751	-1.319	-.847	-.590
2002-03 $R^2 = 0.224$	-.000	-.020	.660	.147	.147	1.466	-.137	-.411	-1.640	-.999	.991	.565
2003-04 $R^2 = 0.197$	-.000	-.896	.105	.931	-.012	-1.377	-.041	-1.460	-.297	-2.602*	-.065	-.573
2004-05 $R^2 = 0.138$	-.000	-.378	.231	1.077	.000	.052	-.032	-.482	-.821	-2.978*	-.022	-.080
2005-06 $R^2 = 0.193$	-.002	-1.983**	.431	1.780***	.044	2.003**	.006	.076	-.817	-2.532*	.018	.054

*, ** and *** indicate significant correlation respectively at 1%, 5% and 10% respectively.

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Industrial Development in Goa

SURESH SHANBHOGUE AND AMITHA SHANBHOGUE

Goa has witnessed significant transition from agrarian to industry and service sector economy. The agriculture in the state has taken a back seat mainly due to less economic returns in comparison with non-agricultural activities in relative terms. Though, Goa did not inherit any industrial base from Portuguese, the industrial sector in Goa has grown leaps and bounds making significant contribution to the state income and employment. This paper analyses the industrial development of Goa.

Introduction

Goa, the tiny state of Indian union is the most progressive state in the country today. It has the highest per capita income and its social indicators like birth rate, death rate, infant mortality rate, total fertility rate etc are the best in the country. Although, Goa became a part of Indian union after 14 years of India's independence, its pace of development has been the best in the country. There exists wide variation in the levels of development achieved by different States in the country. Goa is the only state in the country that has achieved both social and economic development. This comparison is in relative terms and Goa is yet to go a long way towards achieving the standards of a developed nation in the world (Shanbhogue 2007).

The state of Goa is in the third stage of demographic transition characterized by low death rate (7.74: 2008-09), low birth rate (15.17: 2008-09) and high per capita income (Rs.1,32,719: 2009-10). The State had reached the level of replacement in population control in 1990's with total fertility rate being 1.77 (1998). The economic structure of the state indicates transition of the economy from agrarian to industrial and service sector during the last five decades after liberation. While the share of primary sector (excluding mining) to the state income has declined from 22.6% in 1960 to 6.05% in 2008-09, the share of secondary and tertiary sectors has increased from 8.9% and 49.7% to 36.18 % and 53.21% respectively during the same period. However, inspite of tremendous growth in mining production and its export over the years its share in the state income has declined significantly from 18.8% in 1960 to 4.56% in 2008-09. The industrialization and tourism have led to transition in occupational pattern of population and economic structure of the State. The significant decline in the workforce in agriculture and allied

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activities from 60% in 1960 to 16 % in 2001 indicates declining preference to agriculture and allied activities in the state. The people in Goa prefer to keep agriculture land fallow and pursue non-agricultural activities, which may be attributable to higher economic returns in non-agricultural sectors like tourism, trade, commerce and industry in relative terms. A very high growth in industrial sector is evident from the significant increase in the share of secondary sector to the state income after liberation.

Objectives

The main objective of this paper is to analyse the index of industrial production and estimation of elasticity and returns to scale of industrial production.

Methodology

The Directorate of Planning, Statistics and Evaluation (DPSE) data is used in this paper to analyze the growth in the production index under different industry groups of manufacturing sector. The Field Operation Division of National Sample Survey Organization conducts Annual Survey of Industries taking the frame of factories registered under the Factories Act, 1948 under the statutory provision of the Collection of Statistics Act, 1953 and the rules framed there under in 1959. Based on this survey the detailed tables are generated by the Central Statistics Office, Government of India. The DPSE making use of these detailed tables is publishing a report on Annual Survey of Industries (ASI) every year. In this paper the ASI report of DPSE is used to estimate the elasticity and returns to scale of industrial production using regression analysis based on the Cobb-Douglas (C-D) production function. The C-D production function may be expressed in the form of multiple log-linear regression models. A three-variable log-linear model can be expressed as

$$\text{Log}Y = B_1 + B_2\text{Log}\,X_2 + B_3\text{Log}X_3 + u. \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \quad (1)$$

In this model the partial slope coefficients B_2 and B_3 are also called the partial elasticity coefficients. Thus, B_2, measures the elasticity of Y with respect to X_2, holding the influence of X_3 constant; that is, it measures the percentage change in Y for a percentage change in X_2, holding the influence of X_3 constant. Since the influence of X_3 is held constant, it is called a partial elasticity. Similarly, B_3 measures the (partial) elasticity of Y with respect to X_3 holding the influence of X_2 constant. In other words, in a multiple log-linear model, each partial slope coefficient measures the partial elasticity of the dependent variable with respect to the explanatory variable in question, holding all other variables constant. If the elasticity coefficients are added then we get an economically important parameter called returns to scale parameter, which gives the response of output to a proportional change in inputs. If the sum of the elasticity coefficients is one then we have constant returns to scale (i.e. doubling the inputs simultaneously doubles the output), if it is greater than one then we have increasing returns to scale (i.e. doubling the inputs simultaneously, more than doubles the output), and if it is less than one then we have decreasing returns to scale (i.e. doubling the inputs less than doubles the output).

Industrialization Since Liberation

Prior to liberation people preferred trade and commerce to industry. The situation then prevailed probably was not conducive for industrial development. Lack of infrastructural facilities like poor road and rail communications, lack of power, lack of entrepreneurial skills, financial support were the main reasons. At the time of liberation there were only 46 small scale industries engaged in limited industrial activity like cashew processing, fruit and fish canning, laundry soap making, a carbon dioxide plant, a Mangalore tiles factory and rice mills. Keeping this in view the first draft plan of the territory (1963-66) strongly emphasized that 'unless special consideration is shown to the erstwhile Portuguese territories as regards licensing of industries, allocation of sufficient quotas of scarce raw materials, and above all ensuring an adequate supply of electric energy – generated locally or drawn from the neighboring States – any hope of substantial industrialization will be illusory. The National Council for Applied Economic Research in its Techno Economic Survey report (1964) had recommended establishment of variety of industries which are technically feasible and economically justifiable.

The first draft plan (1963-66) formulated various schemes like establishment of industrial estates, promotion of pharmaceutical and cottage industry, liberalized credit to small entrepreneurs engaged in handloom, handicrafts, coir industry, training for skill development, subsidy on power, resources based industries like coconut oil extraction and hydrogenation, pottery, crockery and glass manufacture, preparation of power-alcohol and distilled liquors, non-resource based industries like cotton spinning and weaving, manufacture of fibers, etc. The Government laid emphasis on evolving necessary institutional mechanism so as to provide the entrepreneurs technical and financial support for setting up of industries. The Maharashtra State Financial Corporation was set up in Goa in the year 1964. Later offices of the Small Industries Service Institute (SISI) and Maharashtra Small Scale Industries Development Corporation were also setup. For providing necessary physical infrastructure at one place the Goa Daman & Diu Industrial Development Corporation (GDDIDC) was established under the GDDIDC Act 1965. The first industrial estates having all necessary infrastructure facilities like roads, water, electricity, communication etc was established by the GDDIDC in the year 1966.

In spite of these basic infrastructural facilities, Goa for some time, could not make any headway towards industrialization. The main reason was the dearth of entrepreneurs willing to make use of such facilities, and ask for more. Moreover, during pre-liberation period mineral resources had brought good amount of foreign exchange to the territory. The stalwarts in Goa's mining industry saw better prospects and security in mining than to any other industry. Consequently, in initial stages after the liberation, the business community of Goa continued with the same pattern of economy which it had prior to liberation. Gradually, however, in view of better contacts with the rest of the country and the realization of the fact that unless we industrialize we would perish, people started thinking in terms of setting up industrial ventures (Gandhe S.K. 1976). However, sustained efforts of the

government in creation of infrastructure and institutional mechanism and also due to awareness programmes and industrially backward status conferred to the territory by the Pande committee and certain concessions extended as recommended by the Wanchoo committee (Angle P.S. 1983) entrepreneurs started coming forward to avail the benefit. For catalyzing and financing industrial investment in the form of term loan, equity participation and underwriting support for the industrial projects, the Economic Development Corporation (EDC) was set up in the year 1975. The District Industries Centre (DIC) was set up in the year 1978 and the Goa Handicrafts Rural and Small Scale Industries Development Corporation (GDDIDC) was set in the year 1980. The Khadi and Village Industries Board were set up in the year 1982. The GDDIDC has given impetus for industrial development over the years by establishing 21 industrial estates in the State comprising 712 industrial sheds. The Economic Development Corporation has played the role of a catalyst facilitating investment of Rs 582.00 crore during the period 1975-76 to 2008-09.

Thus, since liberation Goa witnessed gradual increase in the number of small scale industrial units. In the first decade after liberation, the number of SSIs increased from 46 at the time of liberation to 621 in 1970-71. This increased to 1447 in the year 1980-81, which increased to 4020 in the year 1990-91. By the year 2000-01, the number has gone up to 6157 and as on 31st March 2011 there were 7438 micro, small and medium industrial units. As on 31st March 2011 the were 408 large scale industries in the State. The State has emerged as a hub of pharmaceutical industries. There has been steady increase in the number of units registered under sections 2m (i) and 2m (ii) of the Factories Act, 1948. The number of units registered under the Factories Act 1948 has increased from 358 in the year 1986-87 to 1248 in the year 2009-10 and the number of units in operation has increased from 240 to 710 during the same period.

Index of Industrial Production

The index of industrial production (IIP) of Goa comprises two sectors viz. mining and manufacturing with a weight of 9.04% and 90.96% respectively. As the electricity production within the state being negligible and Goa being totally dependent on the electricity supplied from neighboring state grids, the electricity sector is not reflected in the production basket of the index. Thus, the very high weight of manufacturing sector in the index itself indicates dominance of production of manufacturing sector in the state's economy. The base year for calculation of the index numbers of industrial production is 1993-94, as Goa is yet to change its base year for IIP. The item basket of manufacturing sector comprises 77 items, spread over 11 industrial groups considered at two-digit level of National Industrial Classification (NIC) – 1987 with coverage of 80% of the value of total output of the organized manufacturing sector during the year 1993-94.

At two-digit level the NIC group (30) manufacture of chemicals and chemical products has highest weight of 41% comprising 26 items. This is followed by 17% for NIC group (31) manufacture of rubber, plastic, petroleum and coke

(six items), 8% for NIC group (20-21) manufacture of food products (12 items), 8% for NIC group (33) manufacture of basic metal and alloys (four items), 4% for NIC group (35-36) manufacture of machinery and equipment other than transport (four items), 4% for NIC group (37) manufacture of transport equipment machinery & parts (three items), 3% for NIC group (38) other manufacturing industries (four items), 2% for NIC group (26) manufacture of textile products (six items), 2% for NIC group (22) manufacture of beverages, tobacco and related products (five items), 1% for NIC group (28) manufacture of paper and paper products (four items) and 1% for NIC group (32) manufacture of non-metallic mineral products (three items).

During the period 1993-94 to 2008-09 the manufacturing sector index has registered a compound annual rate of growth (CARG) of 12.27% (Table 1). Within the manufacturing sector, the industry group manufacture of machinery & equipment other than transport has registered a significantly high CARG of 28.62%, which may be mainly attributable to significant growth in the production of computer based systems (CARG 38.64%), ceiling fan (CARG 19.12%) and washing machine/laundry machine (CARG 12.99%).

Table 1: Index of industrial production and CARG (1993-94 to 2008-09)

(Base Year 1993-94 = 100)

Sl. No.	NIC Code	Manufacturing group	IIP 2008-09	CARG (%)
1	20-21	Manufacture of food products	140.82	2.31
2	22	Manufacture of beverages, tobacco and related products	271.37	6.88
3	26	Manufacture of textile products	899.70	15.77
4	28	Manufacture of paper and paper products.	579.00	12.42
5	30	Manufacture of chemicals and chemical products	186.63	4.25
6	31	Manufacture of rubber, plastic, petroleum and coke	216.57	5.29
7	32	Manufacture of non-metallic mineral products	0.91	-4.59
8	33	Manufacture of basic metal and alloys	2221.85	22.96
9	35-36	Manufacture of machinery & equipment other than transport	4363.14	28.62
10	37	Manufacture of transport equipment . machinery & parts	155.85	3.00
11	38	Other manufacturing industries	134.47	1.99
		Manufacturing sector index	567.38	12.27

Source: Report on Index of Industrial Production during 2007-08 and 2008-09
Directorate of Planning, Statistics and Evaluation, Government of Goa.

The second best CARG of 22.96% was registered in the industry group manufacture of basic metal and alloys, which may be attributable to the significant increase in the production of copper wire of all kind (CARG 49.59%), other iron and steel products (CARG 28.31%) and cold rolled steel (CARG

26.79%). But, the item pig iron which carries significant weight with in the industry group of manufacture of basic metal and alloys has registered a CARG of only 7.61%. The industry group manufacture of textile products has registered a CARG of 15.77% , which may be mainly attributable to a very high increase in the production of sanitary towels/napkins (CARG 22.72%). The industry group manufacture of paper and paper products has registered a CARG of 12.42%, which may be attributable to significant increase in the production of duplex cartoons (CARG 26.17%).

It is evident from Table 1 that in all other industry groups the CARG was significantly lower than the manufacturing sector average. It is pertinent to note that the industry group manufacture of chemicals and chemical Products with a maximum weight (41%) comprising highest number of items (26) has registered a very low CARG of 4.25%. The industry group manufacture of non-metallic mineral products has almost lost its relevance with a negative CARG of 4.59%. This significant variation in the CARG of IIP among different industry groups indicates changing trends in the composition of industries and their item basket over the years in Goa.

Elasticity Coefficients and Returns to Scale Parameter

Fixed capital, employment and Net Value Added (NVA) of manufacturing industries in Goa for the period 1985-86 to 2007-08 are given in Table 2. The figures for the period 1985-86 to 2005-06 have been culled out from the report on Annual Survey of Industries 2005-06 of DPSE, Government of Goa and figures for the years 2006-07 and 2007-08 have been taken from the publication Annual Survey Industries (Volume I) for the year 2006-07 and 2007-08 published by the Central Statistics Office, Government of India, Kolkata.

Table 2: Fixed capital, employment and NVA of manufacturing industries in Goa (1985-86 to 2007-08)

Sl.No.	Year	NVA (Rs	Employment	Fixed Capital
in crore)	(number)	(Rs in crore)		
1	1985-86	83.36	15256	162.58
2	1986-87	119.51	15032	178.44
3	1987-88	96.62	15003	177.51
4	1988-89	157.14	15200	196.55
5	1989-90	174.85	17416	241.91
6	1990-91	153.40	17206	269.07
7	1991-92	265.53	19637	366.04
8	1992-93	265.38	18854	366.79
9	1993-94	404.81	20123	673.06
10	1994-95	402.60	20305	604.38
11	1995-96	528.62	22258	872.90
12	1996-97	695.64	24256	1146.50
13	1007-98	881.35	27656	1604.59
14	1998-99	1170.42	25556	1924.58

contd...

contd...

15	1999-2000	1276.32	28981	2502.96
16	2000-01	1470.48	31090	2780.59
17	2001-02	1601.50	28727	3030.01
18	2002-03	1819.60	35061	3424.20
19	2003-04	2287.96	34457	3738.84
20	2004-05	2970.92	37581	4156.97
21	2005-06	3295.25	39045	3921.37
22	2006-07	3612.51	41620	4095.97
23	2007-08	3905.27	50347	4500.19

Source: A Report Annual Survey of Industries 2005-06, Government of Goa. Annual Survey of Industries, 2006-07 (Vol I) and 2007-08 (Vol.I), CSO, Government of India.

In the equation (1) mentioned under methodoloy, Y, the output is measured by Net Value Added (in crore rupees), X_1 the labour input, is measured by number of persons employed in the manufacturing sector and X the capital input, is measured by stock of fixed capital (in crore rupees). The hypothesis (null) to be tested is that employment and fixed capital together do not have any impact on NAV.

Based on the data given in Table 2 the regression equation obtained is given below and the various parameters of regression are given in Table 3.

$$\text{LogY} = -4.5566 + 1.2266\ \text{LogX2} + 0.6594\ \text{Log X3} \quad \ldots\ldots\ldots\ldots\ldots\ldots \quad (2)$$

Table 3: Regression parameters

	Standard Error (SE)	t-statistic	p value	R^2	F
Intercept	1.1002	-4.1415	0.0005	0.989	923.53
Variable X_2	0.3113	3.9399	0.0008		p=0.0000**
Variable X_2	0.0926	7.1199	0.0000**		

***Denotes p value is extremely small.*

The partial slope coefficient of 1.2266 measures the elasticity of output (NVA) with respect to the labour input (employment). That means, holding the capital input constant, if the labour input increases by 1%, on the average, output goes up by about 1.23%. Similarly, holding the labour input constant, if the capital input increases by 1%, on the average, output goes up by about 0.66%. The sum of two elasticity coefficients is 1.8860, which indicates that the economy of Goa is characterized by increasing returns to scale. It may also be observed from the estimated coefficients that both employment and fixed capital are individually statistically significant on the basis of one-tail test. One-tail test is used because both lobour and capital are expected to have a positive effect on output. The R^2 value of 0.989 means that about 98.9% of the variation in the (log) of output is explained by the (logs) of labour and capital. The estimated F value is highly significant as the p value being extremely small. Thus, the null hypothesis that employment and fixed capital together do not have any impact on NAV is rejected.

Conclusion

The very high CARG in the index of industrial production indicates vibrant manufacturing sector contributing significantly to the economy of the state. The regression analysis reveals that the estimated coefficients of labour and capital are individually statistically significant and the economy of Goa is characterized by increasing returns to scale. The very high significance level of F statistic reveals that employment and fixed capital together have tremendous impact on the net value added in the manufacturing sector.

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Impact of Reforms on Indian Life Insurance

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The study analyses the relationship between life insurance sector reforms in India and the growth of life business in post reform period. At the empirical level, an index bas been constructed measure the reforms and then used VAR-VECM model to find out the long run relationship. The Granger causality test suggests that life insurance sector reforms improved the overall development of life insurance development in India.

Introduction

In India, the reforms in the insurance sector (Life and General) commenced with the setting up of the Committee on Reforms on Insurance Sector under the chairman-ship of Dr. R.N.Malhotra, the ex- governor of RBI, by the GOI in April 1993 for examining the structure of insurance industry. The recommendations of the Committee was submitted in 1994 which was accepted in principle by the government and started implementing the recommendations since December 1999, thus heralding an era of liberalization in the country's insurance sector. The setting up of Insurance Regulatory and Development Authority (IRDA) and opening up of Insurance Business (life and general) to foreign capital up to 26 per cent were the initial steps in this direction. It is widely acknowledged that the opening up of the insurance sector has been aimed at ushering in greater efficiency in the insurance business by maximising productivity and minimising transaction cost.

At present there are 21 private life insurers are operating in the Indian life insurance market along with the only state ownel life insurer Life Insurance Corporation of India (LICI). The total volume of premium reached to Rs. 221,791 crore in 2008-2009 from Rs. 24,630 crore in the year 1999-2000 which is little more than 800% increase by 22 numbers of insurers (including LICI) in India. In India, private life insurers are slowly gaining the momentum to penetrate the market with their new products, services and the global knowledge of expertise in doing life business. This can be witnessed from their growing market share statistics which shows nearly 30 percent of the Market are in their hands at the end of 2008-09 financial years. Most important aspect is that their acceptability is on the rise though it is an urban phenomenon.

Literature Review

The role of financial development and economic growth has been well established by the researchers and economic analysts in their empirical

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studies (Levine and Zervos, 1998, Levinee, 1990, Kind and Levine, 1993 and Levine et al. 2000). These studies established the role of financial institutions and financial intermediaries in fostering the economic growth by improving the efficiency of capital accumulation, encouraging savings and ultimately improving the productivity of the economy. Recent studies show that the insurance industry can improve the economic growth through financial intermediation, risk aversion and generating employment. By identifying, the macro-economic factors that promote the demand for life insurance it would be possible to find out the factors actually work as a catalyst in promoting financial development and thereby economic growth. For example, empirical work on insurance market by Browne and Kim (1993), Browne et al. (2000), Ward and Zurbruegg (2002), Beck and Webb (2003) and Esho et al. (2004) have shown that the level of insurance demand can be influenced by the economic, demographic and legal factors. Despite the findings of several influencing factors affecting the life insurance demand and the promotion of life insurance development, there is meek guidance for the policy makers to focus on specific factor/s to foster the life insurance development. More importantly, the focus on demand side has neglected the supply side of the life insurance market. The causal relationship between insurance development and the economic development has well being studied by Arena (2008) and found that the insurance activity does promote the economic development. Another study by Vadlamannati (2008) shows that the insurance reforms have positive affect on the economic development in India.

Objectives

The main objective of this paper is to analyse the impact of reforms on the Indian life insurance business.

Methodology

Life Insurence Index: To construct the index which has been named as Life Insurance Reforms Index (LIRI), we have considered the fundamentals which are post reform phenomenon, i.e., those elements which manifest the reforms initiatives in this sector. We have considered major policy reforms and regulatory reforms in constructing the LIRI. The following are the main categories which has been measured to construct the LIRI,

(a) FDI (Foreign Direct Investment) in life insurance business, and

(b) Regulatory reforms in life insurance sector.

The scores in the FDI in life insurance sector would calculated as under,

FDI in life insurance sector = *1 for every one new entrant in this sector.*
= *2 for every two new entrant in this sector, and so on.*

That is, if in any given year there are six new foreign entries, then score would be 6 (six) in that particular year.

To measure the regulatory reforms the following scoring system is being applied in this study, Vadlamannati, (2008) also used similar kind of parameters in his study.

Life insurance Regulatory reforms
= '0' for no reforms initiatives and steps;
= 1 for setting up of any committee;
= 1 for report submitted by any committee;
= 1 for any report accepted by the government;
= 1 for passing any bill in the parliament; and
= 0.25 for every new regulations framed under the IRDA Act, 1999, till date.

Table 1: Life Insurance Reforms Index (LIRI) in India

Years	FDI (Total No. of Comp.)	Regulatory Reforms	LIRI Index
1988-89	01	0	1.00
1989-90	01	0	1.00
1990-91	01	0	1.00
1991-92	01	0	1.00
1992-93	01	1	2.00
1993-94	01	2	3.00
1994-95	01	3	4.00
1995-96	01	4	5.00
1996-97	01	7	8.00
1997-98	01	9	10.00
1998-99	01	11	12.00
1999-00	01	14.5	15.50
2000-01	11	15	26.00
2001-02	14	17.5	31.50
2002-03	13	17.75	30.50
2003-04	14	18.50	32.50
2004-05	15	19.25	34.25
2005-06	16	19.25	35.25
2006-07	17	20	37.00
2007-08	21	21.25	42.25

We have used two variables in our study to analyze the reforms initiative in India. We used the total life insurance premium volume (LIP) as a measure of development of life insurance business in India and a composite index (LIRI) to measure the life insurance reforms in India. To eliminate the heteroscedasticity we have used the natural logarithm of life insurance premium in the study. The specified variables denoted as

$$L_t = \log \text{LIP and } R_t = \text{LIRI}.$$

In this study we first check the stationary properties of the variables since the non stationary time series variable might give spurious results. We use Augmented Dickey Fuller (ADF) test and Philips Perron (PP) test to verify the stationary time series variable. Non stationary variables may be used in our model provided the series are co-integrated. Therefore co-integration study also been done to verify this property. We will use Engle-Granger (1987) co-integration test. We also check the short run dynamics of our model by using the VAR-VECM technique.

Results

The results of the unit root tests are very sensitive to the assumptions about the time series under test, e.g. trend, intercept or both trend and intercept. To understand the importance of the nature of the series under the unit root test, we plot them graphically at their level values and after differencing.

Fig. 1: Life Premium and Life Insurance Reforms Index at Levels

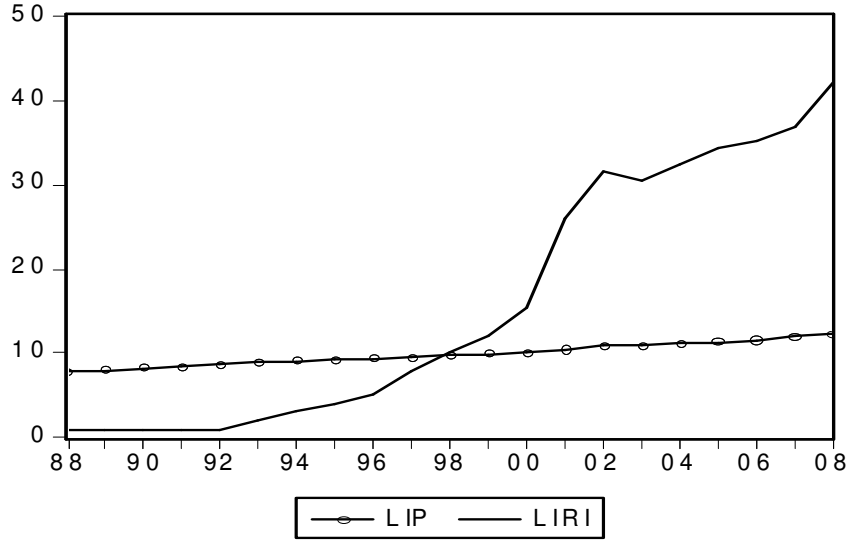
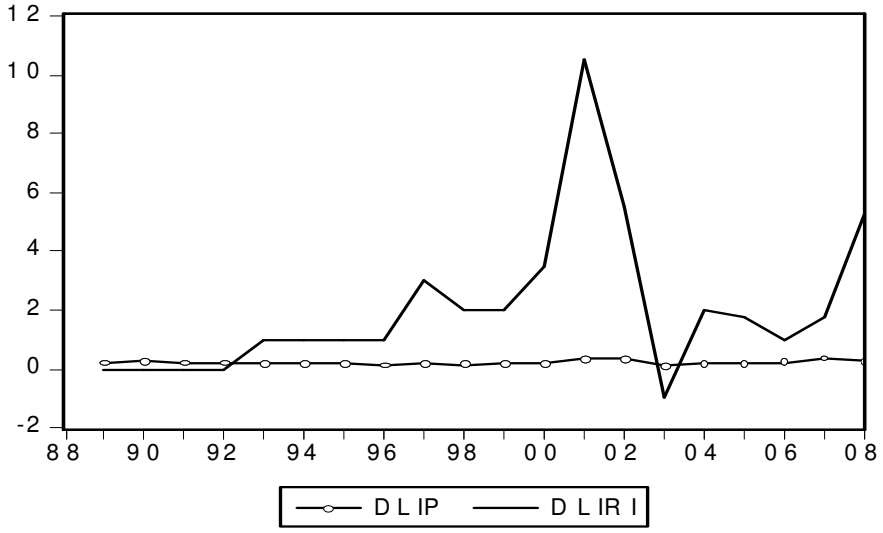


Fig. 2: Life Premium and Life Insurance Reforms Index at First Difference



From Figure 1, we can see that both the time series have some trend and intercept at their levels. Considering the particular nature of trend in both the series, we have differenced the data series once and the trends have been removed but the intercept remained which can be seen in the (Figure 2). Based on these characteristics the ADF test and PP test are performed. The results of both the tests are summarised in the table 1 and 2.

Table 2: ADF unit root test

Variables	Null Hypothesis	ADF test Stat.	Prob*	DW stat	Critical Values 1%	5%	10%
L	L has a unit root (intercept & trend)	-1.6384	0.7381	1.8596	-4.5325	-3.6736	-3.2773
ÄL	L has a unit root (intercept)	-3.1677	0.0391	2.0366	-3.8573	-3.0403	-2.6605
R	R has a unit root (intercept & trend)	-2.2708	0.4281	1.7873	-4.5325	-3.6736	-3.2773
ÄR	R has a unit root (intercept)	-2.8234	0.0747	1.8772	-3.8573	-3.0403	-2.6605

* Mac Kinnon (1996) one-sided p-values. Lag Length: 1 (Automatic based on Modified AIC, Maximum Lag =4)

It is clear from the ADF test (Table 1) that both the series (life insurance premiums and life insurance reforms index) have unit root at their level values at 10%, 5% and 1% significance level. That is, the series are non-stationary. The same properties of both the series are confirmed by the PP test which showed in (Table 2).

Table 3: Philips-perron unit root test

Variables	Null Hypothesis	ADF test Stat.	Prob*	DW stat	Critical Values 1%	5%	10%
L	L has a unit root (intercept & trend)	-1.0116	0.9949	1.5461	-3.8085	-3.0206	-2.6504
ÄL	L has a unit root (intercept)	-3.0325	0.0498	1.8324	-3.8315	-3.0299	-2.6551
R	R has a unit root (intercept & trend)	-1.9603	0.5865	1.3819	-4.4983	-3.6584	-3.2689
ÄR	R has a unit root (intercept)	-2.4972	0.1316	1.7182	-3.8315	-3.0299	-2.6551

* Mac Kinnon (1996) one-sided p-values. Bandwidth: 2 (Newey-West using Bartlett Kernel)

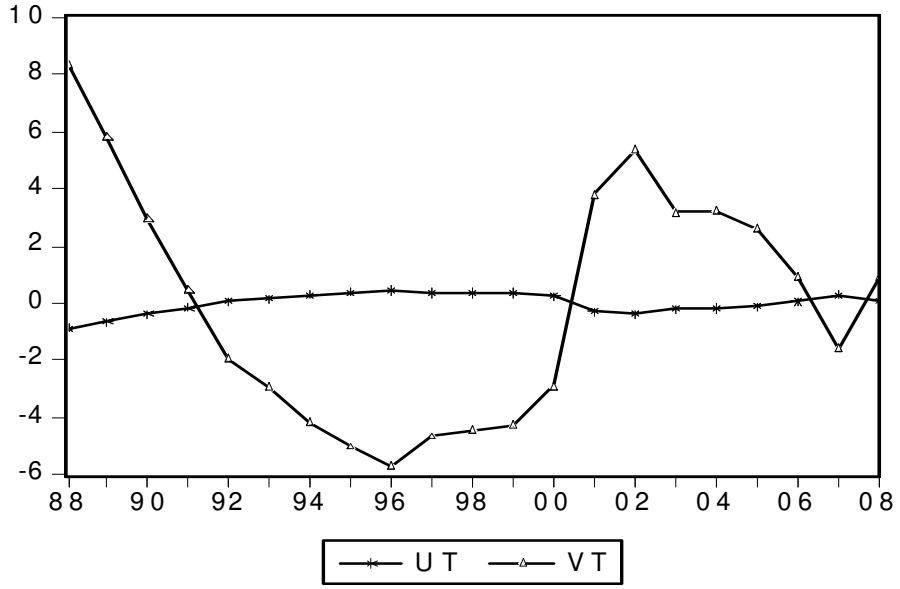
After the first differencing, the hypothesis of unit root is rejected in both series (see ADF test in Table: 2). That is, both the series become stationary after first differencing. These findings also confirmed by the PP test except in case of R. but the correlogram, which shows Autocorrelation Functions (ACF) and Partial Autocorrelation Function (PACF) at different lags (fig: 4 to fig: 7) confirms our findings.

Co-integration

Co-integration tests are conducted to ascertain any long run equilibrium relationship between these two series. The basic purpose of the co-integration test is to determine whether a group of non- stationary variables are co-integrated or not. For two series to be co-integrated, both need to be integrated in the same order. Since the two variables in our study are non- stationary

and integrated of order *I*(1), we have used the Engel-Granger co-integration test for the co-integration study. After we obtain the residuals, we plot them graphically (Fig. 8) to see whether they contain any trend or not and then we will be able to examine the same with the help of ADF test (Table: 3) and PP test (Table: 4) to check the unit root property.

Fig 3: Graphical Presentation of Residual Series Ut and Vt



The ADF test and the PP test on the residual series indicate that both the series are stationary at 5 % and 10 % level. Therefore, both the life insurance premiums and the life insurance reforms are co-integrated in the long run. The correlogram of the residual series also confirms that they are stationary, i.e., *I*(0). Now we can say that there is a stable long run relationship between insurance reform and the development in the life insurance sector.

Table 4: ADF unit root test

Variables	Null Hypothesis	ADF test Stat.	Prob*	DW stat	Critical Values 1% 1%	5%	10%
U_t	U_t has a unit root (intercept)	-2.6488	0.0111	-2.6923	-1.9601	-1.6070	
V_t	V_t has a unit root (intercept)	-2.2807	0.0253	-2.6923	-1.9601	-1.6070	

Lag Length: 1 (Automatic based on Modified AIC, Maximum Lag =4)

Table 5: Philips-perron Unit Root Test

Variables	Null Hypothesis	ADF test Stat.	Prob*	DW stat	Critical Values 1% 1%	5%	10%
U_t	U_t has a unit root(intercept)	-2.6247	0.0115	-2.6857	-1.9590	-1.6074	
V_t	V_t has a unit root(intercept)	-2.2874	0.0248	-2.6857	-1.9590	-1.6074	

Bandwidth: 2 (Newey-West using Bartlett Kernel)

Vector Error Correction Model (VECM)

In this model, both series become stationary after first differencing. But differencing may result loss of information in long run relationship among the variables. Even if there exists a long run equilibrium relationship between the two series, there may be disequilibrium in the short run. Engel–Granger identifies that the co-integrated variables must have an ECM (Error Correction Model) representation and a VAR model can be reformulated by the means of all level variables. The Vector Error Correction specification restricts the long run behaviour of the endogenous variables to converge to their co-integrated relationships while allowing a wide range of short run dynamics, hence, one can treat the error terms (*ET*) as the "equilibrium error". Through the co-integration term, the deviation from the long run equilibrium is corrected gradually in the course of a series of short run adjustments. Therefore, VECM gives us important information about the short run relationships between these two co-integrated variables. The general form of this modified equation by employing variables of our study is presented below:

$$\Delta L_t = \quad _1 + \quad _1 ET_{1t-i} + \qquad L_{t-i} + \qquad R_{t-i} + \quad _t \qquad (1)$$

$$R_t = \quad _2 + \quad _2 ET_{2t-i} + \qquad R_{t-i} + \qquad L_{t-i} + \quad _t \qquad (2)$$

Where, $_t$ and $_t$ are white noise error terms, and ET is equal to $ET = [\ L_{t-i} - (\ R_{t-i})]$ which is the long run effect and lagged independent variables are short run effect. That is, changes in the dependent variables are effected by the *ET*, L_{t-i}, and $R_{t-i.}$.

Before estimating the VEC Model with the co-integrated vectors, it is necessary to identify and select the optimal lag length of initial VAR. Therefore, the different information criterias were computed for different time lags. Based on the results of different information criteria (AIC, SIC, HQ, LR, FPE) we have selected optimal lag 4 in our study.

VECM Coefficients Estimation

Table 6: Co-integrating Vector Coefficients

Variables	Coefficients	't' statistics	Standard Errors
L_{t-1}	1.0000		
R_{t-1}	-0.1290	-32.3301*	0.0039
C	-7.8592		

*Null hypothesis that estimated coefficient is equal to zero can be rejected at 1% level.

Table 7: VECM Coefficients

Explanatory variable	Coefficients	't' Statistics	Standard Errors
Constant	0.5715	5.3572*	0.1066
ET_{1t-1}	-0.1145	-3.3304*	0.0343
L_{t-1}	-1.1102	-2.4900**	0.4458
L_{t-2}	1.5126	1.9861**	0.7616
L_{t-3}	-0.0992	-0.2299	0.4315
L_{t-4}	-1.6077	-2.5831**	0.6224
R_{t-1}	0.0258	2.9012**	0.0089
R_{t-2}	-0.0471	-3.7163*	0.0126
R_{t-3}	-0.0362	-1.7153***	0.0211
R_{t-4}	0.0261	1.3413	0.0194
Constant	8.7015	1.9722	4.4119
ET_{2t-1}	2.6264	1.8466***	1.4223
L_{t-1}	-12.6635	-0.6867	18.4395
L_{t-2}	84.0103	2.6671**	31.4979
L_{t-3}	-36.2187	-2.0294***	17.8466
L_{t-4}	-70.2233	-2.7280**	25.7412
R_{t-1}	0.7069	1.9212***	0.3679
R_{t-2}	-1.8771	-3.5797*	0.5243
R_{t-3}	-0.4905	-0.5619	0.8728
R_{t-4}	2.4960	3.0984*	0.8055

Note: *, **, *** indicates significant at 1%, 5% and 10% level.

Findings from VECM

From VECM, the estimated equation functions has the following forms

$$L_t = -0.1145\,(L_{t-1} - 0.1290R_{t-1} - 7.8592) - 1.1102\ L_{t-1} + 1.5126\ L_{t-2} - 0.0992\ L_{t-3} - 1.6077\ L_{t-4} + 0.0258\ R_{t-1} - 0.0471\ R_{t-2} - 0.0362\ R_{t-3} + 0.0261\ Rt_{-4} + 0.5715238422 \quad (3)$$

$$R_t = 2.6264\,(L_{t-1} - 0.1290R_{t-1} - 7.8592) - 12.6635\ L_{t-1} + 84.01039\ L_{t-2} - 36.2187\ L_{t-3} - 70.2233\ Lt_{-4} + 0.7069\ R_{t-1} - 1.8771\ R_{t-2} - 0.49051\ R_{t-3} + 2.4960\ R_{t-4} + 8.7015 \quad (4)$$

From the above results we can observe that the co-integrating vector coefficients in the long run in both the equations are significant at 5 % level. This indicates that the system is in the state of short term dynamics. In the short run, in case of equation (5), the lagged values of R_t variable of consecutive three years has significant influence on L_t (life insurance premium volume) along with the lagged values of first, second and fourth year of L_t . On the other side, in equation (2), the dependant variable R_t significantly dependent on second, third and fourth year lagged values of L_t

and first, second and fourth year lagged values of R_t itself while other variables do not affect the life insurance reforms in short run. The positive sign of ET_{2t-1} shows that the change in the value of R_t (insurance reforms) positively depends on past errors.

The causal relationship: A long run relationship implies that there must be at least one causal relationship exists among the variables. Therefore, the next step is to find out whether reforms in the life insurance sector promotes the development of life insurance business in India or the overall development in the life insurance sector helps to increase the reform process in life insurance sector. Since the series in our study are *I*(1) and co-integrated, the proper statistical inference can be obtained by analyzing the causality relationship on the basis of error correction model (ECM) as the simple F statistic in the traditional Granger causality test does not have a standard distribution. The result of the VEC Granger causality test (in Table. 7(a) and (b)) shows that the relationship between the two variables in India is bi-directional which means life insurance reforms in India improves the total development in the insurance sector and the development in the insurance sector also promote the overall reforms in India.

Table 8: VEC Granger Causality

Dependent variable: L

Excluded	Chi-sq	df	Prob.
R	19.44915*	4	0.0006
All	19.44915	4	0.0006
ÄL	18.14406*	4	0.0012
All	18.14406	4	0.0012

* Significant at 1% level.

Conclusion

The life insurance sector reforms improved the overall development of life insurance development in the recent years in India. The VEC Granger causality test shows that the relationship between the insurance sector reforms and development of life insurance sector in India is bi-directional. This is probably due to the huge potentiality of the life insurance market which is still under served and the untapped market itself works as a catalyst in improving the reforms in this sector.

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Role of Team Learning in Learning Organization: Study of Some Large Indian Service Organizations

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The study attempts to explore the role of team learning in a learning organization in terms of its degree of presence in some selected large Indian service organizations. A structured questionnaire has been administered among the sample-executives in such organizations to gather their perceptions in terms of functional teams, transfer of knowledge, boundaryless structure, and alignment.

Introduction

Team Learning may seem to be a term that means the process of cultivation of learning by a team. But, in fact, a team represents various facets of an organization and team learning, in that sense, focuses on the collective learning of a team and sharing every bit of knowledge and information with every member of the team. It stresses on the aspect of making tacit knowledge explicit in due course to make every member knowledgeable enough to deal with the job. Learning Organization is an organization that facilitates the learning of all its members and continuously transforms itself is an organisation with its roots in the vision of, and the search for, a strategy to promote individual self-development within a continuously self-transforming organization. Learning is associated with the capacity for continuous transformation based upon individual and organizational development. i) the need to think insightfully about complex issues so that the team may learn how to tap the potential for many minds to become more intelligent than one mind, ii) the need for innovative, coordinated action, and iii) the ability to encourage and stimulate learning in other teams.

Review of Literature

A Learning Organization is not one where all the individuals in the organization learn but where the organization collectively learns (Schein, 1993). Some researchers have identified three distinct areas of research that provide insights into how teams learn in order to stimulate cross-area discussion and future research. They have found that scholars have made progress in understanding how teams in general learn and have proposed

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that future work should develop more precise and context-specific theories to help guide research and practice in disparate task and industry domains. (Edmondson, Dillon, & Roloff. 2006) Lee & Roth (2007) has attempted to answer two interrelated questions – who learns and how in the Learning Organization. By implication, many theories of Learning Organization are based on a static and erroneous separation of individual and collective. They have followed four episodes from a larger case study that exemplified the theoretical arguments. These are based on a longitudinal ethnographic study of a salmon hatchery and a public-sector organization to which the former was accountable. Conceptual framework is strongly dialectical. In their actions, individuals concretely reproduce the organization and, when actions vary, realize it in novel forms. Organizations, therefore, presuppose that individuals concretely generate them. However, without an organization, there would be no aim or orientation to the individual actions to speak in the first instance. It has been found that individuals learn through production of socio-material resources and notions of organizations which are not abstract. These resources increase action possibilities for the collective, whether realized concretely or not. Expansive learning in individuals is co-constitutive of learning in organizations and decreasing interest in individual learning results in decreased levels of action possibilities for the collective.

Methodology

The population for the study has been taken as the top 500 organizations in India in a list published in Dalal Street Investment Journal (June, 2005**)**. A sample of 10% (see *Appendix*) is drawn from the said list by using the *Random Number Tables* **(**Stockton & Clark. 1971**)**. Thus, the sample constitutes 50 such organizations. The study has used both secondary and primary data. Secondary Data is collected from The annual reports and information available in the websites of the sample organizations have been used to prepare the brief profiles of the sample organizations. The initial contact with 50 such organizations was established by using an Organization Overview Questionnaire through which the willing organizations provided relevant information relating to them and the contact details for their executives. The Human Resource (HR) representatives of the organizations concerned were contacted as the next step. Finally, it was found that 30 out of 50 such organizations had expressed their willingness to participate in this exercise. Out of 30 such organizations, 10 organizations finally participated in the study.

Selection of the Sample Executives: The term 'executive' has not been defined in this study as it is the discretion of the concerned organization as to whom it refers to as its executives. Representatives of the HR departments of the sample organizations supplied the lists of their executives in and around Kolkata from where a sample of executives (i.e., 10% of the executive population of each such organization) was drawn by using the Random Number Tables.

Data Collection: Out of 735 sample-executives from 10 such sample-organizations, 315 sample-executives responded to all items in the

questionnaire. The reasons for non-availability of data may be scepticism of some sample-executives, nature of information required to be provided which was thought by some sample-executives as confidential, busy schedule of some sample-executives, and lack of understanding of the proper nature of the study on the part of some sample-executives.

Table 1: Number of the sample executives

Organi-zation	Segment	Executive Manpower in Kolkata (approx.)	No. of Sample Executives & %	No. of Sample Executives who provided complete information & %
X_A	Software	600	60 (10%)	25 (4.16%)
X_B	Banking	350	35 (10%)	12 (3.42%)
X_C	Software	250	25 (10%)	11 (4.4 %)
X_D	Insurance	1,050	105 (10%)	53 (5.04 %)
X_E	Banking	1,000	100 (10%)	62 (6.2 %)
X_F	Insurance	980	98 (10%)	35 (3.57%)
X_G	Hospitality	575	57 (9.91%)	22 (3.82 %)
X_H	Telecom	2,000	200 (10%)	68 (3.4 %)
X_I	Software	200	20 (10%)	15 (7.5 %)
X_J	Hospitality	350	35 (10%)	12 (3.42 %)
Total	7,355	735 (9.99%)	315 (4.28%)	

Source: worked out from the secondary data

As the above 10 organizations which finally participated in the study did not want to disclose their identities in any publication, those organizations have been described as X_A to $X_{J.}$

Hypothesis of the Study

Executives working in the large Indian service organizations have the team learning skill.

Scoring of the Items

In 3-point scaled items, 1 represents most favourable response, 2 represents confusing response, and 3 represents most unfavourable response. In 4-point scaled items, 1 represents most favourable response, 2 represents moderately favourable response, 3 represents confusing response, and 4 represents most unfavourable response. In 5-point scaled items, 1 represents most favourable response, 2 represents moderately favourable response, 3 represents confusing response, 4 represents moderately unfavourable response, and 5 represents most unfavourable response.

Results

Results of the scores tabulated have been worked out in two parts.

- First, the correlation of each item of team learning with team learning as a whole is observed to see how strong the relation of each such item of team learning is with team learning as a whole.

- Then test of significance has been done by taking into consideration both the top 30% (high-scoring) sample-executives and the bottom 30% (low-scoring) sample-executives. The t-value of each such item indicates that the items can be considered for further investigation.

Table 2: Item-wise coefficient of correlation of the component *team learning*

	Items	Coefficient of correlation (r)
1.	Working as a team is not always important	0.82
2.	A competent and knowledgeable employee will always get a better job elsewhere	0.59
3.	It is not always necessary to communicate to the middle-order or lower-order employees about the nature and need for change	0.58
4.	Attitude of the workforce when a completely new and relatively complex project is taken	0.73
5.	You really think that the interests of certain groups usually affect the process of change	0.80

The coefficient of correlation of any item of Team Learning with Team Learning as a whole has been observed to be within the range 0.58 to 0.82, showing moderately high to high degree of correlation.

Table 3: Item-wise distribution of t-values

Item no.	t-value	Item
1	29.682	Working as a team is not always important (*3-point*)
2	7.007	A competent and knowledgeable employee will always get a better job elsewhere (*3-point*)
3	11.918	It is not always necessary to communicate to the middle-order or lower-order employees about the nature and need for change (*3-point*)
4	16.854	Attitude of the workforce when a completely new and relatively complex project is taken (*5-point*)
5	27.073	You really think that the interests of certain groups usually affect the process of change (*5-point*)

The results of t-test also indicate that the presence of team learning in large Indian service organizations is significant enough. Such results further show that the executives working in the large Indian service organizations have team learning skill.

Organization-wise Findings

- Organization G, followed by Organizations B and J, is the poorest performer in terms of team learning. Teamwork is a remote idea in Organization H, whereas others do have functional teams.
- All the organizations, except Organizations C and H, have lack of proper alignment in teams.

- Transfer of knowledge is ideal in Organizations B, C, F, and J and moderately high in Organizations A, D and E.
- Organizations E, and J, maintain strict boundaries whereas the others are moving towards boundaryless structure.

Table 4: Comparison of results of the sample service organizations (A ….J)

Team Learning (item-wise)	Mean A	Mean B	Mean C	Mean D	Mean E	Mean F	Mean G	Mean H	Mean I	Mean J
1	1.33	2.50	1.00	1.20	1.50	2.53	2.50	1.25	1.38	2.55
2	1.33	1.00	1.00	1.60	1.50	1.00	2.40	1.33	1.25	1.00
3	1.00	1.00	1.00	1.20	2.75	1.60	1.00	1.00	1.25	2.40
4	3.33	2.67	1.00	2.80	2.50	1.60	3.20	1.00	2.75	2.00
5	3.50	5.00	1.00	3.00	3.75	1.80	3.60	1.67	2.50	4.20
Team Learning (as a whole)	10.50	12.67	5.00	9.80	12.00	8.60	12.80	6.00	8.75	12.20

Source: worked out from the primary data

Conclusion

The study reveals the leverages and blockages in the sample-organizations with respect to team learning and also the sample-executives' team learning skill.

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Appendix

List of 50 Organizations
(Ranked according to NSE)

1. Oil & Natural Gas Corporation, (1) 2. Tata Motors (11), 3. Housing Development Finance Corporation (13), 4. Hero Honda Motors, (15), 5. Punjab National Bank (23), 6. Nestle India (27), 7. Indian Petrochemicals Industries (41), 8. Asian Paints (44), 9. Reliance Energy (45), 10. Tata Chemicals (50), 11. NTPC (52), 12. Sun Pharmaceutical Industry (55), 13. Indian Hotels Company (60), 14. Dr Reddy's Laboratories (65), 15. Britannia Industries (66), 16. UTI Bank (72), 17. Tata Tea (74), 18. Hindalco Industries (79), 19. Castrol India (82), 20. Videocon Industries (89), 21. Bharat Petroleum Corporation (92), 22. Bharat Forge (97), 23. Procter & Gamble Hygiene & Healthcare (99), 24. LIC Housing Finance (102), 25. Engineers India (104), 26. GlaxoSmithkline Consumer Healthcare (106), 27. Marico (109), 28. Dabur India (115), 29. IDBI (129), 30. Patni Computer Systems (137), 31. GTL (144), 32. Kesoram Industries (159), 33. Merck (180), 34. Indiabulls Financial Services (196), 35. Gokaldas Exports (202), 36. Shree Cements (218), 37. United Phosphorus (230), 38. Hinduja TMT (241), 39. Alok Industries (255), 40. Petronet LNG (277), 41. Kotak Mahindra Bank (285), 42. NIIT Technologies (287), 43. Forbes Gokak (294), 44. Emami (313), 45. Hindustasn Copper (388), 46. Aarti Industries (367), 47. Bajaj Auto Finance (381), 48. CCL Products India (389), 49. Upper Ganges Sugar Industries (395), 50. S Kumars Nationwide (397).

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Book Review

Entrepreneurship Development By
Dr. S.L. Gupta & Arun Mittal, International Books House Private Limited, 2011, Pages 519, Price Rs. 345/-

The present book *Entrepreneurship Development: Text and Cases* has been designed after a thorough analysis of the current academic demand. The book is useful for BBA, BBM, B.Com, M.Com, MBA, MBM and other related courses.

The book is comprehensive and covers all essential topics related to entrepreneurship. There are separate chapters on the topics of current interest such as Retail Entrepreneurship, and Women Entrepreneurship.

All the chapters have opening cases related to the topic discussed in the chapter. The opening cases have been selected and prepared to give initial insights regarding the topic so that a practical context can be associated with the theoretical aspects while going through the book. It includes ample number of chapter-end cases, formats, biographies of successful entrepreneurs and examples related the discussed topics. Various examples from the real life business situations help the reader understand the conceptual aspects in a better manner. The book contains five complete feasibility reports, which give the idea of business proposal. These feasibility reports can work as the benchmark reports for the students when they work on a similar kind of assignment.

The theoretical content of the book contains a wide range of topics on entrepreneurship development. First four chapters give the primary idea about entrepreneurship including the concept, features and core elements of entrepreneurship, values and attitudes of entrepreneurs, characteristics, demands and requirements of entrepreneurs, principles of entrepreneurship, motives behind entrepreneur, creativity, innovations and idea generation.

Chapter five explains the barriers to entrepreneurship, which is a very important topic in the Indian context. Chapter six talks about women entrepreneurship in India and also deals with the various categories of women entrepreneurship. Chapter seven discusses various aspects about intrapreneurship, which is also the matter of current interest. Chapter eight to chapter sixteen explains the most important areas to be focused while implementating a new venture. These chapters include separate discussion on each element such as various stages for starting a new venture and preparing a business plan, Franchising as a format of entrepreneurship, entrepreneurial buy-ins, marketing strategies for a new venture, operations management, financial management for new ventures, sources of finance, human resource management for new ventures and intellectual property rights.

In chapter seventeen, the problems of new ventures have been identified. These problems include administrative, marketing and production problems. Chapter eighteen contains the sources of funds in the form of Institutional support to new ventures including the discussion on SIDO, EDI, TCOS, SIDBI etc. The last chapter of the book is "Retail Entrepreneurship in India" which discusses how organised retail business has emerged as a new alternative of new venture format.

However, apart from the text, ample number of case studies is also the significant aspect of this book. We can find a handsome number of good cases on reputed organisations such as Pantaloons retail, Lilliput, Moti Mahal Delux, Biocon Limited, Jindal Steels, Dainik Bhaskar Group, Infosys, ICICI venture capitals, Federation of Indian Women Entrepreneurs (FIWE) etc. The case studies are either the success stories of the organisations or their founders. These cases show that how is the vision for a new venture sought and nurtured.

The authors have included five feasibility reports in the book which are very useful to give guidelines to the students for making a feasibility report.

This book will be useful for students, academicians and professionals and entrepreneurs.

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