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AN ANALYTICAL STUDY OF RISK AND RETURN ON INDIAN STOCK MARKET

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Abstract: In this paper, an attempt has been made to measure the impact and recovery of Global Financial Crises on Indian economy in general and on the Indian Stock Market in particular. Additionally, this study intends to discuss the role of RBI in the present context. This paper employs the data from April 2001 to March 2013 to investigate the impact on Indian stock market and the integration of Indian stock market and US stock market. The result suggests that the Indian Stock market was affected by the Global financial crunches and also shows that the recovery from the slowdown during the global financial crisis is well underway.

Keyword: Indian economy, Indian stock market, Financial Crisis, RBI and Sharpe ratio.

INTRODUCTION:

After globalization and liberalization, the financial system in India has undergone a rapid change and this paved the way for adoption of new economic policy that routed our capital market more broad based with the starting of OCTEI, NSE etc. Due to momentum gained by globalization, our financial markets were at forefront. Recent financial meltdown although appearing ruinously from the current view point by no means a unique event such as the US stock market crash in 1987, the breakdown of the European monetary system in 1992, the turmoil in bond market in 1994 and the Asia-Pacific crisis beginning in 1997 were all extra ordinary events. In today's fast moving financial world, there were many factors like political environment, economic integration, electronic development, development of trade, growth of capital market, fiscal disciplines and control of economy bends the type of culture of financial market. The existence of economic and trading links, the increase in liberalization activities of governments, the advancement of international trade and finance, rapid development in telecommunication and the formation of common trading blocs such as NAFTA, EU and ASEAN were vital factors contributing to financial integration. In this paper, an attempt has been made to measure the impact and recovery of Global Financial Crises on Indian economy in general and on the Indian Stock Market in particular. Further, the study intends to discuss the role of RBI in the present context.

Statement of the Problem:

In India, the stock market has undergone significant transformations with the liberalization measures. The Bombay Stock Exchange (BSE) of India has emerged as one of the largest stock exchange in the world in terms of number of listed companies, comprising many large, medium-sized and small firms. The inflow of foreign capital has made a crucial contribution to the growth of the stock market. India has become a major destination, representing about a fourth of total portfolio capital inflows to the emerging market economies (EMEs) group. India has also engaged in various bilateral trade and economic co-operation agreement with several countries and regional groups across Asia, Europe and the Western Hemisphere. Our stock market had been growing day by day in the competitive world economy. Hence, a study was made to examine the effect of risk exposure towards global financial crisis and present scenario of Indian Stock Market aftermath of crisis.

Objective of the study

The principle objectives of the study were to examine the impact of global financial crisis on Indian Stock Market, more specifically, the study was intended to:

- Understanding how the global financial crisis is being transmitted to the Indian economy;
- Examine Sign of recovery of Indian economy aftermath of crisis
- Estimate the risk and return on Indian Stock Market.
- Examines the relationship between the Indian Stock Market and US Stock Market.

Review of literature

In the literature, the integration of global equity markets has been a well studied topic since the stock market crash of October 1987. Though most of the studies had initially been conducted for the developed markets like the US, European countries and Japan, recently, Post Asian crises in particular; literature has started focusing on emerging Asian markets. A small body of literature exists in the Indian Context also. It was observed that there were no studies in the Indian context looking ahead the impact of the crisis which affected USA stock market on India's stock market that is of a most recent issue. Therefore, the aim of this study was to test whether there exist an effect of the recent crisis on Indian Stock Market. The studies such as Yang and Lim (2002) in an empirical study of nine East Asian stock markets for the period January 1990 to October 2000 found some evidence of short-term linkages. Their results indicated that there was a significant difference between sub-periods pre and (during) post-Asian crisis, with an overall improvement of correlation coefficient for each pair from the pre-crisis to the post crisis period, except for Malaysia and Taiwan. Unlike results from short run tests, there was no long run co-movement among East Asian Stock markets, as the absence of co integration in the post-crisis period rules out the existence of a long-term equilibrium trending relationship among East Asian stock markets. Nath and Verma (2003) tested for co-integration between the nifty, STI and Taiex and found no evidence in favor of Co-integration. Lamba (2005) implemented a large sample to investigate the presence of long-run relationship between South Asian equity markets and the developed equity markets for the period through July 1997 to Dec 2003. His results indicated that Indian market was influenced by developed equity markets of US, UK and Japan. Raj and Dhai (2008) examines the integration of India's Stock market with global markets such as the United States, the United Kingdom and Japan, along with some other major regional markets such as Singapore and Hong Kong. Empirical evidence supported the international integration of India's Stock Market in terms of US dollars but not in local currency, a finding attributable to investment decision of foreign Investors. P.K. Mishra, KB Das and BR Pradhan (2009) examined the efficiency of Indian Stock Market in the context of recent global financial crisis. The study, by employing the unit root tests on the sample of daily stock return, supported the evidence of weak form of market inefficiency in India. Sinha, Pankaj; Gupta, Sushant and Randev, Nakul (2010) have been examines the state of the Indian economy pre, during and post recession by analyzing various macro economic factors such as GDP, exchange rate, inflation, capital markets and fiscal deficit. They have forecast some of the major economic variables using ARIMA modeling and present a picture of the Indian economy in the coming years. The findings indicate that Indian economy is reviving after a slowdown during the period of global recession. It is forecasted that GDP, foreign investments, fiscal deficit and capital markets will rise in 2010-11. Furthermore, the rupee-dollar exchange rates will not change much during the same period.

Global Financial Crisis: A Theoretical backdrop

A financial crisis refers to a loss of confidence in a country's currency or other financial assets causing international investors to withdraw their funds from the country. Financial crisis was applied broadly to a variety of situations in which some financial institutions or assets suddenly lose a large part of their value. Financial crisis includes stock market crashes and the bursting of other financial bubbles, currency crises, and sovereign defaults. The world's economy was in difficult time period due to the intensification of global financial crisis following the bankruptcy of Lehman Brothers in September 2008. The global macro economic imbalance such as saving-investment and huge cross border financial flows put great stress on the financial intermediation process and major cause for the crisis.

Impact on India:

The Indian economy looked to be relatively insulated from the global financial crisis that started in August 2007 when the 'Sub-Prime Mortgage Crisis first surfaced in the US. The impact of global crisis has been transmitted to the Indian economy through three distinct channels, viz., Financial Sector, Exports and Exchange Rates. The financial sector includes the banking sector, equity markets, external borrowings and remittances. The world wide financial crisis brought about 70 per cent fall in demand for Indian exports in its major market as its second channel of global financial crisis. Last, but not least, the rupee value came under pressure with the outflow of portfolio investments, higher foreign exchange demand by Indian entrepreneurs seeking to replace the external commercial borrowing by domestic financing, and consequent decline in foreign exchange reserves as its third sector.

Impact on Stock Market:

The Stock Market activity was one of the principal activities in the corporate world among the chain of activities, which got affected due to the financial crisis. The stock market indices were one of the principal indicators of the economic activities. The movements of stock market indices present the future economic outlook. A falling stock index reflects the dampening of the investment climate while a rising stock index indicates more confidence and soundness of the economy. When the crisis affects the real activities, it affects the stock market, as profit expectation on financial investment would be lower. If financial investment would be affected, its impact would be felt on the real investment, as real investment would not increase. Once the real sector activity lowers that would affect the entire economy. The expedition of the investors' interest mainly works affecting both the financial and real investment in the economy.

RBI response to the Crisis:

As the current global financial crisis showed clearly the liquidity risk can raise manifold during the crisis and can pose serious downside risk to macro economic and financial stability. The only controlling and regulatory authority which can reduce this crisis situation in India has done its part effectively by stressing the various relief measures with response to the crisis. CRR short down by a total of 250 paisa points and SLR requirements were released initially by 1% and subsequently an additional window of 0.5% points was introduced specifically to enable banks to draw funds for providing liquidity to mutual funds. Apart from these initiatives, RBI had imposed prudential limits on inter bank liabilities in relations to their net worth and provision for balance sheet items including derivatives which had been reviewed to strengthen capital requirements and lightening of regulation and supervision of NBFC.

Sign of Recovery

Indian economic recovery seems to be well underway. Economic growth stood at 8.6 percent during fiscal year 2010-11. GDP growth for 2009-10 per quick

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estimates of January 31, 2011 was placed at 8 percent. The recovery in GDP growth for 2009-10, as indicated in the estimates, was broad based. Seven out of eight sectors/sub-sectors show a growth rate of 6.5 percent or higher. The exception, as anticipated, is agriculture and allied sectors where the growth rate needs to higher and sustainable over time. Sectors including mining and quarrying; manufacturing; and electricity, gas and water supply have significantly improved their growth rates at over 8 percent in comparison with 2008-09. When compared to countries across the world, India stands out as one of the best performing economies. Although there was a clear moderation in growth from 9 percent levels to 7+ percent soon after the crisis hit, in 2010-11, at 8.6 percent, GDP growth in nearing the pre-crisis levels and this pace makes India the fastest growing major economy. In order for India's growth to be much more inclusive than what it has been, much higher level of public spending is needed in sectors, such as health and education along with the implementation of sectoral reforms so as to ensure timely and efficient service delivery. Plan allocations for 2010-11 for the social sectors have been stepped up, this process however needs to be strengthened and sustained over time. The GDP grew at 8.5 percent in 2010-11 compared to an upwardly revised 7.4 percent in 2009-10. Against the revival in the preceding two years, the current year saw the global economy entering a turbulent phase once again. While US experienced a sluggish growth, the sovereign debt crisis in Europe underpinned the shaky investor confidence across the world. Increasing oil prices and a resultant slower world trade growth has earmarked modest growth in emerging and developing countries as well. The growth price stability equilibrium further deteriorated in 2011-12. The situation has been compounded with exchange rate fluctuations triggered by downgrading of US and the monetary tightening measures to curb inflation at home. Concomitant effect of these has been a slowdown in capital flows and a rising cost of funds which in turn have dampened the domestic activity. Despite the given scenario, it is heartening to note that by any peer comparison the growth rate in India remains ahead of most other countries. After a robust growth of over 8 percent in the last two years, the Indian economy has slowed down in the year 2011-12 to a modest 6.5 percent. This was mainly due to deceleration in industrial growth. The growth rate in the year 2012-13 is 5.2 per cent, the lowest in a decade, on account of a weak performance by the manufacturing, agriculture and service sector.

DATA AND METHODOLOGY

The data and methodology adopted for drawing out the present study were underlined below:

Data Analysis:

The sample consists of daily average index prices from BSE and NSE from April 1, 2001 to March 31, 2013. The daily price data of these two indices were obtained from various websites including Bombay Stock Exchanges, National Stock Exchanges and yahoo finance. The State Bank of India fixes fixed rate and that fixed rate (6.5%) was taken as a proxy for risk free rate of return.

Methodology:

Various statistical tools like Mean-Variance analysis and Sharpe ratio were employed in the study that facilitates to estimate the risk and return involved in the investment decisions which in turn estimates the impact of global financial crisis on Indian stock market. The brief outline of those statistical tools had been summarized here under:

Mean-Variance:

The Mean-Variance enables to estimate the return and risk factor involved in investment process. Some of the important terms are as follows:

Return:

The rate of return is the single most important outcome of an investment. Return is the motivating force and the principal reward in the investment process and it is the key measure available to investors in comparing alternative investments. Return as a securities in the change in security price during a holding period. The present study has calculated the annualized rate of return on the market index by using the following formula.

$$R = \frac{P_{t+1} - p_t}{P_t}$$

Where,

R_i = Return on 'i' th scrips

P_t = Price of the share at time t

P_{t+1} = Price of the scrip's at the end of the holding period.

Risk: Risk is the uncertainty associated with future possible outcomes. Risk is composed of the demand that brings variations in return on income. The main force contributing to the risk are price and interest. It is the variability in expected returns. This variability is generally measured by using a statistical measure called 'Standard deviation'. This measure has been considered to measure 'total risk' in portfolio theory. The formula used is

$$\sigma_i^2 = \sum_{i=1}^{n} (R_i - E(R_1))^2$$

Where,

R_i = Actual Return during a holding period.

$E(R_i)$ = Expected Return or Average Return.

Sharpe Ratio: The sharpe ratio which is developed by Nobel laureate William F. Sharpe has been used to measure the performance of reward-to-risk. It provides insight in to the risk/reward scenario of a security or a portfolio. The Sharpe ratio measures excess investment return as a function of volatility. The premise of this ratio is that the investment or portfolio must return gains which are proportional to the risk that is being taken. It is generally accepted that a higher Sharpe ratio is a better investment.

Formula

$$SharpeRatio \quad \frac{Expectedportfolio\,\mathrm{Re}\,turn \quad RiskfreeRateof\,\mathrm{Re}\,turn}{S\,\tan dardDeviationofportfolio}$$

Maximum Drawdown: It is one way to measure the riskiness of a mechanical investment program. Compared with other risk statistics, maximum Drawdown is particularly easy to interpret. It is simply the largest drawdown experienced by a strategy during the received time under study. It is an easy way to compare the investment riskiness of different Strategies.

Limitation

- One of the major limitations of the study was the length of the data period. i.e., the study was limited to twelve years only. Generally twenty years data would be more appropriate to form the trend analysis.
- Secondly, the study was based on secondary sources. And hence, it suffers from all the limitations of the secondary data.
- Finally, the study was restricted to the application of ratio analysis and correlation only. And it would be more effective if some of the other advanced econometric tools have been used.

Analysis and Interpretation

The relationship between the return and its volatility as a proxy for risk has been considered as important topic in financial research. However, nature of their relationship clearly pictuarised mixed evidence in the nature of these relationships. The Performance of Sensex and Nifty were scrutinized and presented in the following Tables (Table. 1 and Table 2).

TABLE-1
Descriptive Statistics

YEAR	BSE-SENSEX				NSE S&P CNX NIFTY			
	MEAN	STDEV	SKEW	KURT	MEAN	STDEV	SKEW	KURT
2001-02	0.000	0.012	-0.642	3.001	0.000	0.014	-0.864	4.633
2002-03	-0.001	0.008	-0.145	-0.251	0.000	0.008	-0.118	0.431
2003-04	0.002	0.011	-0.462	0.441	0.002	0.011	-0.292	0.319
2004-05	0.001	0.013	-3.164	32.513	0.001	0.012	-3.100	29.464
2005-06	0.002	0.008	-0.487	1.284	0.002	0.008	-0.573	0.515
2006-07	-0.001	0.050	-0.498	27.483	0.000	0.014	-0.574	2.604
2007-08	0.002	0.043	1.429	35.548	0.001	0.017	-0.842	4.528
2008-09	-0.002	0.021	-0.645	2.778	-0.002	0.025	-0.225	1.012
2009-10	0.003	0.015	0.637	13.590	0.002	0.015	3.212	26.242
2010-11	0.000	0.008	-0.092	-0.026	0.000	0.008	-0.061	0.054
2011-12	0.004	0.006	-0.123	22.268	0.001	0.006	-0.065	22.168
2012-13	0.002	0.009	-0.425	17.236	0.001	0.004	-0.023	5.825

Source: www.bseindia.com;www.nseindia.com

Some of the preliminary statistics tools were presented in Table-1, which shows the movements of daily average stock returns and standard deviation. Skewness and Kurtosis measures provide insights about the underlying statistical distribution of stock returns. It is evident that Skewness was negative and Kurtosis was positive for both Sensex and Nifty during the study period. There was also an evidence of excess skewness and Kurtosis relative to the normal distribution.

TABLE-2
Performance of Sensex and Nifty for 2001-02 - 2012-13

Year	BSE-SENSEX				NSE-S&P CNX NIFTY			
	Returns	Risk	Sharpe ratio	Max Drawdown	Returns	Risk	Sharpe ratio	Max Drawdown
2001-02	-1.30	21.93	-1.60	-14.61	-3.53	18.73	-3.88	-12.61
2002-03	-10.89	13.33	-11.37	-42.80	-13.06	12.24	-13.59	-36.83
2003-04	79.01	17.17	78.63	-41.53	74.42	17.98	74.05	-39.65
2004-05	16.78	19.05	16.44	-23.73	7.93	20.18	7.61	-22.57
2005-06	71.43	13.23	70.93	-13.87	72.00	12.78	71.50	-15.90
2006-07	13.21	22.58	12.92	-25.67	-12.91	79.40	-12.99	-27.95
2007-08	27.09	27.41	26.85	-11.86	71.00	68.57	70.91	-12.18
2008-09	-39.46	38.98	-39.62	-28.52	-36.08	32.81	-36.28	-29.35
2009-10	84.51	24.40	84.24	-14.98	88.03	24.34	87.76	-52.78
2010-11	2.53	13.36	2.05	-62.66	11.10	13.50	10.62	-62.30
2011-12	25.16	20.58	22.24	-12.82	27.90	25.41	25.85	-10.86
2012-13	68.43	12.23	69.93	-11.87	65.00	11.78	69.50	-14.90

Source: www.bseindia.com;www.nseindia.com

The Annualized Returns, Risk , Sharpe Ratio and Maximum Drawdown of Sensex and Nifty indices through the period April 1, 2001 to March 2013 were presented in Table-2. This clearly shows a mixed evidence of return for both Sensex and Nifty during the study period. The table depicted clearly that there was an increase in stock return during FY 2003-04 and FY 2009-10 and the highest return was gained during the financial year 2009-10. During the Crisis period, the return was negative for both Sensex (-39.46) and Nifty (-36.08). Additionally, risk-adjusted performance Sharpe Ratio is also negative for both Sensex (-39.62) and Nifty (-36.28) respectively. The results also showed positive returns averaged approximately 24.29 and 25.89 per cent for the Sensex and Nifty with a volatility of 21.14 and 30.05 per cent. Overall, the analyzed result during the study period showed positive returns.

Table-3
Correlation Matrix

	Nifty	Sensex	Nasdaq	Dowjones
Nifty	1			
Sensex	0.754*	1		
Nasdaq	0.492*	0.598*	1	
Dowjones	0.476*	0.586*	0.696*	1

***correlation is significant at the 0.01 level**
Source: www.bseindia.com;www.nseindia.com; www.yahoofinance.com

Correlation proved to be one of the vital tools for analyzing the stock returns. Since correlation of stock price indices could be elevated owing to the presence of an underlying time trend and the persistence of prices in level form, the unconditional correlation matrix was reported in Table-3. The table revealed highest positive correlation between Indian stock market and US stock market. Again, results on this study made an impact that US and Indian Stock Market have been strengthened during the study period. Cross correlation provide a preliminary indicator of equity integration, with positive correlation exhibited for the period of analysis, which showed that the markets were most closely linked with US market.

FINDINGS AND SUGGESTIONS

Findings

1.The adoption of New Economic Policy routed our Capital Market more broad based with the starting of OCTEI, NSE etc. Owing to this, our financial market were at forefront.
2.The impact of Global Financial Crisis has been transmitted to the Indian economy through three distinct channels viz., Financial Sector, Exports and Foreign Exchanges.
3.The Stock Market activity got affected due to financial crisis which in turn has greater effect on profit expectation among the investors.
4.RBI has implemented many remedial measures to overcome the crisis.
5.India's economic performance in 2010-11 and 2011-12 shows that the recovery from the slowdown during the global financial crisis is well underway.
6.Highest positive correlation between the Indian Stock Market and US Stock Market and an indication of equity integration with positive correlation exhibited for the period of analysis.

SUGGESTIONS

The steps that would further strengthen the Indian Stock Market to reach its high morale among the investors are as under:
1.The SEBI and the central government should make all positive efforts to boost the morale of the Indian investors to invest in the stock market quite often.
2.The government must have some strategic measures, so that it can withstand the crisis situation. Hence, our economy will not be affected badly.

CONCLUSIONS

In this paper, an attempt has been made to study the impact and recovery of Global Financial Crisis on Indian stock market. For this, the study employs the data through the period April 1, 2001 to March 31, 2013 that has been collected from various websites including National Stock Exchanges, Bombay Stock Exchanges and several other websites. From the study, it was concluded that the Indian Stock market was affected by the Global financial crunches. The fear of the US financial crisis affecting Indian markets, but there was no panic as the capital market watchdog was monitoring the situation very closely. The Indian stock market was resilient and the clearing system has proved its ability to deal with stock market fluctuations. Financial stability in India has been achieved through perseverance of prudential policies which prevent in situations from excessive risk taking and financial markets from becoming extremely volatile and turbulent. India is facing now facing a challenge and it is not a new phenomenon for India as it has faced several challenges in the past and has overcome them. Our nation hence, has the strength to overcome the current challenges also.

Scope for Further research:

The slowdown in the economy of any country will definitely have great impact on financial sector. The extension of this paper is needed to examine further the impact of financial market towards real sector.

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