

RELATIONSHIP BETWEEN STOCK MARKET AND CURRENCY MARKET (A STUDY IN TIMES OF CRISES)

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ABSTRACT

For studying the security market, we have analyzed the CNX 500 index, which is taken to be a proxy for security market. The CNX 500 Index is a capitalization weighted index of 500 companies that represent about 90% of the total market capitalization of India and about 98% of the total turnover (Source: Bloomberg). The index was developed with a base value of 1,000 as of 1994. For studying the currency market, we have analyzed the movement in INR/USD as US Dollar is considered to be the reserve currency of the world.

KEYWORDS: security market, CNX 500 Index, Capitalization, Reserve Currency, Total Turnover.

Introduction

The study of currency and stock markets has always been of great interest to academicians and practitioners. Analyzing the interaction between the two markets is interesting because exchange rate and stock market have been extremely sensitive indicators of the economy and are considered to be proxies of economic growth of the country.

In this study we attempt to analyze the relation in security market and currency market over the past 18 years from April 1995 to March 2013, and specifically in times of three important crises that have affected the world economies.

There have been some studies in the past that have focused on analyzing the interaction between stock market and currency market. Franck and Young (1972) found that there is no interaction between foreign exchange market and stock market. Similarly, Solnik (1987) found that changes in exchange rate has no significant effect on stock prices. Some other studies that report no significant relation between stock market and foreign exchange market include Bahmani-Oskooee and Sohrabian (1992), Chow et al (1997) and Nieh and Lee (2001).

Bhattacharya and Mukherjee (2003) examined the causal relationship between stock prices and three macroeconomic variables. The macroeconomic variables considered included exchange rate, foreign exchange reserves and trade balance. Using data for the period 1990 to 2001, they found that there is no link between stock prices and the three macroeconomic variables.

Gulati and Kakhani(2012) examined the relationship between stock market and foreign exchange market in India. They used correlation analysis and Granger Causality to study the relation between rupee dollar exchange rate and stock market indices for the period 2004 to 2012. The granger

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causality results report no relation between exchange rate and stock market and very less degree positive relationship was found between the two markets.

Nath and Samanta (2003) studied the dynamic linkage between stock market and foreign exchange market in India using granger causality test for the period March 1993 to December 2002. They found that in general the returns in these two markets are not inter related but in recent years stock market returns have influenced the returns from foreign exchange market.

Apart from analyzing the long term trend between these indicators, we intend to analyze the impact of certain specific macroeconomic disasters on the Indian stock market and Indian currency.

We study the impact of **Dot Com Bubble**, **Subprime Crisis** and **Eurozone Crisis** on the relation between Indian stock market and Indian currency as these crises have had an indirect impact on Indian markets due to strong interlinkage of world economies.

The next section gives a brief outline about the different time periods taken for the study.

Dot Com Bubble

The **Dot-Com Bubble** was a major speculative bubble in which security markets in industrialized economies experienced a rapid increase in their equity value resulting from growth in the Internet sector. The later part was followed by a burst of the Dot com bubble. The major impact of these happenings was felt in the period of April 2000 to March 2001. We have studied the interaction between CNX 500 and INR/USD. We have considered INR/USD because dotcom bubble took place in the United States and had a major impact on the value of US Dollar.

Sub Prime Crisis

The U.S. subprime crisis was a set of conditions that led to a huge crisis followed by a great recession. It happened due to increase in subprime mortgage delinquencies that led to foreclosures. These happenings in the mortgage markets had a huge impact on the securities market and currency market, mainly in the period of January 2008 to December 2009. Thus, we study the interaction between CNX 500 and INR/USD in this period.

Euro Zone Crisis

The Euro zone crisis has affected the countries of the Eurozone since late 2009. It is a crisis that was fuelled by combined action of Government and Banking fraternity. Thus, we study the interaction between CNX 500 and INR/USD, and also between CNX 500 and INR/EUR, as this crisis stemmed from Euro zone countries. The analysis is done from the period of April 2010 to May 2012.

Data and Methodology

The entire data for this study has been collected from Bloomberg. Data for CNX 500 and INR/USD is taken from April 1995 to March 2013. We have taken data from the year 1995 as CNX 500 was developed with a base value of 1,000 in the year 1994. Thus to maintain parity in time periods of data for stock market and currency market, we collected data from April 1995. We have used daily frequency for our analysis. To compute returns, we have taken log returns for CNX 500 and exchange rate.

We have seen trend in the stated variables, and to see the interaction between stock market and currency market, we have calculated the correlation between stock market and currency market.

Also to see the cause and effect relationship, we have applied Granger Causality test on the variables.

Apart from analyzing the long term relation, to study the impact of major crisis the following specific time periods are selected:

- Correlation and causality between CNX 500 and INR/USD is seen from April 2000 to March 2001 to analyze the impact of Dot Com Bubble
- Correlation and causality between CNX 500 and INR/USD is seen from January 2008 to December 2009 to analyze the impact of Subprime Crisis
- Correlation and causality between CNX 500 and INR/EUR is seen from April 2010 to May 2012 to analyze the impact of Eurozone Crisis

Correlation and Causality is computed on daily log return values.

The processing of data is done using MS-EXCEL and E-VIEWS.

Analysis

Trend Analysis

Long Term Trend

- **CNX 500**

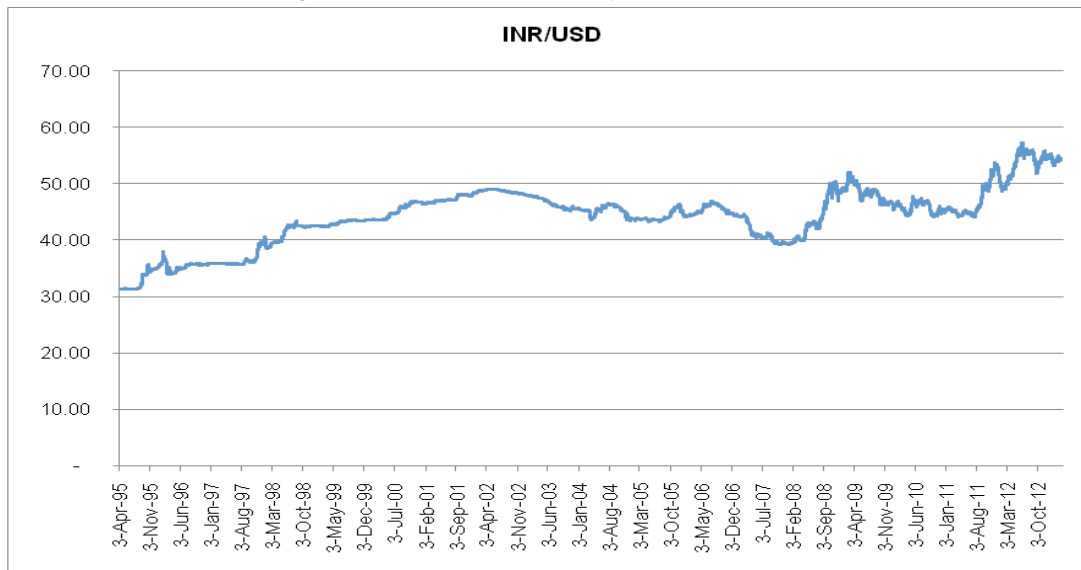
The following graph represents the movement in CNX 500 from April 1995 to March 2013.



We can see that the CNX-500, which is a proxy for the Indian stock market, has experienced a marked increase in this time period from a value of 814.74 on 3rd April 1995 to 4,438.35 on 28th March 2012.

- **INR/USD**

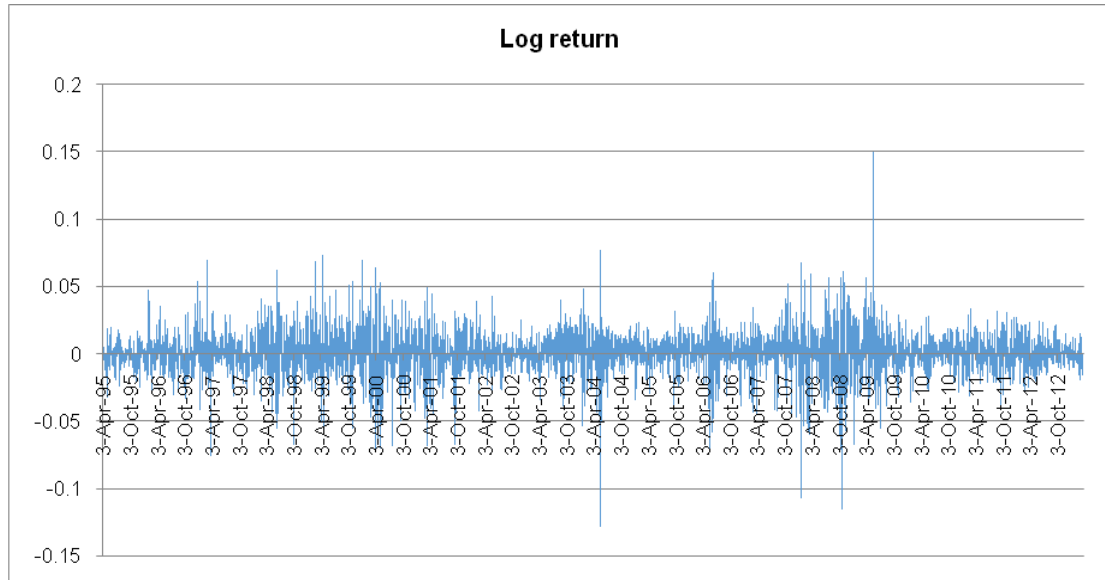
Next we see the long term trend in Indian currency with respect to U.S. Dollar.



As we can see in the above graph, the Indian Rupee has depreciated from a value of 31.42 against a dollar on 3rd April 1995 to 54.28 against a dollar on 28th March 2013.

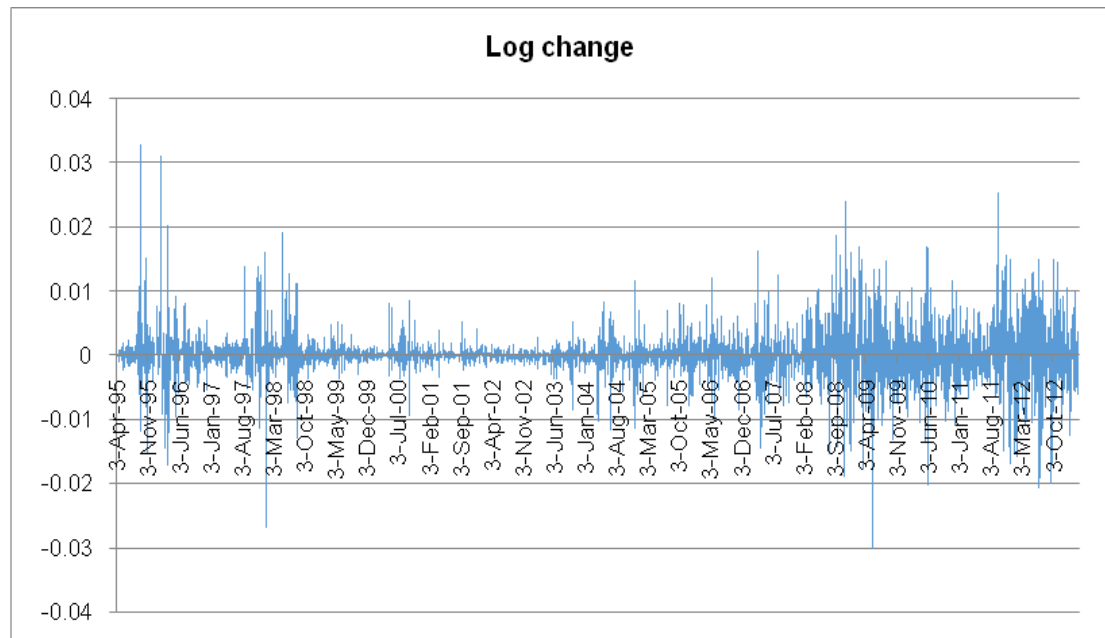
Apart from movement in security prices and absolute value of currency, we have also seen the **trend in returns** offered by CNX 500 and changes in currency markets. This analysis helps us to see if there has been an increasing or a declining trend in the returns earned by investors in both the markets.

- **CNX 500**



The above graph indicates that though there has been a huge change in the absolute prices, there hasn't been a major change in the values of daily returns.

- **INR/USD**



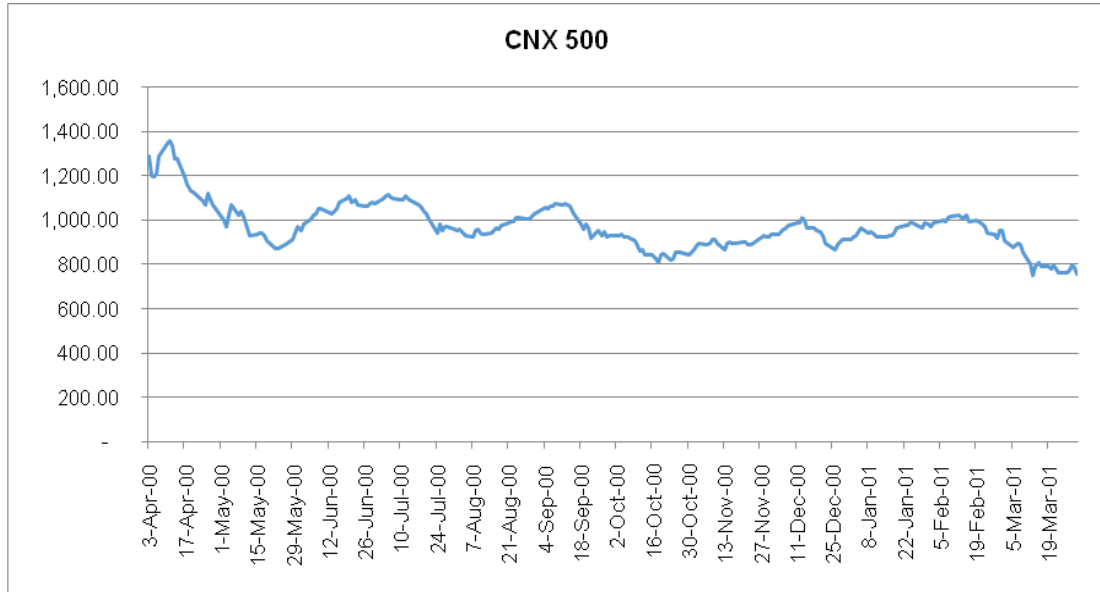
The above graph indicates that there have been high daily fluctuations in the currency in certain time periods.

After looking at the long term trend, we move on to analysis in times of specific crisis.

Dot Com Bubble

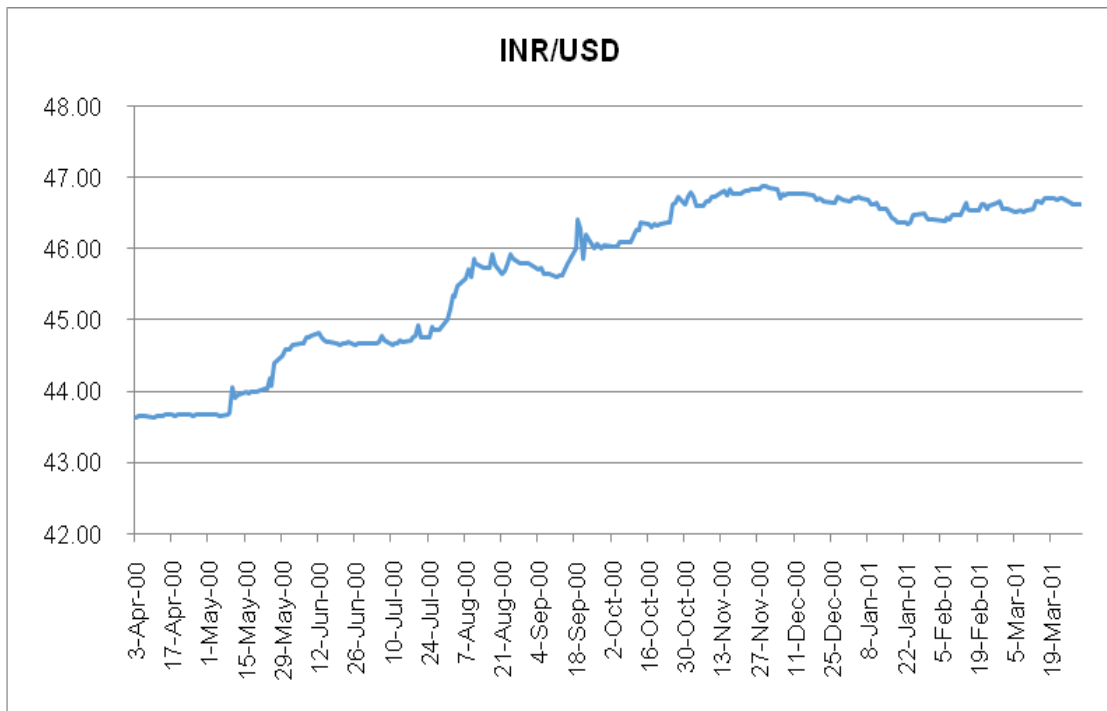
First we analyze the impact of DOT COM BUBBLE. The following results are obtained:

- **CNX 500**



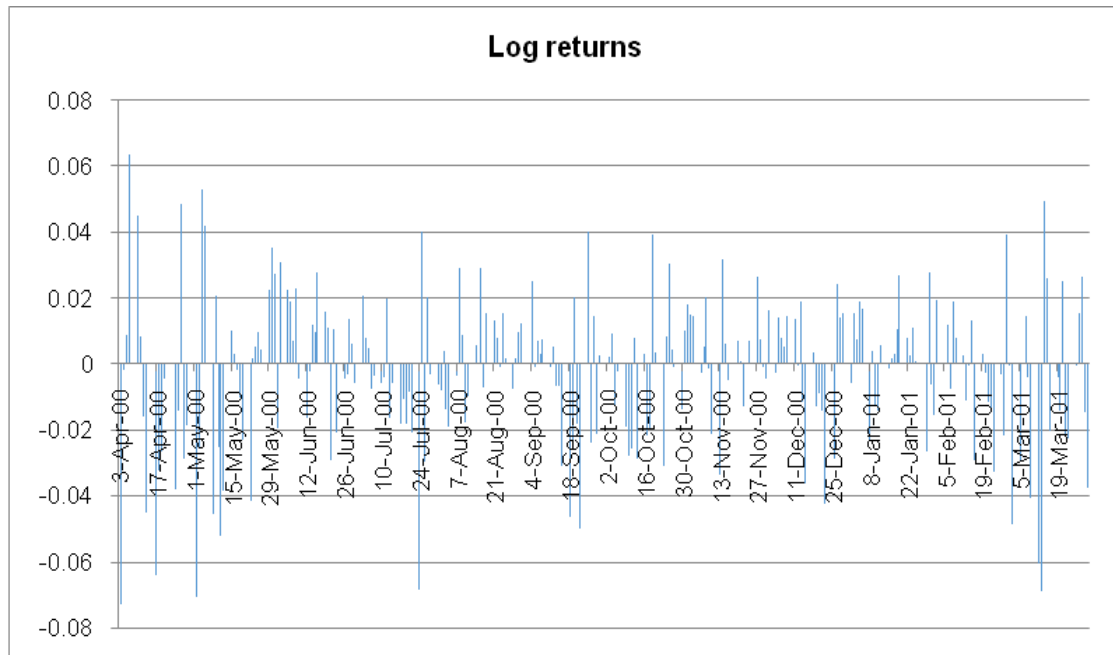
The index declined from a value of 1,287.99 on 3rd April 2000 to 754.20 on 30th March 2001.

- **INR/USD**



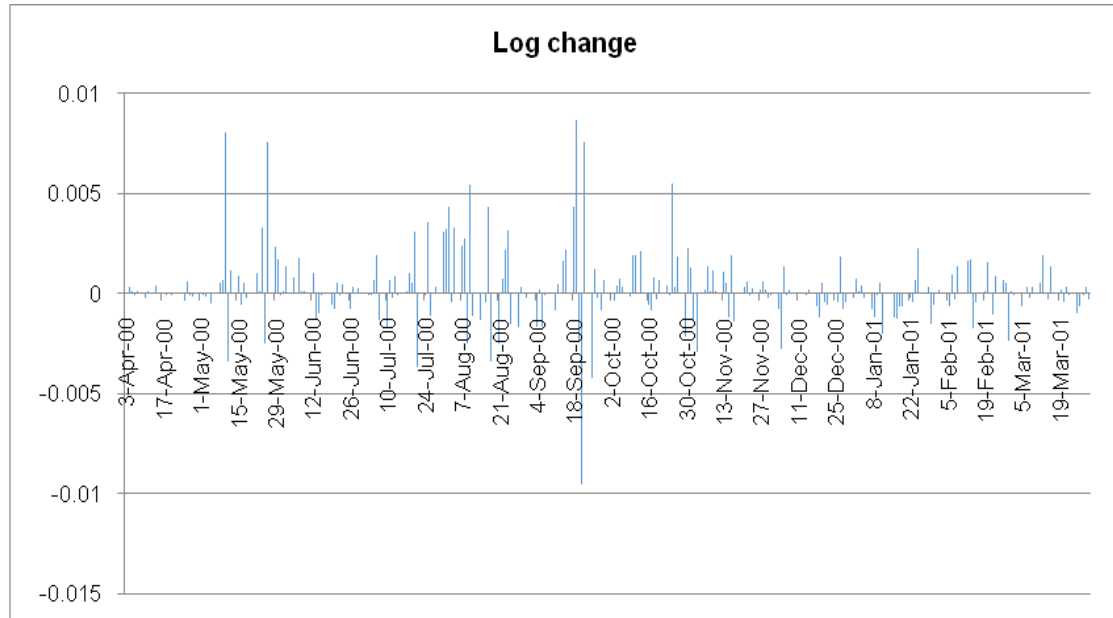
The Indian currency depreciated from 43.63 on 3rd April 2000 to 46.62 on 30th March 2001. After analyzing the absolute price movements, we have again observed the trend in returns.

- **CNX 500**



We can see no significant change in the above graph for daily fluctuations as compared to the long term trend.

- **INR/USD**

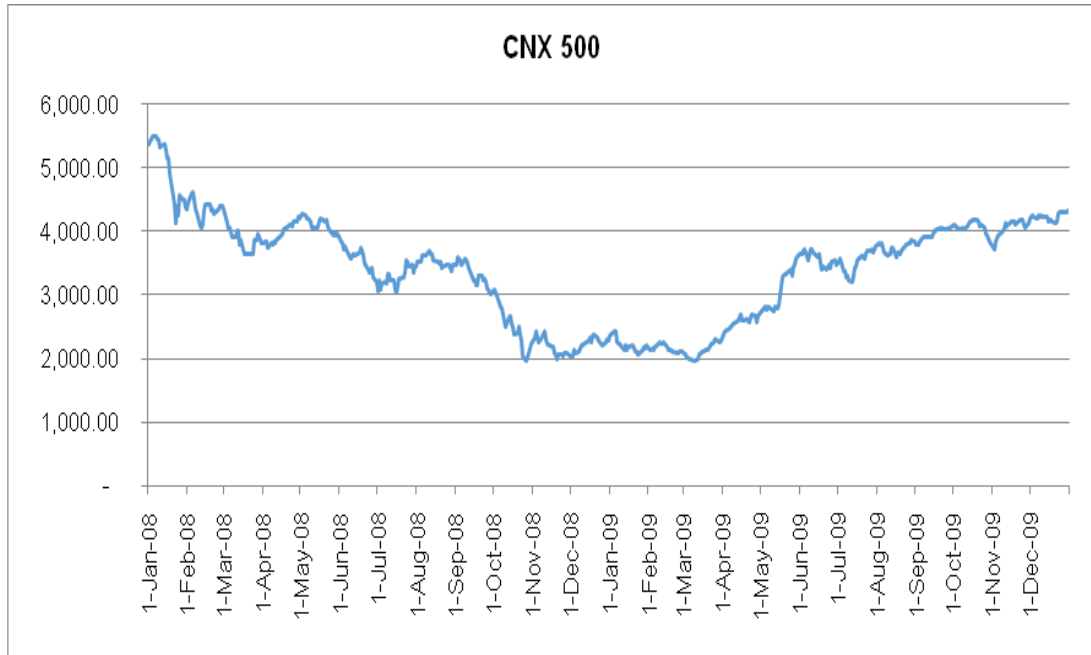


We can see no significant change in the above graph for daily fluctuations as compared to the long term trend.

Sub Prime Crisis

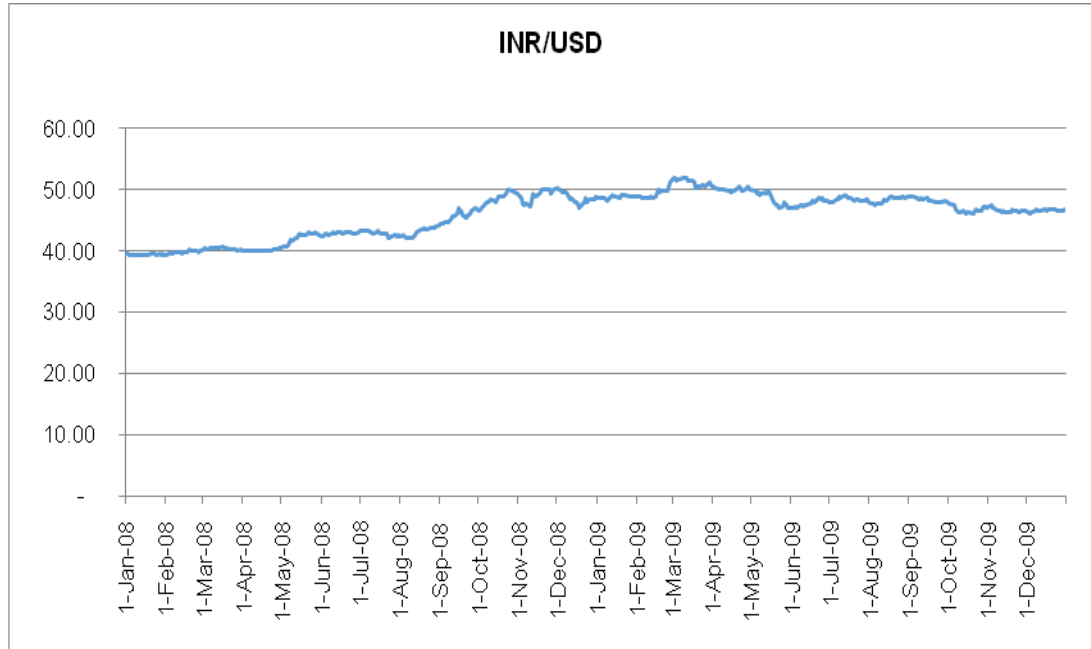
Next, we analyze the trend in times of Subprime crisis.

• **CNX 500**



We can see from the above graph that the index has fallen from a value of 5,384.55 on 1st January 2008 to 4,329.10 on 31st December 2009.

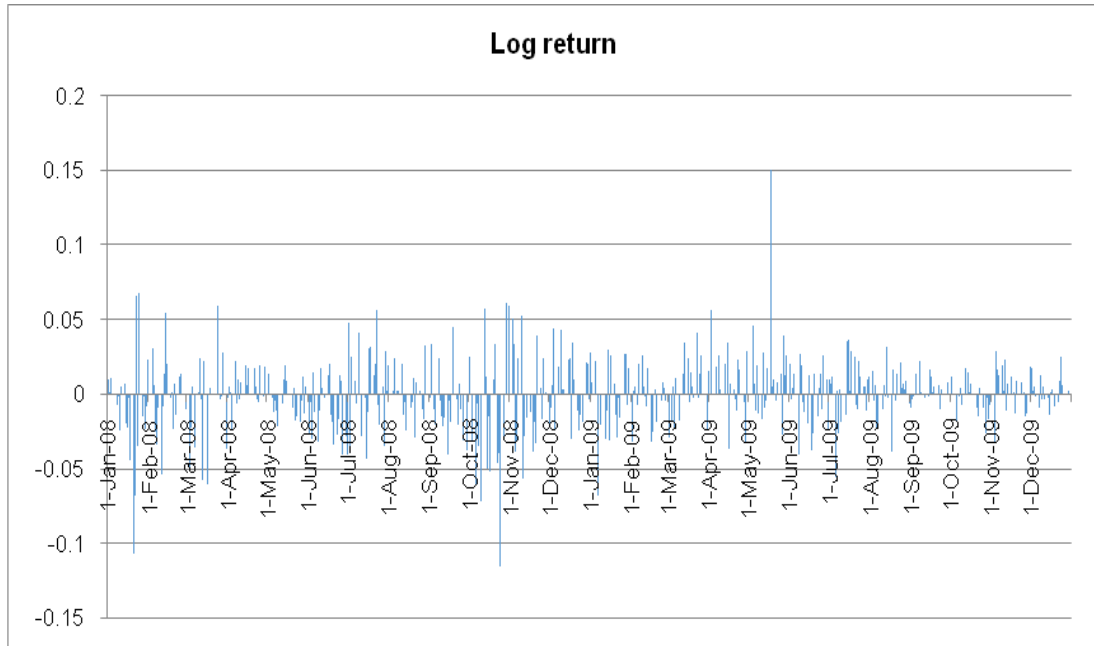
• **INR/USD**



The Indian currency has depreciated from a value of 39.42 on 1st January 2008 to 46.53 on 31st December 2009.

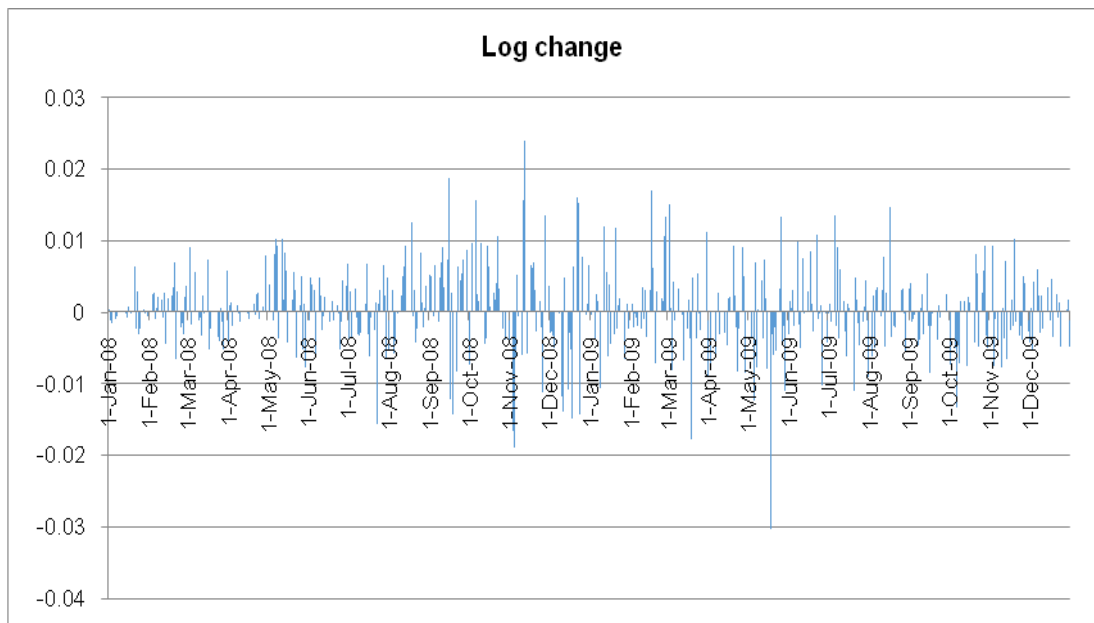
After analyzing the absolute price movements, we have again observed the trend in returns.

• **CNX 500**



We can see no significant change in the above graph for daily fluctuations as compared to the long term trend.

INR/USD

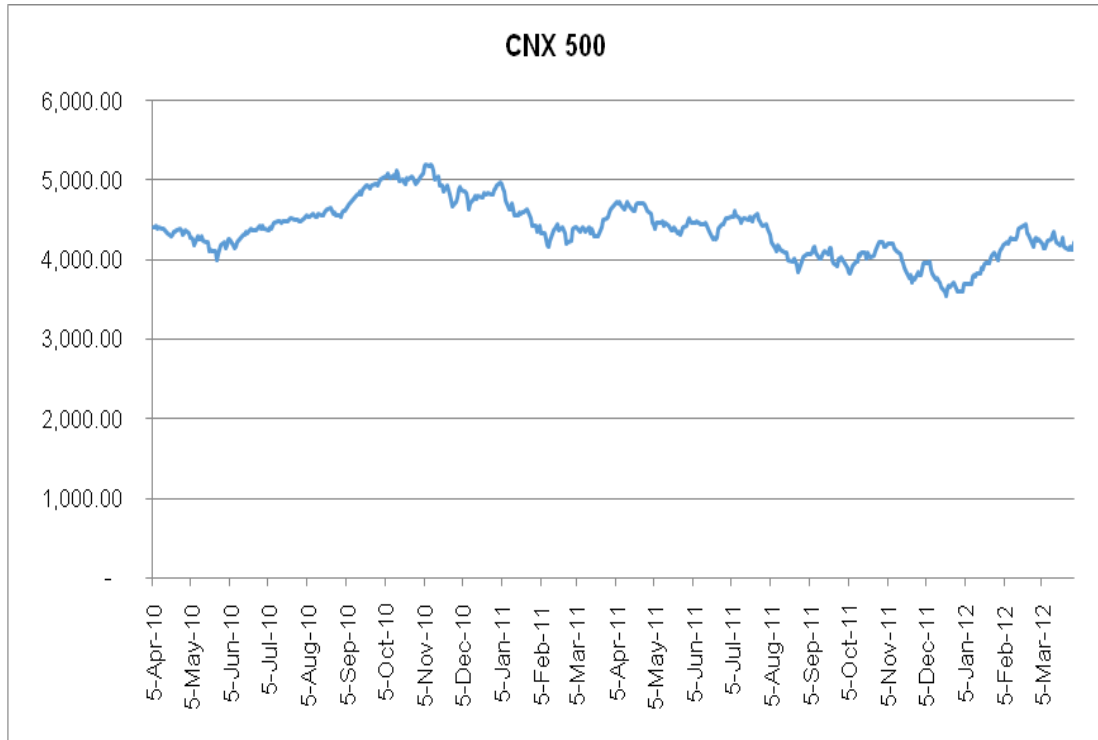


It can be seen that the fluctuation in currency has been higher in times of Subprime crisis as compared to the long term trend.

Euro Zone Crisis

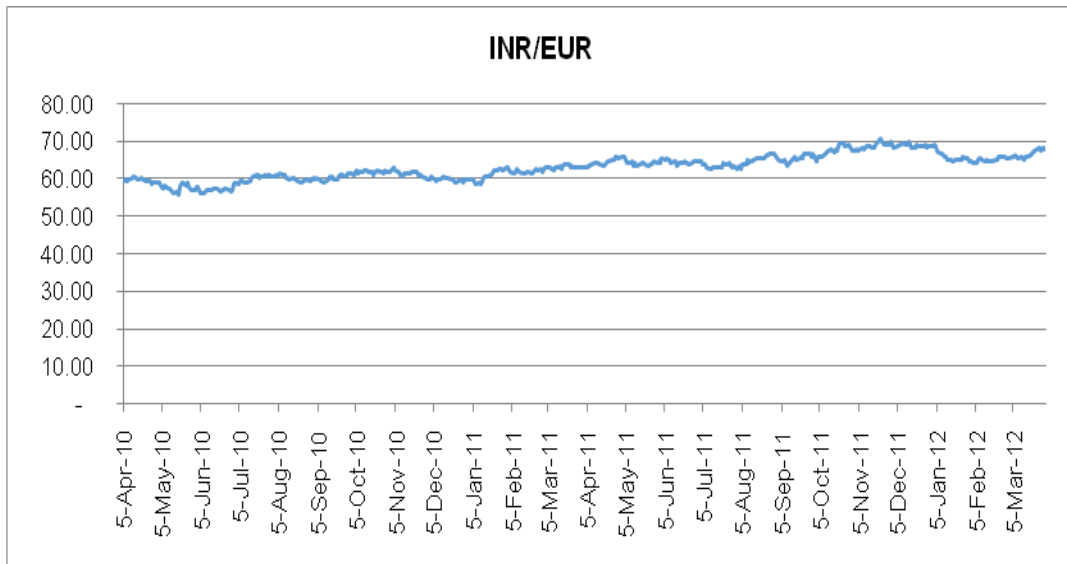
Lastly we see the impact of Euro Zone crisis.

• **CNX 500**



We can see from the above graph in times of Euro Zone crisis the value of CNX 500 has come down from 4403.90 on 5th April 2010 to 4221.80 on 30th March 2012.

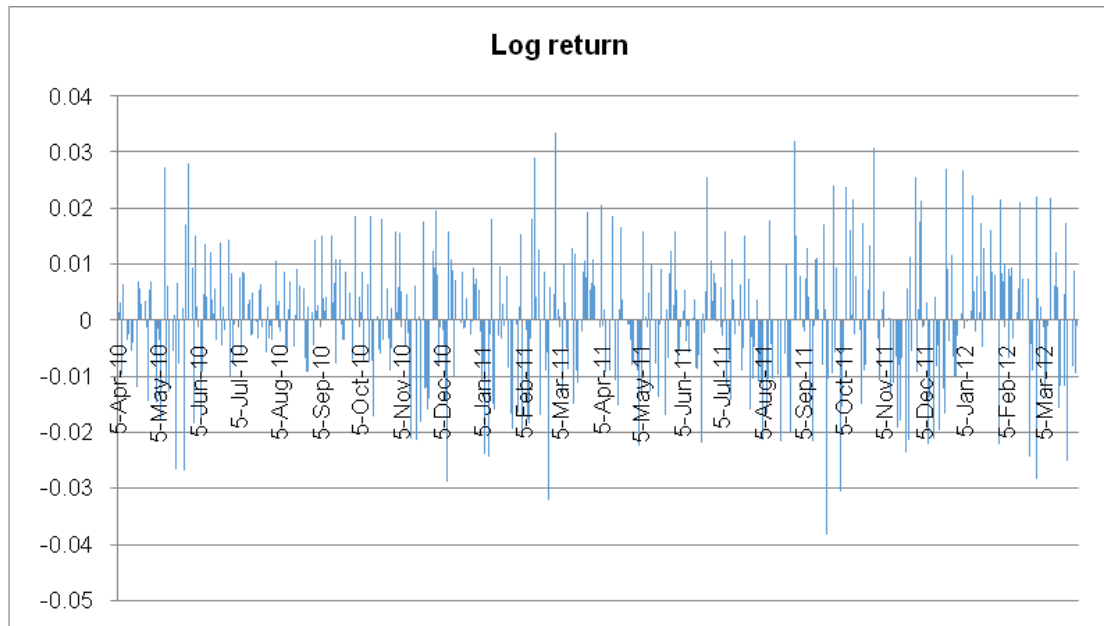
INR/EUR



We can see from the above graph in times of Euro Zone crisis the INR has depreciated against the Euro from 59.85 on 5th April 2010 to 67.97 on 30th March 2012.

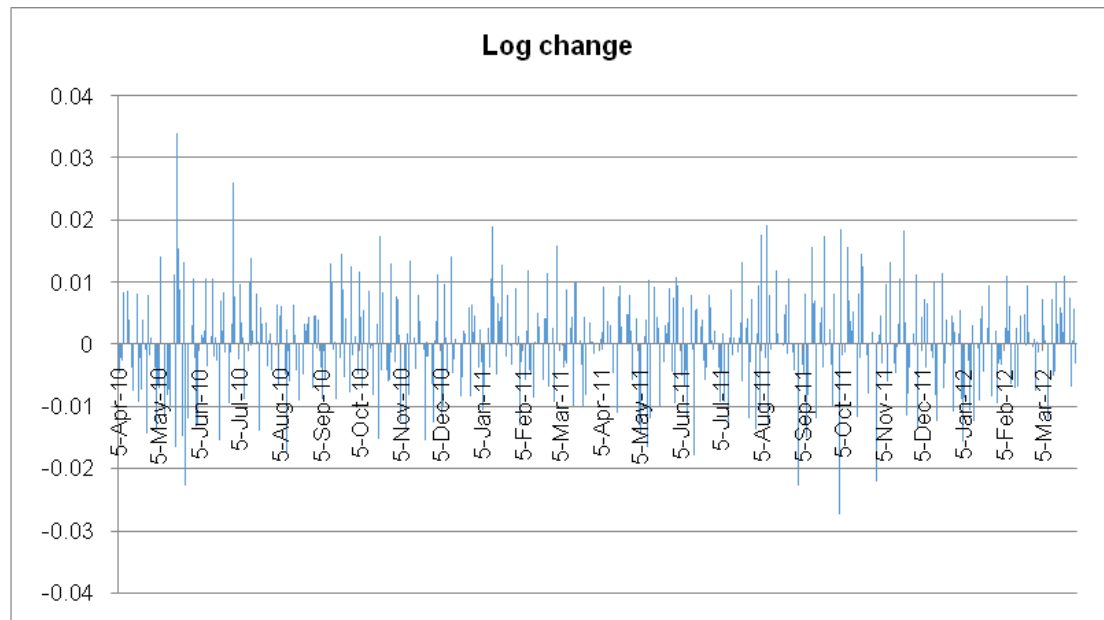
After analyzing the absolute price movements, we have again observed the trend in returns.

• **CNX 500**



We can see no significant change in the above graph for daily fluctuations as compared to the long term trend.

• **INR/EUR**



It can be seen that the fluctuation in currency has been high in times of Euro Zone crisis.

Correlation

After the trend analysis, to see the interaction between stock market and currency market, we calculate the correlation between returns provided by the stock market and currency market. The following table gives the correlation values:

Correlation	Long Term	Dot Com Bubble	Subprime Crisis	Euro Zone Crisis
Between CNX 500 and INR/USD (CNX500 and INR/EUR for Euro zone crisis)	-0.284280768	-0.122244148	-0.52752	-0.23065

As we can see from the above table that the correlation has been moderately low for all the time periods except in case of Subprime crisis.

The period affected by subprime crisis indicates that the correlation between CNX 500 and INR/USD is equal to -0.52752, indicating that the INR has depreciated w.r.t USD (INR/USD has depreciated from a value of 39.42 on 1st January 2008 to 46.53 on 31st December 2009) and the CNX 500 has also come down in value, pointing to a weakening stock market performance and hence the economy.

Causality

After analyzing the correlation between the variables, we have applied Granger causality to see the cause and effect between the two markets.

Long Term Trend

The following were the Null Hypothesis for long term analysis:

- Change in CNX 500 does not granger cause change in INR/USD
- Change in USD/INR does not granger cause change in CNX 500

The results obtained indicate that changes in CNX 500 causes changes in INR/USD. This means that the money realized by FIIs by changes in stock prices, leads to change in demand for currency, leading to a change in the value of INR/USD.

Trend During Dot Com Bubble

The following were the Null Hypothesis:

- Change in CNX 500 does not granger cause change in INR/USD
- Change in INR/USD does not granger cause change in CNX 500

The results obtained indicate that changes in currency lead to change in value of CNX 500. This can be explained by the reasoning that the DOT COM BUBBLE had a great impact on the INR/USD rate, which affected the flow of money by FIIs in the Indian stock market thus leading to changes in the value of CNX 500.

Trend During Sub Prime Crisis

The following were the Null Hypothesis:

- Change in CNX 500 does not granger cause change in INR/USD
- Change in INR/USD does not granger cause change in CNX 500

The results obtained indicated that none of the variables affect the other. These results seem to be puzzling as theoretically the results should have matched the results obtained during the time of DOT COM BUBBLE.

Trend during Euro Zone Crisis

The following were the Null Hypothesis:

- Change in CNX 500 does not granger cause change in INR/EUR
- Change in INR/EUR does not granger cause change in CNX 500

The results obtained indicate that changes in INR/EUR rate lead to changes in CNX 500. This seems to be obvious as the Euro Zone crisis affected the INR/EUR rate, which in turn through foreign flows and market interlinkages affected the Indian stock market.

Conclusion

Thus, we can conclude from our study that there has not been any significant difference in fluctuations in the stock market in long term and in times of Dot Com Bubble, Subprime crisis and Euro zone crisis.

The correlation between stock market and currency market is not found to be very strong, whereas causality indicates that changes in the stock market have led to changes in the currency market in the long term.

On the other hand, in times of crisis changes in currency market has affected the changes in stock market, except during times of Subprime crisis where results appear to be puzzling.

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