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REVIEW OF LITERATURE

NEED/IMPORTANCE OF THE STUDY

STATEMENT OF THE PROBLEM

OBJECTIVES

HYPOTHESES

RESEARCH METHODOLOGY

RESULTS & DISCUSSION

FINDINGS

RECOMMENDATIONS/SUGGESTIONS

CONCLUSIONS

SCOPE FOR FURTHER RESEARCH

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- Schemenner, R.W., Huber, J.C. and Cook, R.L. (1987), "Geographic Differences and the Location of New Manufacturing Facilities," Journal of Urban Economics, Vol. 21, No. 1, pp. 83-104.

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RELATIONSHIP BETWEEN COMMERCIAL BANKS STOCK RETURNS AND MONETARY VARIABLES IN INDIA

SHINIL SEBASTIAN
ASST. PROFESSOR
DEPARTMENT OF COMMERCE
CHRIST UNIVERSITY
BANGALORE

ABSTRACT

The purpose of this study is to examine the impact of frequent changes in important monetary variables on banking stocks prices. The concern is whether or not current economic indicators, as reflected in interest rates, exchange rates and inflation, can explain banking stock returns. This study considered NSE bank nifty index as banks' stock representatives, because this bank index consists of all major banks listed in the Indian capital market. The explanatory variables in this study considered the three important monetary variables namely, foreign exchange rates, long-term interest rates and inflation rates. The econometric tools like unit root test, ordinary least squares, Johansen-Juselius (1990) Multivariate Co integration test and Vector Error Correction Model (VECM), have been applied in this study. Johansen Cointegration test proves that there is a long run relationship between bank nifty and the above-mentioned three monetary variables. Based on the results of Ordinary least squares on vector error correction equation this study found that monetary variables have significant impact on bank stock returns, but a major portion of the bank nifty movement is explained by its own innovations. Also, this study finds that positive changes in foreign exchange rates and long term interest rates are affecting the bank nifty movement negatively. But, the wholesale price index or inflation rates do not affect the bank nifty or banks' stock price movement significantly. Among the three monetary variables used in this study, foreign exchange rates have the highest influence on bank stock prices.

KEYWORDS
NSE Bank Nifty, Exchange rates and Interest rates.

INTRODUCTION

Bank stocks are on among the more active stocks in our Indian capital market .After the liberalization and de regulation of interest rates the Indian banking sector is now, a more attractive venue for investors. There are many banks listed on the stock market. Fluctuations among banking stocks are very high even though they earn good profit and growth. Returns from banking stocks are not stable because of high fluctuations in stock prices and in the entire stock market. The variability in the return or changes in bank stock prices are not only because of bank's profitability, but also due to some external forces. The monetary variables like foreign exchange rates, interest rates and inflation are directly associated with banks. These monetary variables keep changing because of many national and international events or factors. Bank nifty index is one of the major sectoral stock indices in the Indian stock market. It represents stock movement of all the commercial banks in India. Based on the movement of NSE bank nifty index, we can easily judge how Indian bank stocks are performing in terms of returns from bank stocks. It represents 12 of the major banks in the Indian capital market. These 12 banks are market leaders in the banking industry in India. So, movement in this index will help the investors to take investment decisions on bank stocks.

REVIEW OF LITERATURE

There have been many studies conducted related to changes in economic variables and its impact on stock prices. But studies related to relationship between bank stock prices and monetary variables are very less. **Ballester, et al.** (2009) explored the exposure of the banking sector to interest rates risk. By applying a univariate GARCH model they reported that changes in inertest rate and its volatility have negative and significant impact on the banking stocks return in the Spanish stock market. **Chamberlain, et al.** (1996) examined the exchange rate sensitivity among US banks and Japanese banks by using daily and monthly data. Results show one third of thirty companies observed are sensitive to exchange rate changes. But relatively only a few banking companies are affected by exchange rate changes in Japan. This difference because of number of factors like differences in the structure of ownership, in securities and derivatives laws, in supervision, in the extent of foreign ownership, or in hedging policies. **Santoni** (1986) studied the effect of inflation on commercial banks. The regression analysis of this study shows that unanticipated and anticipated changes in inflation inversely related to share prices of banks. **Benink and Wolff** (2000) empirically studied the sensitivity of bank stock returns to interest rate changes in the US stock market. They found that there was a significant negative relationship between bank stock returns and interest rate changes in the early 1980s. They concluded that interest rate sensitivity had reduced in the late 1980's and early 1990's because of availability of interest rate derivatives contracts that can be used for hedging purposes. **Boyd et al., (2001)** studied the impact of changes in inflation on financial sector performance. Study results show that there is a significant and economically important negative relationship between inflation and banking sector development. The marginal impact of inflation shows stock market development diminishes rapidly. **Murtagh and Bessler** (2003) studied the sensitivity of financial stocks and non financial stocks indices to interest rates and exchange rates in Canada, Germany, Japan, UK and US. by applying Ordinary least squares method, he found that changes in interest rate and exchange rate have more impact on financial indices especially bank stocks. **Vardar, et al., (2008)** analyzed the impact of interest rate and exchange rate on the composite and sector price indices, in the Istanbul Stock Exchange (ISE). In their studies they employed Generalized Autoregressive Conditional Heteroscedasticity (GARCH) models to investigate the volatility and return behavior of indices with respect to changes in exchange rate and interest rate. Evidence from this study shows that informational arrivals of interest and exchange rate largely affect indices in ISE. Changes in interest rates have an increasing impact on volatility of the technology sector, financial and composite indices volatility decline by the changes in this variable growth.

It might be argued that banks are special financial institutions whose operations are distinctive in financial markets and have a strong impact on an economy. The simplistic notion that the economic health of a developing country like India is vitally dependent on the financial health of its banking system is the principal motivation for this study. A review of the literature reveals that there has been no well-known study of the strength and direction of relationships between Indian banking stock returns and key monetary variables like inflation, exchange rates and interest rates.

IMPORTANCE OF THE STUDY

It is generally found that most of the banking company stocks are exposed to volatility in spite of having a good financial performance. This is due to changes in various external factors such as inflation, interest rate and foreign exchange rate .To find out the impact of the changes in these variables on the stock prices of banking companies, this study has been taken up. This will be provide important information to investors because all the variables that are considered in this study are directly related to banks and also in the recent days news about all these variables are very often appearing in the media. If the investor knows about the behavior of these variables through this study he can take good investment decision based on the information of those variables.

OBJECTIVES OF THE STUDY

To find out the impact on bank nifty due to the changes in monetary variables (Long term interest rates, foreign exchange rates (USD/INR) and inflation(WPI)).
To identify which monetary variable have more influence on the bank index.

To find whether there is any long term relationship between monetary variables and NSE Bank nifty index or not .

METHODOLOGY

The main method used to analyze the time series behavior of the data involves co integration and the estimation of a Vector Error Correction Model (VECM). This is one of the most -established methodologies when testing the long run and short run relationships among variables. The first step of this process involves a test for stationarity; the order of integration of the variables is estimated. For this purpose, this study employs Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) tests for unit roots. Once the order of integration of each variable has been determined, the study has performed the co integration analysis to determine whether the time series of these variables display a stationary process in a linear combination. For this purpose, the Johansen (1991) method of multivariate co integration is employed. A finding of co integration implies the existence of a long term relationship between the NSE Bank index and the monetary variables. If there is at least one co integrating relationship among the variables, then the causal relationship among these variables can be determined by estimating the VECM.

The present study uses monthly data for the period January 2000 to November 2011 for India on the following monetary variables and Stock market index namely, NSE bank Nifty Index (bank nifty) , Long term interest rates (INT), wholesale price index(WPI), and exchange rate(RS/$, Forex). The data for the monetary variables were extracted from the Handbook of Statistics on Indian Economy available on the RBI web site and the monthly closing price of NSE bank nifty is collected from the NSE's website. In the empirical analysis the variables are used in log form.

RESULT AND DISCUSSION

TABLE 1: ADF AND PHILIP PERRON UNIT ROOT TEST RESULTS FOR LEVEL SERIES DATA

Variables		ADF		PP	
		t-stat	P	t-stat	P
Bank nifty		-2.372783	0.3921	-2.440936	0.3571
INT		-1.805624	0.6970	-1.851001	0.6745
Forex		-1.791791	0.7037	-1.816104	0.6919
WPI		-2.364706	0.3964	-1.946311	0.6249
Test critical values:	1% level	-4.023975		-4.023975	
	5% level	-3.441777		-3.441777	
	10% level	-3.145474		-3.145474	

TABLE 2: ADF AND PHILIP PERRON (PP) UNIT ROOT TEST RESULTS FOR FIRST DIFFERENCED DATA

Variables		ADF		PP	
Bank nifty		-11.53987	0.0000	-11.54079	0.0000
INT		-11.87667	0.0000	-11.87722	0.0000
Forex		-9.199230	0.0000	-9.210960	0.0000
WPI		-7.453214	0.0000	-7.478486	0.0000
Test critical values:	1% level	-4.024452		-4.024452	
	5% level	-3.442006		-3.442006	
	10% level	-3.145608		-3.145608	

TABLE 3: JOHENSENS CO INTEGRATION TEST UNRESTRICTED CO INTEGRATION RANK TEST (TRACE)

Hypothesized No. of CE(s)	Eigen value	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.258826	59.11185	47.85613	0.0031
At most 1	0.061518	17.77816	29.79707	0.5825
At most 2	0.041946	9.016279	15.49471	0.3639
At most 3	0.022233	3.102827	3.841466	0.0782
Unrestricted Cointegration Rank Test (Maximum Eigen value)				
Hypothesized		Max-Eigen	0.05	
No. of CE(s)	Eigen value	Statistic	Critical Value	Prob.**
None *	0.258826	41.33369	27.58434	0.0005
At most 1	0.061518	8.761882	21.13162	0.8512
At most 2	0.041946	5.913452	14.2646	0.6243
At most 3	0.022233	3.102827	3.841466	0.0782
Max-eigen value test indicates 1 co integrating eqn(s) at the 0.05 level				
* denotes rejection of the hypothesis at the 0.05 level				
**MacKinnon-Haug-Michelis (1999) p-values				

TABLE 4 : OLS ON VECTOR ERROR CORRECTION EQUATION

D(BANK NIFTY) = C(1)*(BANK NIFTY(-1) - 0.138787684507*INT(-1) +				
4.25643906379*FOREX(-1) - 4.27303212124*WPI(-1) -				
1.43785449454) + C(2)*D(BANK NIFTY(-1)) + C(3)*D(BANK NIFTY(-2))				
+ C(4)*D(INT(-1)) + C(5)*D(INT(-2)) + C(6)*D(FOREX(-1)) + C(7)				
*D(FOREX(-2)) + C(8)*D(WPI(-1)) + C(9)*D(WPI(-2)) + C(10)**				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C(1)	-0.064683	0.043664	-1.681389	0.0219
C(2)	-0.051038	0.09064	-0.563086	0.5743
C(3)	0.019641	0.077136	0.254623	0.7994
C(4)	-0.413218	0.167828	-2.462157	0.0151
C(5)	0.360058	0.171685	2.097205	0.0379
C(6)	-2.719384	0.411235	-6.612729	0
C(7)	-0.832835	0.480516	-1.733211	0.0854
C(8)	-1.781312	1.265958	-1.407087	0.1618
C(9)	0.900274	1.280982	0.7028	0.4834
C(10)	0.023204	0.010573	2.194577	0.03
R-squared	0.367804	Mean dependent var		0.015384
Adjusted R-squared	0.324036	S.D. dependent var		0.105641
S.E. of regression	0.086855	Akaike info criterion		-1.980403
Sum squared resid	0.980694	Schwarz criterion		-1.770286
Log likelihood	148.6282	Hannan-Quinn criter.		-1.895017
F-statistic	8.403587	Durbin-Watson stat		2.044023
Prob (F-statistic)	0			

**C(1) is error correction term C(2) and C(3) are bank nifty lagged in 1 and 2 respectively. C (4, 5) are Interest rates lagged in 1 and 2. C (6,7) are foreign exchange rates lagged in 1 and 2.And C(8, 9) are WPI lagged in 1 and 2. C (10) is intercept.

FINDINGS

The causal nexus among monetary variables has been investigated by employing multivariate co integration analysis. Co integration analysis tells us about the long-term relationship between Bank nifty movement and the set of monetary variables. Co integration tests involve two steps. In the first step, each time series is scrutinized to determine its order of integration. To meet this requirement, unit root tests designed by Dickey and Fuller (1979) and Phillips and Perron (1988) have been employed. In the second step, the time series is analyzed for co integration by using the likelihood ratio test, which includes (i) trace statistics and (ii) maximum Eigen value statistics. A financial time series is said to be integrated to order one i.e, I (1), if it becomes stationary after differencing once. If series are integrated of order one, there may exist a linear combination that is stationary without differencing, then the data streams are co integrated. First step to conduct cointegration test is, test whether the data set have unit root or not. Pre condition is that all the variables should have unit root. For this purpose, the ADF test for unit roots and Phillips-Perron unit root test has been used at level and first difference. Table-1 and 2 exhibits the results of the Dickey-Fuller (ADF test) and Phillips-Perron unit root test results. Table 1 shows ADF and Philip-Perron unit root test results for level series. And Table 2 shows ADF and Philip-Perron unit root test results for first differenced data. This clearly shows that the time series are not stationary at level but at the first differences of the logarithmic transformations of the series are stationary. Thus, the series are integrated to the order of one I (1).From the above unit root analysis we can see that it is meeting the prerequisites, to perform cointegration analysis. The maximum likelihood-based Johansen (1988, 1991) test and Johansen-Juselius (1990) procedure is used to determine the presence of co integrating equations in a set of non stationary time series. A trace statistic has been used to test the null hypothesis of cointegrating vectors against the alternative of more cointegrating vectors. Table-.3 exhibits the results of the multivariate co integration test for the entire sample period. It shows there is a cointegration between Bank nifty indices and monetary variables for the period January 2000 to November 2011 in the Indian capital market. The trace test and Max-Eigen value test indicates the presence of one co integrating equation at the 0.05 level. Therefore, the result provides evidence of a long-term relationship between Banks nifty Index and monetary variables. To find the short term correlation between monetary variables and bank nifty index this study employs vector error correction method. This method helping to identify the influence of monetary variables on bank nifty.

Table 4. Shows the regression of bank nifty and monetary variables based on the vector error correction equation. This equation is based on 2 lags. The regression of bank nifty on monetary variables based on the vector error correction method gives meaningful or non spurious regression .It is very clear that monetary variables jointly have influencing power on bank nifty R squared is 0.367804 with an F value at 8.403587 (highly significant at p = 0.0000). Coefficient of C(6,7) and coefficient of C(4) are negative , it means that changes in foreign exchange rates and long term interest rates are negatively correlated to bank nifty ,with 1% and 5 % significant level respectively. But the impact of inflation is insignificant. In addition, the DW statistic at 2.04 is higher than the adjusted R Square value. The error term C1 is negative it is validating that the long run relationship between monetary variables and bank nifty. To check the validity of this model the following tests have been adopted:-**Coefficient test –Wald Test**.

This test will help us to analyses the short run impact of changes in these monetary variables on bank nifty. The Wald test results of each variable are shown in the following tables.

TABLE 5: COEFFICIENT TEST FOR WPI: - WALD TEST: WPI

Test Statistic	Value	Df	Probability
F-statistic	1.027452	(2, 130)	0.3608
Chi-square	2.054903	2	0.3579

TABLE 6: COEFFICIENT TEST FOR FOREX; WALD TEST: FOREX

Test Statistic	Value	Df	Probability
F-statistic	25.8665	(2, 130)	0
Chi-square	51.733	2	0

TABLE .7 COEFFICIENT TEST FOR INT:- WALD TEST: INT

Test Statistic	Value	Df	Probability
F-statistic	6.046187	(2, 130)	0.0031
Chi-square	12.09237	2	0.0024

The coefficient analysis by Wald test indicates that foreign exchange rates and long term interest rates have short run impact on bank nifty. The Chi square value is much Greater than F statics and P value is less than the 5%.The result support to reject null hypothesis (According to Wald test guideline for accepting or rejecting null hypothesis is If P value is less than 5% reject null and if P value is greater than 5% accept null hypothesis). Here the null hypothesis are as follows, Forex does not cause the bank nifty, INT does not cause bank nifty and inflation does not cause bank nifty. According to Wald test the null hypothesis cannot be rejected in case of WPI. It means that in the short run inflation doesn't have any impact on bank Nifty or whole sale price index doesn't have any significant impact on Bank stocks.

Residuals Test Results

The following residual tests have also been applied in this study to test the validity of the study:-

- Heteroskedasticity test
- Heteroskedasticity Test: ARCH
- Histogram(to test normality of the variables)
- Breusch-Godfrey Serial Correlation LM Test:

TABLE 8: HETEROSKEDASTICITY TEST: BREUSCH-PAGAN-GODFREY

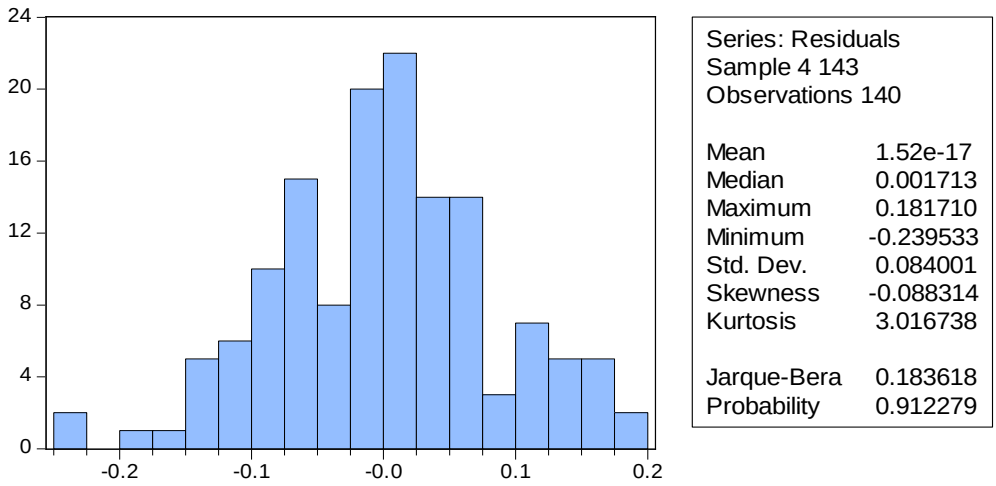
F-statistic	2.526293	Prob. F(12,127)	0.0051
Obs*R-squared	26.97872	Prob. Chi-Square(12)	0.0578
Scaled explained SS	23.45695	Prob. Chi-Square(12)	0.0241

TABLE 9: HETEROSKEDASTICITY TEST: ARCH

F-statistic	3.543628	Prob. F(1,137)	0.0419
Obs*R-squared	3.504708	Prob. Chi-Square(1)	0.0412

The probability value is higher than the 5% in Breusch-Pagan-Godfrey Hetroschedastcity (table no.8) test. So we cannot reject null hypothesis. This proves that residuals of the variables are homoschedastic. The probability value in Heteroskedasticity ARCH is 0.0412 which is less than 5% .This results prove that there is no auto regressive conditional Heteroskedasticity (ARCH) effect in this model.

FIG.1 HISTOGRAM



From the histogram (Fig. 1) Jarque-Bera statistic is 0.1836 and probability value is 0.91 which higher than 5%. This result not supporting to reject null hypothesis, i.e.; it is proved that residual in the test are normally distributed.

TABLE 10: BREUSCH-GODFREY SERIAL CORRELATION LM TEST

F-statistic	1.022504	Prob. F(2,128)	0.3626
Obs*R-squared	2.201554	Prob. Chi-Square(2)	0.3326

Based on the table.10 Breusch-Godfrey Serial Correlation LM Test it is proved that in the models residuals are not serially correlated, because the probability value of Chi-square is 0.33 which is higher than the 5%.

CONCLUSION

The underlying objective of this study was to investigate the relationship between NSE bank nifty and three important monetary variables namely long term interest rates, foreign exchange rates and inflation. The main motivation of this study is that banks stocks have high importance in the Indian capital market as well as it has crucial importance to financial sectors and to economies. The economic health of a country is largely dependent on the financial health of banking companies.

Applying Johansens's methodology of multivariate cointegration analysis on monthly time series data, this study examined the dynamic relationship between monetary variables and NSE bank index in India. Monetary variables such as foreign exchange rates, wholesale price index, and long term interest rates were used to represent external forces and the NSE's bank index was used to represent the commercial banks stocks returns. The main findings revealed that there is a long run equilibrium relationship between the monetary variables and bank stock returns. According to the VECM model estimated in the study, the rate of inflation, the long term interest rates and the foreign exchange rates were found to exert a significant lagged influence on the stock market index. A major proportion of the variability in the bank index was explained by its own innovations while only a minority was explained by monetary variables. This may be because the monetary variables used in this study represent only a subset of variables available in studies of developed markets. Future studies may benefit by integrating other variables such as industrial production, a broader measure of money supply and a short-term interest rate into their analyses.

The short run causal impact of the monetary variables analyzed by using Wald test applied on OLS of vector error correction model shows foreign exchange rates and long term interest rates have causal impact on bank index but whole sale price index (inflation) doesn't show any significant impact on bank nifty in the short run. Among the three variables foreign exchange rates is more influencing the bank stock returns, the reason may be because the Indian commercial banks are highly exposed with giving loans to multinational companies and also whenever the Indian rupee starts depreciating, foreign institutional investors may withdraw their holding from the Indian capital market.

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