

CO-INTEGRATION AMONG STOCK PRICES AND MACROECONOMIC VARIABLES IN INDIA – A BANKING SECTOR PERSPECTIVE

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Abstract *The study attempts to establish the relationship between banking stock prices in India (S&P BSE BANKEX) and macroeconomic variables namely index of inflation, foreign exchange rate, industrial production, interest rate and money supply over the period of 9 years from April 2009 to March 2018. The study applies unit root tests and finds all variables to be non-stationary at level but integrated of the first order. It then employs Johansen's co-integration test in order to estimate the presence and number of co-integrating vectors and vector error correction model (VECM) to identify relationships. While the study finds that macroeconomic variables are co-integrated with banking stocks in India, short-run dynamics to establish equilibrium were absent among them. It is observed that banking stocks relates positively to industrial growth and negatively to money supply. While banking stock prices were positively linked with inflation & foreign exchange rate and negatively linked with interest rates, their relationship was not statistically significant.*

Keywords: *Stock Prices, Macroeconomic Variables, Unit-Root Tests, Johansen's Co-integration, VECM*

INTRODUCTION

Stock market is the market space where financial transactions between buyers and sellers of securities take place. On one hand, it makes long-term capital available to the listed firms enabling them to expand their business; while on the other hand it offers a variety of investment avenues for investors (Naik & Padhi, 2012). The stock market provides a platform for transaction of securities and helps in determining their prices through demand and supply which are further dependant upon the investor preferences and the performance of the listed firms. Researchers are interested in identifying the factors impacting stock prices. Several studies in the past have concluded that stock prices are related with macroeconomic variables. Mukherjee & Naka (1995) studied their relationship in Japan and found the evidence of long-term relationship between them. Several other researchers established significant relationships (Amare & Mohsin, 2000; Maysami et al. 2004; Humpe & Macmillan, 2007; Ahmed, 2008; Akbar et al., 2012; Naik & Padhi, 2012) in different economies by using different time period of data. All these studies concluded that stock prices are associated with macroeconomic variables, however their relationship

might alter depending upon the parameters used.

However, despite being one of the fastest growing economies in the world, little research has been done in India to establish relationships. The previously identified results vary from one market to other and depend upon the time period and frequency of data used. Moreover, several studies conducted in the past have pointed towards the need of establishing the relationship of macroeconomic variables with sector specific stocks. Thus, further research is needed to strengthen this relationship. The study is aimed at identifying the relationship between stock prices (specific to banking sector) and macroeconomic variables including rate of inflation, risk free interest rate, industrial production, foreign exchange rate and money supply (broad) over a period of 9 years from April 2009 to March 2018. The results of the study shall increase the available literature and provide recommendations for policy makers and investors.

EVIDENCES FROM LITERATURE

Maysami & Koh (2000) attempted to establish the linkage between stock prices and macroeconomic activities over a period of 7 years (January 1988 to January 1995) in

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Singapore. Their study employed vector error correction model to examine the dynamic relations and concluded that there exists co-integration among stock prices and changes in exchange rate, stock price, interest rates and money supply.

Wongbankpo & Sharma (2002) studied the relationship of rate of inflation, interest rate, foreign exchange rate, gross national product and broad money supply with stock prices in five countries Asian economies (Singapore, Indonesia, Malaysia, Philippines and Thailand) from 1985 to 1996. The results of the study revealed that in Philippines & Indonesia, rate of inflation affects stock prices and money supply negatively, while money supply in Thailand, Singapore and Malaysia showed positive association with stock prices.

Humpe & Macmillan (2007) also analysed this relationship in US economy over a period of 40 years from 1965 to 2005. The study employed co-integration analysis for establishing long-term association. The study found stock prices to be positively related with growth in industrial output and negatively related with rate of interest and inflation.

Keray Raymond (2009) attempted to investigate the relationship in context of Jamaica by using data from 1990 to 2009 (monthly data). The study found the variables to be co-integrated by applying the Johansen co-integration test. Co integration and Vector Analysis indicated stock prices to be positively influenced by broad money supply & rate of inflation and negatively influenced by the exchange & interest rate.

Few studies have also been conducted in the Indian context. Naka et al. (1998) analyzed this association over a period of 35 years (1960 to 1995). The study employed a VECM approach and found that the selected macroeconomic variables and stock prices were co-integrated. The study concluded that the rate of inflation is negatively associated with stock prices in India.

Ahmed (2008) also explored this linkage in India over a period of 12 years from 1995 to 2007. While the study confirmed the relationship among them however, it concluded that statistical relationship values of macroeconomic variables differ as per the dependent variable i.e. BSE Sensex and BSE Nifty.

Srivastava (2010) attempted to establish relationship between macroeconomic factors (inflation, industrial production, rate of interest & currency and MSCI world index) and stock prices in India using monthly time series data for the period April 1996 to January 2009. The study used mathematical models including Johansen co-integration test to estimate co-integrating equations and vector error correction model (VECM) for analysing the short-run dynamics. The study found that wholesale price index and rate of interest impact the stock prices in the long run.

Naik & Padhi (2012) also studied the relationship using macroeconomic variables viz. growth in industrial output, money supply (broad, M3), inflation rate (wholesale level), interest rate (yield on 91 days t-bills) & foreign exchange rate of INR with USD. The study used data for over 17 years from 1994 to 2011 and applied both the Johansen's co-integration and VECM techniques. Their study found the presence of one co-integrating equation by using trace statistics confirming association between the two in the long term. While the relationship of money supply (broad) and industrial production showed positive linkages with stock prices, in case of rate of inflation it was negative owing to lesser purchasing power of buyers and increase in costs of raw materials lowering the profitability and stock prices for the firm and market as whole.

THEORETICAL FRAMEWORK

Maysami et al. (2004) stated that rise in industrial production fastens the pace of economic growth and increases stock prices. Due to the unavailability of data for traditional measures of real economic activity on monthly basis, researchers use index of industrial production as a real measure of output as the data for the same is available and released monthly. The studies investigating the relationship of IIP with stock prices found that a growth in industrial production shall result into higher revenue for the firms. These higher revenue shall in turn result into higher profitability for the firm given that the impact of rate of inflation do not hamper industrial production growth. Therefore, the increase in profitability will increase the present value of the firm thereby triggering higher investments in stock markets thus making the stock prices to rise and vice-versa. Studies conducted by Chen et al. (1986), Maysami et al. (2004) and Ratanapakorn & Sharma (2007) established positive association between IIP and stock prices. However, certain studies including Olowe (2007), Vardhan & Sinha (2015) among others found negative relationship between stock prices and IIP. Researchers establishing negative relationship attributed the presence of speculative trading in market, increase in inflation offsetting the additional profits due to increase in production and exclusion of service-specific stocks from IIP as explanations of this negative relationship.

Therefore, the Study Chooses Index of Industrial Production as a Crucial Factor Affecting Stock Prices

Interest rates are expected to have a negative association with stock prices, as any increase in interest rate will lead to reduction in liquidity and money supply in the market.

Increase in interest rate also makes borrowing costs more expensive for firms causing a reduction in profitability of the firm and thus its stock price overtime. Ahmed (2008) through his study concluded that as per the Indian context, stock prices tend to lead economic development except the fluctuations in interest rate which in contrast lead the stock prices. Similarly, Maysami et al. (2004) stated that stock prices are driven by interest rates in such a way that when a high quantity of stocks are not bought out of savings, an upward movement in interest rates will result into higher procurement costs owing to interest repayments costs and decrease in profitability of firms.

Hence, Interest Rate is Found to be an Important Factor Explaining Movements in Stock Prices

Relationship of money supply with stock prices is empirically mixed. Wongbankpo & Sharma (2002) examined the relationship between the two and identified that stock prices are positively related with money supply in Thailand, Malaysia and Singapore. Researchers such as Abdullah & Hayworth (1993), Maysami et al. (2004) and Sohail & Hussan (2009) among others also found similar relationships. On the other hand, several other researchers including Humpe & Macmillan (2007) and Rahman et al. (2009) found negative relation between them arguing that an increase in supply of broad money shall result in an increase in the discount rate which in turn shall reduce the stock prices owing to increase in costs. Hussin et al. (2012) and Ray & Sarkar (2014) also found similar relationship in Malaysia and India respectively.

Thus, Money Supply is Another Important Variable Identified by Literature

As per existing literature, the relationship of inflation with stock prices is found to be both negative and positive. It is argued that rate of inflation and risk free rate are positively correlated. Thus, an increase in inflation will reduce the stock prices on account of higher borrowing costs. Coleman & Tettey (2008) and Akbar et al. (2012) analyzed their relationship in Ghana and Pakistan respectively and found inflation rate to be negatively associated with stock prices. Several other studies conducted by Fama (1981), Mukherjee & Naka (1995) and Pal & Mittal (2011) also found negative relationship between inflation and stock price. However, certain other studies including Gjerde & Sættem (1999) and Nishant & Shaheen (2004) established a positive relationship between the two.

Therefore, Inflation is Considered as a Significant Influence Upon Stock Prices

The relationship between foreign exchange rate and stock prices depends upon the type of economy (with respect to import or export). Depreciation of domestic currency shall increase stock prices of domestic firms in an export oriented economy and decrease their stock prices in an import-oriented economy. Smyth & Nandha (2003) concluded exchange prices to be significantly related with stock prices in India and Sri Lanka. Amare & Mohsin (2000) also established similar relationship in two Asian countries. However, Menike (2006) established negative association between them in Sri Lanka. Keray Raymond (2009) and Hussin et al. (2012) also found similar negative relationship between them in Jamaica and Malaysia respectively.

Thus Exchange Rate is Another Important Factor Affecting Stock Prices

Thus, the study identifies interest rate, money supply, index of industrial production, foreign exchange rate and inflation as critical macroeconomic factors influencing stock prices. Other macroeconomic variables have been omitted owing to their multi-collinearity with present variables. The impact of these variables are studied by using descriptive statistics, unit root test, Johansen's co-integration test and vector error correction model depending upon the type of data set. Following model shall be used for determining the stock prices.

$$X = (\text{SPI}, \text{IIP}, \text{IF}, \text{MS}, \text{ER}, \text{IR})$$

Where SPI denotes stock market index (S&P BSE BANKEX), IIP denotes index of industrial production, IF denotes inflation rate, MS denotes broad money supply, ER denotes exchange rate and IR denotes interest rate.

OBJECTIVE OF THE STUDY

To identify the relationship between banking stock market in India (S&P BSE BANKEX) and five macroeconomic variables namely interest rate, money supply, industrial production growth, foreign exchange rate and inflation.

RESEARCH METHODOLOGY

- a. Scope of the study - The scope of the study is to examine relationship of five macroeconomic variables with Indian Stock Market. Furthermore, it deals with the firms listed in the S&P BSE BANKEX Index.

- b. Variables - The study considers five macroeconomic variables viz. risk free rate of interest, money supply, industrial production, foreign exchange rate and inflation as independent variables and S&P BSE BANKEX as the dependent variable.
- c. Construction of Variables - The variables are constructed in the following way.

Table 1: Construction of Variables

Variables	Symbols	Proxy Used
Index of Industrial Production	IIP	Natural logarithm of monthly index of industrial production
Inflation	IF	Natural logarithm of monthly wholesale price index
Money Supply	MS	Natural logarithm of broad money supply (month-end)
Exchange Rate	ER	Natural logarithm of monthly exchange rate in INR per US\$
Interest Rate	IR	Monthly average of call money rates
Stock Prices	SPI	Natural logarithm of monthend closing prices of S&P's BSE BANKEX

- d. Data Period - The study shall consider monthly data of all dependent and independent variables from the period April 2009 to March 2018.
- e. Sources of Data - Secondary data will be extensively used in the study. The source of data collection for each variable is listed in the table below.

Table 2: Data Sources

Variables	Data Source
Index of Industrial Production	Ministry of Statistics and Program Implementation, Government of India
Wholesale Price Inflation	Website of Economic Adviser, Ministry of Commerce and Industry
Money Supply	Handbook of Statistics on Indian economy, RBI
Exchange Rate, INR/USD	Handbook of Statistics on Indian economy, RBI
Call Money Rate	Handbook of Statistics on Indian economy, RBI
S&P BSE BANKEX	Website of Bombay Stock Exchange Ltd.

- f. Tools of Analysis - The study employs descriptive analysis (mean, median, maximum, minimum, standard deviation etc.) to understand the general trend in variables. Unit root analysis is then done to understand the data stationarity. Conducting unit

root tests to analyze the stationarity of data is critical for researchers as the regression of two (and more) non-stationary time series may cause the problem of spurious regression. The study employs three different unit root techniques namely Kwiatkowski-Phillips-Schmidt-Shin (KPSS), Phillips-Perron (PP) and Augmented Dickey Fuller (ADF).

If all variables (including both the dependent and independent variables) are found to be non-stationary at level but become stationary when first differenced, then there might exist co-integration among them. Johansen-Juselius (1990) co-integration test is a one step statistical method for testing the presence and number of co-integrating equations. If y_t is co-integrated, it is possible to generate this time series into form of the vector error correction model (VECM). This model assuming co-integration of order p (Enders, 2004) can be mathematically expressed as below.

$$\Delta y_t = \Pi y_{t-1} + \sum_{i=1}^p \Gamma_i \Delta y_{t-i} + \beta x_t + \varepsilon_t \tag{1}$$

Where, y_t is a $(n \times 1)$ vector of non-stationary $I(1)$; p is the maximum length included in the model; ε_t is $(n \times 1)$ matrix of error terms; Γ_i equals $(\sum_{i=1}^{p-1} A - I)$ and represents the model dynamics over short run; Π equals $(\sum_{i=1}^p A_i - I)$ and represents the long run linkage among the variables included in the vector y_t . Applied only after the confirming stationarity at first difference, idea of the Johansen's co-integration is to determine the rank of the matrix or in other words, the number of independent co-integration vectors. This rank of the matrix can be estimated through maximum eigenvalue statistic and maximum trace statistic, both of which are statistically expressed below.

$$\lambda_{\max} = -T \log(1 - \lambda_{r+1}) \text{ and } \lambda_{\text{trace}} = -T \{ \sum_{i=1}^n (1 - \lambda_i) \} \tag{2}$$

Where, r is the number of co-integrating vectors; T is the sample size and λ_t denotes the eigenvalues taken from the matrix Π . These two statistical tests do not necessarily indicate the same results always. In case of different results, the maximum trace statistic is preferred as it takes into account all of the smallest eigenvalues (Serletis & King, 1997).

If non-stationary variables are found to be co-integrated, they are said to have a long-term relationship. Engle-Granger (1987) introduced an error correction mechanism (ECM) allowing for correcting the disequilibrium in this co-integration relationship (Hamdi et al., 2013). The multivariate counterpart of ECM is referred to as the vector error correction model (VECM), which is also known as restricted form of VAR model. VECM allows for checking the presence of short-run dynamics in the system to restore

equilibrium. Its estimation of the VAR system under the VECM approach for two non-stationary co-integrated variables can be specified from the following equations.

$$\Delta x_t = \alpha_1 + \delta_1 ect_{t-1} + \sum_{i=1}^p \beta_1 \Delta x_{t-i} + \sum_{i=1}^p \gamma_1 \Delta y_{t-i} + \varepsilon_{1t} \quad (3)$$

$$\Delta y_t = \alpha_2 + \delta_2 ect_{t-1} + \sum_{i=1}^p \beta_2 \Delta y_{t-i} + \sum_{i=1}^p \gamma_2 \Delta x_{t-i} + \varepsilon_{2t} \quad (4)$$

Where, δ_1 and δ_2 are the parameters of the error correction terms (ECTs), representing the long run equilibrium amongst the underlying time series; absolute value of δ_1 and δ_2 indicates the speed of getting back to equilibrium; ect_{t-1} is known as the error correction terms obtained from long run model at lagged number i and are commonly referred to as lagged equilibrium error terms. γ_1 and γ_2 capture the short-run influences from changes in x to y and from changes in y on x , respectively.

ESTIMATING RESULTS

Table 3: Descriptive Statistics

Statistic	IIP	WPI	MS	EXR	CMR	SPI
Mean	4.68	4.64	11.36	4.03	6.75	9.63
Median	4.67	4.69	11.39	4.09	6.98	9.54
Maximum	4.93	4.76	11.85	4.22	9.97	10.34
Minimum	4.43	4.38	10.79	3.79	3.18	8.64
Standard Deviation	0.101	0.105	0.306	0.147	1.654	0.362
Skewness	-0.035	-1.067	-0.274	-0.369	-0.769	0.066
Kurtosis	2.609	2.890	1.844	1.570	3.031	2.199
Jarque-Bera	0.710	20.556	7.363	11.654	10.653	2.961
Probability	0.70	0.00003	0.025	0.0029	0.004	0.227

Table 4: Unit Root Tests for Stationary

Variables	ADF Test	PP Test	KPSS Test	Order of Integration
	H0: Variables is non-stationary	H0: Variables is non-stationary	H0: Variables is stationary	
LnSPI	1.840	1.978	1.107*	I(1)
Δ LnSPI	-11.033*	-11.106*	0.135	
LnIIP	3.866	3.161	1.280*	I(1)
Δ LnIIP	-2.157**	-27.259*	0.188	
LnWPI	2.400	3.255	0.958*	I(1)
Δ LnWPI	-5.070*	-5.025*	0.804*	

LnMS	10.331	10.141	1.179*	I(1)
Δ LnMS	-0.882**	-6.396*	0.336	
LnEXR	1.165	1.157	1.059*	I(1)
Δ LnEXR	-7.759*	-7.620*	0.143	
CMR	0.219	0.139	0.312**	I(1)
Δ CMR	-7.979*	-8.183*	0.443***	

*, ** and *** denotes significance at 1%, 5% and 10% level respectively

Δ represents first difference

Table 3 represents the descriptive analysis of the data set. As per the results, call money rate and S&P BSE BANKEX are the most volatile variables with a standard deviation of 1.654 and 0.362 respectively. All independent variables were found to be negatively skewed with exchange rate as the most skewed data series at a skewness of -0.369. S&P BSE BANKEX on the other hand was found to be positively skewed with a value of 0.066. With respect to the curvature of data series, all variables except call money rate were found to be platykurtic. Call money rate on the other hand was found to be leptokurtic. Thus, as per parameters such as skewness, kurtosis and Jarque-Bera the data was not found to be normal.

For checking the stationarity of data, ADF, PP and KPSS tests are applied. The results of these tests are shown in table 4. As per the results mentioned in table 4, all variables are not found to be stationary at level or zero difference. However, when converted to first difference, all variables become stationary implying the possibility of co-integration among them. Thus, Johansen's co-integration approach is used below:

The study applies unrestricted VAR model to identify the ideal number of lags using lag length criteria. As per the results, SC and HQ criterion indicates the number of lags as 1. However in case of number of observation exceeding 100, at least 2 lags should be considered. The study thus considers 2 lags as per the final prediction error criterion as an input for developing Johansen's co-integration test through trace and maximum eigenvalue statistic. Table 6 below shows the results of Johansen's co-integration technique. While the parameters of trace statistic indicates the presence of one co-integrating vector at 5% significance, the maximum eigenvalue test statistics on the other hand indicates no co-integrating equation at 5% significance. As per Johansen and Juselius (1990), the results of trace statistic is chosen over maximum eigen statistic in case of a conflicting scenario. Thus as per the results of trace statistic, the study concludes the presence of one co-integrating equation.

Table 5: VAR Lag Order Selection Criteria

Lag	LogL	LR	FPE	AIC	SC	HQ
0	486.569	NA	2.70e-12	-9.611	-9.455	-9.548
1	1272.747	1462.296	8.23e-19	-24.614	-23.520*	-24.172*
2	1316.833	76.709	7.06e-19*	-24.776	-22.744	-23.954
3	1346.596	48.215	8.15e-19	-24.651	-21.682	-23.449
4	1378.496	47.849	9.18e-19	-24.569	-20.662	-22.988
5	1419.471	56.545	8.84e-19	-24.669	-19.823	-22.708
6	1456.651	46.846	9.49e-19	-24.693	-18.909	-22.352
7	1494.311	42.931	1.05e-18	-24.726	-18.004	-22.005
8	1547.639	54.395*	9.04e-19	-25.072*	-17.413	-21.972

* indicates lag order selected by the criterion
 LR: sequential modified LR test statistic (each test at 5% level)
 FPE: Final prediction error
 AIC: Akaike information criterion
 SC: Schwarz information criterion
 HQ: Hannan-Quinn information criterion

Table 6: Johansen’s Co-integration Test Results

HypothesizedNo. of CE(s)	TraceStatistic	Probability**	Max-Eigen Statistic	Probability**
None	95.985	0.048*	32.176	0.293
At most 1	63.808	0.137	23.314	0.506
At most 2	40.494	0.205	15.200	0.732
At most 3	25.294	0.151	13.230	0.431
At most 4	12.064	0.153	9.672	0.234
At most 5	2.392	0.121	2.392	0.121

* denotes significance at 5% level
 **MacKinnon-Haug-Michelis (1999) p-values

Table 7: Vector Error Correction Model

Normalized Co-integrating Coefficients						
LnSPI(-1)	LnIIP(-1)	LnWPI(-1)	LnMS(-1)	LnEXR(-1)	CMR(-1)	C
1.00	-59.14	-13.62	28.83	-12.06	0.40	-48.76
	(12.56)	(12.83)	(7.60)	(6.82)	(0.37)	
	[-4.70*]	[-1.06]	[3.79*]	[-1.76]	[1.08]	
Coefficient of Error Correction terms						
D(LnSPI)	D(LnIIP)	D(LnWPI)	D(LnMS)	D(LnEXR)	D(CMR)	C
0.027	-0.179	-3.31	0.012	-0.221	0.016	0.021
(0.115)	(0.278)	(1.268)	(0.782)	(0.514)	(0.022)	(0.014)
[0.240]	[-0.643]	[-2.615]	[0.015]	[-0.430]	[0.745]	[1.426]

* denotes significance at 0.05 level

In the next step, co-integrating equation is extracted from the Johansen’s co-integration technique as follows:

$$\text{LnSPI} = 48.76 + 59.14\text{LnIIP} + 13.62\text{LnWPI} - 28.83\text{LnMS} + 12.06\text{LnEXR} - 0.40\text{CMR}$$

The table above highlights the standard error and t-statistic of each of the normalized co-integrating coefficients along with VECM. As per the results, the coefficients of all macroeconomic variables except money supply and call

money rate are found to have a positive relationship with banking stock prices in India. As per the t-statistics, only industrial growth measured by IIP and money supply (broad, M3) are found to be significant. On the other hand, wholesale price inflation, exchange rate and call money rate are not found to be significant. The error correction term derived through VECM is -0.005 but is not significant. This indicates that once short-term deviation from the equilibrium occurs in banking stock prices in India, the model do not respond significantly to go back to its equilibrium state.

With respect to significant relationships, the study found negative relationship between money supply (broad) and Indian banking stock prices. This relationship can be partly explained by the impact of money supply (broad) on discount rate i.e. an increase in money supply shall raise the discount rate which in turn shall reduce the stock prices. This relationship is consistent with studies conducted by Humpe & Macmillan (2007) and Rahman et al. (2009). Hussin et al. (2012) and Ray & Sarkar (2014) also found similar relationships in Malaysia and India respectively. The study also found a positive relationship between IIP and banking stocks in India. This relationship is consistent with studies conducted by Chen et al. (1986), Maysami et al. (2004) and Rahman et al. (2009). The studies argued that an increase in industrial production increases the overall profitability and the present value of the firm. This increase in present value further triggers investments in stock markets thus making the stock prices to rise and vice-versa.

CONCLUSION AND IMPLICATIONS

The study investigated the relationship between banking stock prices in India and macroeconomic variables over the period April 2009 to March 2018. As per the results obtained from three unit root tests (ADF, PP and KPSS), the data was found to be non-stationary at level but becomes stationary when differenced. With the data integrated of the same order, Johansen's co-integration model and vector error correction model are used to establish long and short run relationships.

In conclusion, the study found evidence of co-integration between banking stock prices and macroeconomic variables in India. While the trace statistic suggested the presence of one co-integrating vector in the model, the maximum eigen statistic indicated no co-integrating vector. The study prioritised the results of trace statistic over maximum eigen value statistic as per Johansen and Juselius (1990) and concluded one co-integrating vector in the model. While index of industrial production was found to be positively related with banking stocks, money supply was found to be negatively associated. The relationship of other macroeconomic variables with banking stock prices was

not found to be significant. The error correction estimated through VECM was negative but not significant implying the absence of short-run dynamics in the model to attain equilibrium.

The study holds vast implications for several stakeholders including investors, policy makers and academicians. For investors, the study provides evidence to map their investment strategy with macroeconomic variables and observe their assets with leading or lagging macroeconomic variables. Policy makers can leverage the results of this study to strike a balance between macroeconomic policies variables and stock market returns by formulating favourable monetary and fiscal policy. Lastly for academicians, the study further extends the belief regarding this relationship to sector based banking stocks. Academicians and researchers can further research their relationship by taking different time frame, including more macroeconomic variables and other sector based indices.

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