



# BALANCING GROWTH AND STABILITY: FINANCIAL INTEGRATION AND MACROECONOMIC CHALLENGES IN INDIA

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## -----ABSTRACT-----

Financial integration has become a key component of development strategies in emerging economies such as India, linking domestic financial markets with the global financial system through greater capital mobility, foreign investment, and financial liberalization. Since the economic reforms of 1991, India has progressively eased capital flow restrictions, promoted foreign direct investment (FDI) and foreign portfolio investment (FPI), and strengthened domestic financial markets. While financial integration has improved access to international capital, enhanced liquidity, and supported economic growth, it has also increased exposure to global financial cycles, external shocks, exchange rate volatility, and sudden capital flow reversals, posing challenges for macroeconomic stability and monetary policy.

This study examines the relationship between financial integration, financial stability, and macroeconomic performance in India using annual data from 2000 to 2023. Drawing on the finance-growth literature, it analyzes short-run and long-run linkages between Indian stock market indices (Sensex and Nifty) and key macroeconomic variables such as industrial production, money supply, inflation, interest rates, exchange rates, oil prices, gold prices, and global market indicators. The econometric framework employs Augmented Dickey-Fuller (ADF), Phillips-Perron (PP), and KPSS unit root tests, followed by the Johansen-Juselius co-integration technique and a Vector Error Correction Model (VECM).

Empirical results confirm a long-run co-integrated relationship between stock market indices and major macroeconomic variables, highlighting strong interdependence between financial markets and real economic activity. The study emphasizes the need for strong regulation, prudent macroeconomic policies, and resilient financial institutions to ensure sustainable and stable economic development.

**KEY WORDS:** Financial Integration, Macroeconomic Stability, Stock Market, Indian Economy-----

## I. INTRODUCTION

In the current global economic environment, financial integration has become a central feature of development strategies for emerging economies like India. Financial integration refers to the process through which a country's financial markets and institutions become closely linked with the international financial system by allowing greater cross-border capital flows, foreign investment, and financial liberalization. For India, this process gained momentum after economic reforms in the early 1990s and has been further reinforced in recent years through policy measures aimed at attracting foreign direct investment (FDI) and portfolio inflows, developing deep domestic capital markets, and integrating with global financial networks. Although financial integration can bring advantages such as access to international capital, enhanced liquidity, and improved resource allocation, it also increases the exposure of the Indian economy to external financial cycles, global market volatility, and sudden shifts in investor sentiment. These external influences can contribute to fluctuations in exchange rates, capital flow reversals, and instability in asset prices, posing macroeconomic challenges even as the country pursues high growth targets.

Since liberalization in 1991, the Indian government and the Reserve Bank of India (RBI) have progressively eased restrictions on capital movements, allowing greater participation from foreign investors in equity and debt markets, permitting external commercial borrowings, and encouraging overseas direct investment. This gradual opening has helped attract substantial FDI and foreign portfolio investment (FPI), boosting economic growth and



contributing to the expansion of the financial sector. According to recent data, India continued to receive strong FDI and FPI inflows, highlighting investor confidence in the economy's fundamentals and resilience even amidst global economic turbulence.

However, increased openness also brings macroeconomic vulnerabilities. Global financial market swings, geopolitical tensions, and changing risk appetites among international investors have exposed India to potential capital flow volatility and exchange rate pressures. For example, sudden shifts in global markets can lead to rapid foreign investment outflows, affecting stock markets and exerting pressure on the rupee, which in turn can influence inflation dynamics and monetary policy decisions. Moreover, external shocks transmitted through financial channels can complicate the RBI's task of sustaining growth while maintaining price stability. Recent policy discussions and financial stability assessments by the RBI emphasize that global spillovers and financial market risks remain significant considerations for India's macroeconomic framework.

In this context, study derives insights from the finance as a critical element of growth (Schumpeter 1911, Goldsmith 1969, McKinnon 1973, Shaw 1973, Fry 1978, 1988, Bencivenga and Smith 1991, King and Levine 1993a, 1993b). There can be both short-run and long-run relationships between them. As mentioned before, the long-run analysis is conducted using the Johansen-Juselius (1990) co-integration test. This co-integration test consists of three broad steps. First, examine whether all variables in the model are integrated of the same order and this can be conventionally established by unit root tests. Second, determine the optimal lag length for the VAR model to verify that the estimated residuals are not auto correlated. Third, estimate the VAR model to construct the co-integration vectors to determine the order of co-integration (Enders, 2004, 2010). Finally, estimate Vector Error Correction Model (VECM) to find the short-run and long-run interaction.

The main objective of the research paper is financial stability can help monetary policy in terms of enhanced response of growth and inflation to interest rate actions. Also, financial stability can be associated with enhanced output persistence and lower inflation persistence. In the following, the paper is presented in five sections. First Section given by introduction, Section II reviews the literature. Section III discusses data and methodology. Section IV discusses empirical analysis. Section V is concludes.

## II. LITERATURE REVIEW

The literature on financial integration and macroeconomic instability in India highlights both the opportunities and risks associated with greater openness of financial markets. Since the liberalization reforms of 1991, India has progressively integrated its domestic financial markets with global capital flows through measures such as deregulation of interest rates, foreign institutional investor participation, and gradual capital account liberalization. Some empirical literature on the nexus between financial integration and macroeconomic instability revealed positive relationship. For instance, Mishkin and Frederic S (1999), Barry Eichengreen (2004), Anthony and Gibson (2008), Mitsuhiro Osada and Masashi Saito (2010), Eswar S. Prasad (2010), Jayaraj S (2016) Niranjan R (2017) and their study examine the two of the key questions facing policymakers today are how to reduce the risk of global financial instability and how to handle with it when it occurs. This paper starts by defining financial instability and then showing how it harms economic activity.

**Andreas Hoffmann and Bjorn Urbansky (2003)** examined policy shifts and financial instability in emerging markets from a Hayekian perspective. The study argues that stabilizing financial markets during crises distorts asset pricing. Using secondary data from mature and East Asian markets, it observes rising financial volatility. The findings highlight sensitivity of emerging markets to global monetary policy changes.

**Barry Eichengreen (2004)** analyzed the challenge of financial instability and the role of financial restrictions. The study used IMF data from the world's largest economies covering exchange rates and inflation. It examined the cost of financial crises and banking failures. The results show that banking crises account for nearly 30 percent of total crisis costs.

**Gianni De Nicolo and Alexander Tieman (2006)** examined economic and financial integration in Western Europe. The study analyzed real activity, financial markets, and systemic risk during 1990–2004. Results showed that systemic risk in large banks did not decline over time. The study concluded that integration does not necessarily enhance financial stability.

**Anthony and Gibson (2008)** investigated financial integration, economic instability, and trade structure in emerging markets. A multivariate GARCH model was used to estimate market integration. The study found that



emerging markets remained largely segmented. Financial integration declined significantly during the financial crises of the 1990s.

**Mitsuhiro Osada and Masashi Saito (2010)** examined the relationship between financial integration and economic growth. The study used panel data from 83 countries for the period 1974–2007. Results indicated that financial integration supports growth indirectly. This effect operates through trade expansion and financial market development.

**Eswar S. Prasad (2010)** provided an overview of financial sector regulation and reforms in emerging markets. The study focused on balancing financial stability, development, and financial inclusion. Using data from central banks, it highlighted risks of excessive capital flow volatility. The findings supported moderating financial globalization during unstable periods.

**Claudiu T. Albulescu (2011)** analyzed the impact of financial instability on Central and Eastern European countries. A panel data approach was used to assess economic and financial integration. The study found that financial crises severely affected these economies. Financial integration increased vulnerability despite early economic benefits.

**Samual Muthoga, Almadi Obere, and others (2013)** analyzed regional financial integration and economic growth in the East African Community. The study used dynamic panel SGMM techniques and data from 2000–2009. Results showed a positive relationship between integration and growth. Regional financial cooperation improved economic performance.

**Mahajan and Verma (2015)** examined financial integration and economic growth in India from 1981–2011. The study used co-integration and VECM techniques. Results showed a stable long-run relationship between integration and growth. Structural reforms did not significantly change this relationship.

**Jayaraj S. (2016)** examined financial market integration in India after liberalization. The study used RBI data from 1993–2013 and applied econometric models. Results showed integration among selected segments of financial markets. Financial reforms played a significant role in this integration.

**Niranjan R. (2017)** investigated financial integration and macroeconomic volatility in India. Using VECM and data from 1989–2014, the study analyzed output, consumption, and investment volatility. Results showed that financial openness reduced macroeconomic volatility. Financial integration contributed to economic stabilization.

### III. DATA AND METHODOLOGY

The most popular test of non-stationarity (unit root) is the Augmented Dickey-Fuller (ADF) test. If the series follows an AR( $p$ ) process, the ADF test makes a parametric correction and controls for the higher order correlation by adding the lagged difference terms of the dependent variable to the right-hand side of the regression equation. However, since the ADF test is often criticized for lower power, the unit root test has been complemented with Phillips-Perron (PP) test which adopts a non-parametric method for controlling higher order serial correlation in the series. In both ADF test and PP test the null hypothesis is that the data set has unit root (non-stationary).

The study has been undertaken by collecting purely secondary sources of data and information. However, the main focus of the study is to quantify the links between financial integration, financial stability, financial instability and economic performance in India, the dataset is composed of macroeconomic variables as of 2023. The study used twenty three years annual data between 2000-2023. Further, for panel applied Panel Data Regression researcher limits the data boundary from 2000 to 2023.

For the ADF test, study estimated the most general ADF model, which includes both a drift and linear time trend, as follows.

$$\Delta \ln Y_t = \alpha_0 + \alpha_1 t + \gamma \ln Y_{t-1} + \sum_{i=1}^p \beta_i \Delta \ln Y_{t-i} + \varepsilon_t$$

where  $\ln Y$  is the natural logarithm of the variables in question.  $\alpha_0$ ,  $\alpha_1$ ,  $\gamma$  and  $\beta_i$  are constant terms while  $t$ , and  $\Delta$  are the time trend and the first difference operator, respectively.  $\varepsilon_t$  is the white noise residual and is the lagged values of  $\Delta \ln Y$  to control for higher-order correlation if the series follows an AR( $p$ ). For the PP unit root, study estimated the following model.

$$\Delta \ln Y_t = \alpha_0 + \alpha_1 t + \gamma \ln Y_{t-1} + \varepsilon_t$$

Where, the variables and parameters are the same as defined in the ADF unit root test. The null hypothesis for the ADF unit root test and for the PP unit root test is that  $\gamma = 0$ , which implies that the series has a unit root, the time series is non-stationary, against the alternative hypothesis of stationarity i.e.,

These descriptive statistics provide a historical background for the behavior of our data. For instance, the standard deviations indicate that money supply (M3), Sensex, Nifty, Oil Price (OP), and Gold Price (GP) are more volatile compared to the Index of Industrial Production (IIP), Weighted Average of Call Money Rate (WACMR), the Standard and Poor's 500 composite stock price index (S&P 500), and Exchange Rate (ER), Likelihood Ratio (LR), Bombay Stock Exchange (BSE). Furthermore, the standard deviation indicates that the exchange rate (Ex) and Inflation (INF) are less volatile compared to the rest of the macroeconomic variables during the sample period. From the models are co-integrated, that means that there is a long-run association between Indian stock market index (Sensex and Nifty) and selected macroeconomic variables (IIP, MS, WPI, GP, OP, ER and S&P 500). The presence of co-integration indicates that at least one of the variables react to deviation from the long-run equilibrium relationship.

#### IV. EMPIRICAL RESULT

##### STATISTICAL PROPERTIES OF TIME SERIES DATA

Financial time series are usually assumed to be non-stationary. Also, macro variables can follow different distributions, so all data are tested and analyzed initially. In this section, at first, we have observed the visual inspection of the time series data which are seasonally adjusted, and log transformed. These are presented in Figure 2.1 to Figure-2.11 and show the evolution of these variables during the sample period.

The graphical representations of the variables in the study period provide a visual overview of their trends and patterns over time. Figures 2.1 and 2.2 depict the levels of LNSENSEX and LNNIFTY, showing the overall performance of the Indian stock market indices, with fluctuations reflecting market volatility and investor sentiment during different economic phases. Figure 2.3 presents LNIIP, representing industrial production, which highlights periods of economic expansion and contraction, indicating underlying real sector activity. Figure 2.4 shows LNWPI, capturing wholesale price index movements, reflecting inflationary trends in the economy. Figures 2.5 and 2.6, which present LNMS (money supply) and LNWACMR (weighted average call money rate), depict the liquidity conditions and monetary policy stance, showing how financial markets respond to changes in policy rates. Figures 2.7 and 2.8 illustrate LNGP (government expenditure) and LNOP (other public expenditure or output proxy), highlighting fiscal trends and their influence on economic activity. Figure 2.9 shows FII inflows, providing insight into foreign investor participation and its impact on market dynamics. Figure 2.10 depicts LNER (exchange rate), showing fluctuations in currency value against global pressures, while Figure 2.11 presents LNSP\_500, indicating movements in broader market indices over time. Collectively, these graphical representations allow for a preliminary understanding of the behavior, trends, and volatility of both financial and macroeconomic variables during the study period, serving as a foundation for further econometric analysis.

Table-2.1 summarizes the basic statistical features of the data under consideration including the mean, the minimum and maximum values, standard deviation, kurtosis, skewness, and the Jarque-Bera test for the data in their levels. These descriptive statistics provide a historical background for the behavior of our data. For instance, the standard deviations indicate that money supply (M3), Sensex, Nifty, Oil Price (OP), and Gold Price (GP) are more volatile compared to the Index of Industrial Production (IIP), Weighted Average of Call Money Rate (WACMR), the U.S. stock market (S&P 500), and Exchange Rate (ER). Furthermore, the standard deviation indicates that the exchange rate (Ex) and Wholesale Price Index (WPI) are less volatile compared to the rest of the macroeconomic variables during the sample period.

It has been observed from Table-2.1, that P-values associated with the Jarque-Bera statistics, a test for departures from normality, show that the sample skewness and kurtosis are significantly different from zero and three respectively. Given that the kurtoses of macroeconomic variables are all less than three, the distributions of these series exhibit non-normality. Also, the positive values of the skewness tests for Sensex, Nifty, WPI, GP, ER and FII suggest that these variables have long right tails, while negative values of the skewness tests IIP, MS, IR, OP and S&P 500 suggest that these variables have long left tails. According to Jarque-Bera test, null hypothesis about normal distribution is rejected for all variables except ER. Excepting ER all the macroeconomic variables appear to be significant at 1 percentage level. It is needed that data should be transformed for further analysis.

The correlation matrix reported in Table-2.2, reveals information on the strength of the relationships connecting the macroeconomic variables. Table-2.2 shows a strong positive relationship between Stock Market Index (Sensex

and Nifty) and IIP, MS, WPI, GP, OP, ER and the S&P 500 index. On the other hand, a negative relationship exists between Stock Market Index and IR. These results support the inclusion of these macroeconomic variables in our analysis.

In the Table-2.3, the study present the results of the ADF test on the model including the intercept only in Panel (a) and the model including the intercept and trend components in Panel(b). It is clear from the panel (a) and panel (b), that the null hypothesis of non-stationarity cannot be rejected for all the variables in their levels except IR and FII. Since absolute value of the ADF statistics for all variables are less than the critical values (absolute) at any significance level, i.e., 1%, 5%, and 10%. In case of IR and FII, the absolute value of the ADF statistics is more than critical value (absolute) at 1 per cent significance level; we can reject the null hypothesis of non-stationarity and accept the alternative hypothesis of stationarity in this case.

Therefore, we conclude that all the series are non-stationary in levels except IR and FII. Applying the same test to their first differences shows that the null hypothesis of a unit root is rejected in all cases even at a 1 per cent significance level. Based on these results, most of all variables are treated as integrated of order one i.e., I (1) process except IR and FII.

In Table-2.3, we report the results of the PP test on the model including the intercept only in Panel (a) and the model including the intercept and trend components in Panel (b). From the Table-2.3 panel (a) and panel (b), it is observed that null hypothesis of non-stationarity can be accepted for all the variables in their levels except IR and FII. As the p-values are more than 5 percentages, we cannot reject the null hypothesis rather than accept the null hypothesis of non-stationary in their levels. On the other hand, in case of IR and FII, we can reject null hypothesis and accept the alternative hypothesis of stationarity in their levels, as the p-values of these variables are less than 5 percentages.

Therefore, it is concluded that all series are non-stationary in levels except IR and FII. Applying the same test to their first differences shows that the null hypothesis of a unit root is rejected in all cases even at a 1% significance level. Based on these results most of all variables are treated as integrated of order one i.e., I (1) process except IR and FII. They are stationary in their levels, i.e., I(0).

As the ADF test does not have strong power, we can verify the decision by using the conformation test of stationarity known as KPSS test for stationarity. Study present the results of KPSS test in Table-2.4. The results differ from ADF test as KPSS test does not provide a p-value, showing different critical values only. In this case we compare the test statistic value with the critical value on desired significance level. If the test statistic is higher than the critical value, the study rejects the null hypothesis and when test statistic is lower than the critical value, it cannot reject the null hypothesis.

In Table-2.5, in the panel (a) which consists of intercept only, it is observed that the null hypothesis of stationarity can be rejected for all the variables in their levels except IR. Since the KPSS LM-statistics is more than critical value 0.739 at 1 per cent significance level, it can reject the null hypothesis of stationarity and accept the alternative hypothesis of non-stationarity (unit root) in this case.

In panel (b) the model consists of intercept and trend. From panel (b), the null hypothesis of stationarity can be rejected for all the variables in their levels except WPI. As the KPSS LM-statistics is more than critical value 0.146 at 5 per cent significance level, so we can reject the null hypothesis of stationarity and accept the alternative hypothesis of non-stationarity in this case.

Applying the same test to their first differences in both the cases shows that the null hypothesis of a stationarity is accepted in all cases at 1 per cent significance level. That is, the first differences of log-transformation are stationary in all the cases. Thus, they are the difference stationary series as the first difference of logarithmic transformation of data is used to calculate returns or growth rates.

Based on these three tests, all the individual series are found to have unit root in their levels except IR and FII. However, after taking the log, the first difference these series are found to be stationary at 1 per cent level of significance. Consequently, we drop these two I(0) variables and take all I(1) variables for long-run analysis.

The second step for establishing the presence of a long-run relationship among the I(1) variables is to determine the optimal lag length for the VAR system. Lag-length misspecification for the VAR model often generates auto-



correlated errors. To perform this step, five different criteria including the sequential modified likelihood ratio (LR) test statistic, the Akaike information criterion (AIC), the Schwarz information criterion (SIC), and the Hannan-Quinn information criterion (HQ) have been used to determine the lag lengths in the VAR system. These criteria are widely used in the literature. Table-2.6 reports the results for each criterion with a maximum of 12 lags.

## V. CONCLUSION

### Findings

The empirical analysis of Indian financial and macroeconomic variables during the study period reveals key patterns in behavior, volatility, and long-run relationships. The graphical and descriptive statistics indicate that stock market indices (Sensex and Nifty), money supply, oil prices, and gold prices are highly volatile, reflecting periods of market instability, global shocks, and shifts in investor sentiment. In contrast, variables such as exchange rates, WPI, and interest rates showed relatively stable trends over time. Correlation analysis highlights strong positive associations between stock market performance and macroeconomic indicators like industrial production, money supply, WPI, government expenditure, and foreign inflows, while interest rates display a negative relationship with stock indices. Unit root tests (ADF, PP, and KPSS) confirm that most variables are non-stationary at levels but become stationary after first differencing, indicating they are suitable for long-run co-integration analysis. Exceptions include interest rates (IR) and foreign institutional investment (FII), which are stationary at levels. The co-integration results suggest a long-run equilibrium relationship between financial markets and macroeconomic factors, implying that deviations from equilibrium are corrected over time.

### Suggestions

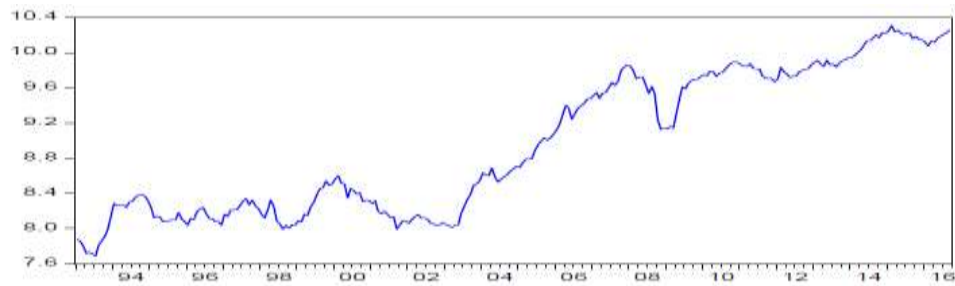
Based on the findings, it is essential for policymakers to maintain a careful balance between financial integration and macroeconomic stability. Stable monetary and fiscal policies, combined with effective regulation and monitoring of capital flows, can help minimize market volatility while fostering growth. Strengthening domestic financial institutions and promoting risk management mechanisms will allow India to harness the benefits of global financial integration without excessive exposure to external shocks. Furthermore, continued development of capital markets, increased transparency, and proactive fiscal measures can support sustainable growth and mitigate the impact of global crises on the Indian economy.

### Conclusion

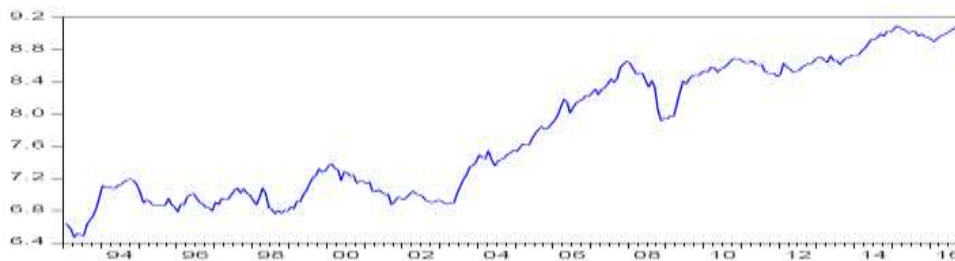
Financial integration has become a defining feature of India's economic development, offering significant opportunities while posing notable challenges. The liberalization of financial markets and increased connectivity with global capital flows have facilitated foreign investment, expanded domestic investment avenues, and supported overall economic growth. Stock market performance, capital inflows, and the growth of financial services highlight how integration acts as a catalyst for development. By opening domestic markets to international investors, India has mobilized resources more efficiently, deepened financial markets, and supported industrial and infrastructural expansion. Integration with global markets has also enabled firms to access larger capital pools, adopt new technologies, and improve productivity across multiple sectors. However, these benefits come with risks. Greater financial openness exposes India to global shocks, market volatility, currency fluctuations, and inflationary pressures, which can threaten macroeconomic stability. Sudden reversals of foreign capital or global financial crises can cause sharp stock market corrections, exchange rate volatility, and strain monetary policy. These risks underscore the importance of balancing openness with strong regulatory frameworks, effective risk management, and prudent oversight to protect the economy from external shocks and speculative flows.

Sustainable growth in India requires combining financial integration with robust domestic policy frameworks. Effective monetary and fiscal policies, proactive central bank interventions, and vigilant supervision of financial institutions are essential to mitigate volatility and maintain stability. Regulatory measures that enforce transparency, market discipline, and risk management strengthen financial resilience, while co-integration among stock indices, industrial production, money supply, and inflation highlights the interdependence of financial and macroeconomic variables. Econometric models, such as VAR and vector error correction models, provide insights into short- and long-term dynamics, helping policymakers anticipate risks and design stabilizing measures. India's experience demonstrates that financial integration can drive investment, market efficiency, and economic growth if accompanied by careful oversight, policy discipline, and institutional reforms. Balancing openness with regulation ensures that integration contributes positively to sustainable development while minimizing macroeconomic vulnerabilities, making financial integration both an opportunity and a responsibility for the Indian economy.

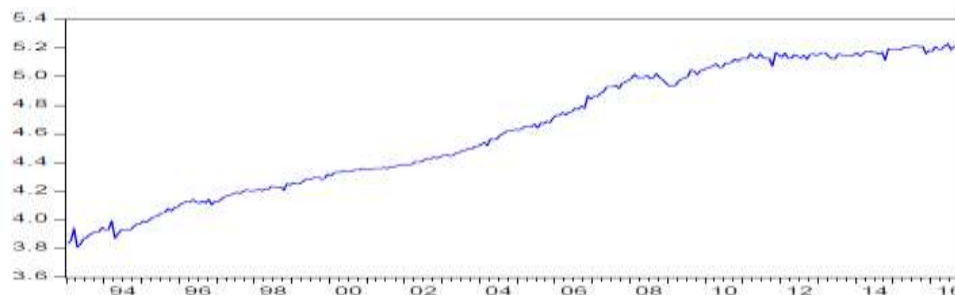
**APPENDIX**



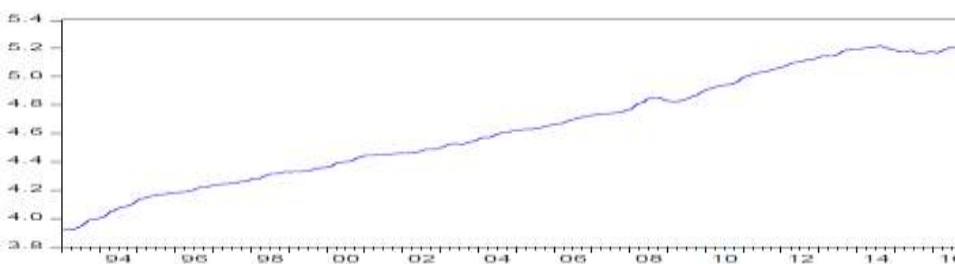
**Figure-2.1: Graphical Presentation of LNSENSEX in their Levels in Study periods**



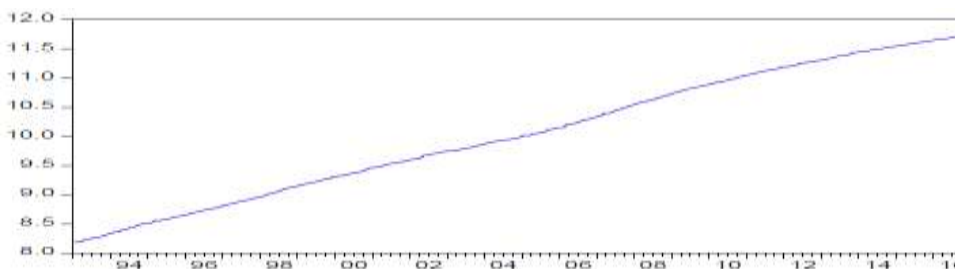
**Figure-2.2: Graphical Presentation of LNNIFTY in their Levels in Study periods**



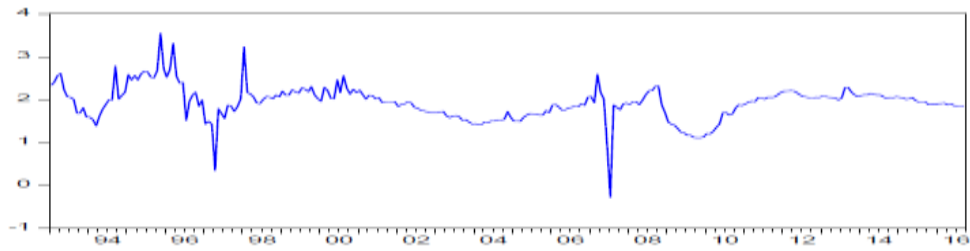
**Figure-2.3: Graphical Presentation of LNIIP in their Levels in Study periods**



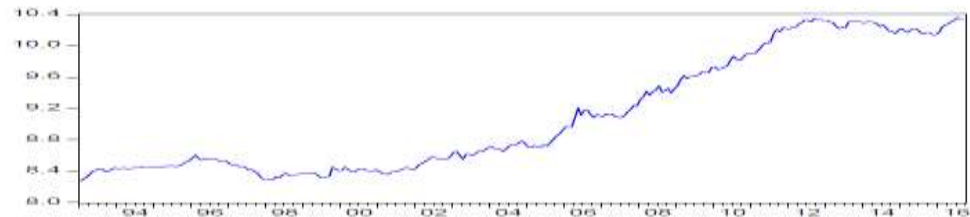
**Figure-2.4: Graphical Presentation of LNWPI in their Levels in Study periods**



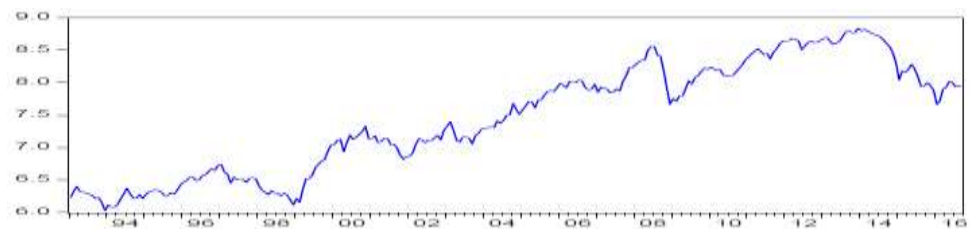
**Figure-2.5: Graphical Presentation of LNMS in their Levels in Study periods**



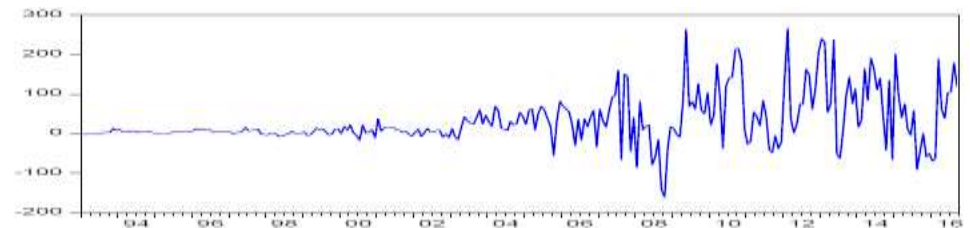
**Figure-2.6: Graphical Presentation of LNWACMR in their Levels in Study periods**



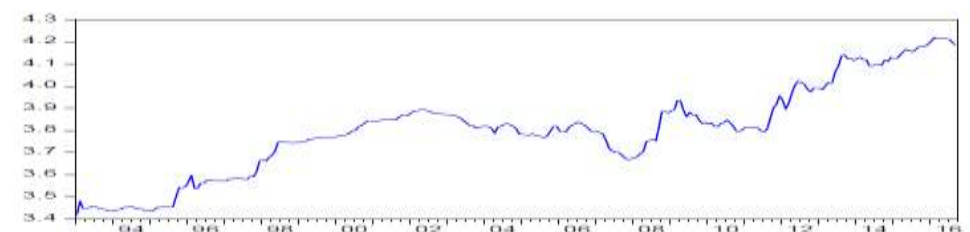
**Figure-2.7: Graphical Presentation of LNGP in their Levels in Study periods**



**Figure-2.8: Graphical Presentation of LNOP in their Levels in Study periods**



**Figure-2.9: Graphical Presentation of FII in their Levels in Study periods**



**Figure-2.10: Graphical Presentation of LNER in their Levels in Study periods**

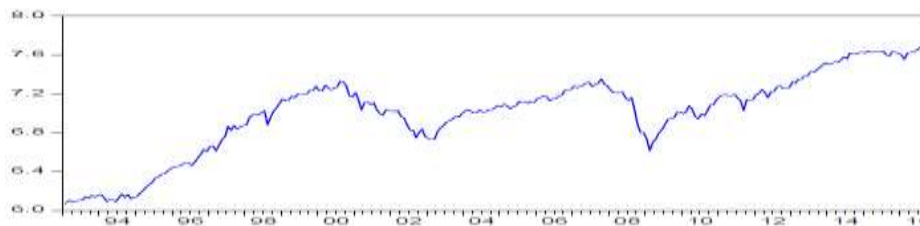


Figure-2.11: Graphical Presentation of LNSP\_500 in their Levels in Study periods

Table 2.1: Statistical Features of the Data at Levels after Seasonal Adjustment

	InSEN SEX	InNIF TY	InIP	InMS	InIR	InWPI	InGP	InOP	InER	FII	InSP50 0
Mean	8.96	7.76	4.63	10.03	1.93	4.63	9.11	7.47	3.80	31.52	7.01
Median	8.69	7.53	4.62	9.97	1.95	4.62	8.72	7.58	3.81	10.44	7.08
Maximum	10.31	9.10	5.23	11.75	3.55	5.22	10.36	8.84	4.22	265.64	7.70
Minimum	7.69	6.47	3.81	8.18	-0.27	3.92	8.28	6.03	3.42	-160.06	6.07
Std. Dev.	0.81	0.81	0.44	1.06	0.39	0.38	0.75	0.85	0.20	63.57	0.41
Skewness	0.19	0.18	-0.12	-0.03	-0.42	0.03	0.54	-0.09	0.02	1.21	-0.70
Kurtosis	1.41	1.44	1.58	1.75	7.93	1.85	1.64	1.66	2.65	5.38	2.97
JB stat.	31.52	30.43	24.68	18.62	297.21	15.77	35.92	21.76	1.45	136.84	23.59
Prob.	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.484	0.000	0.000

Source: Author calculation. World Development Indicators 2023



**Table 2.2: Correlation Matrix of Macroeconomic variables**

	lnSENSEX	lnNIFTY	ln IIP	LnMS	ln IR	lnWPI	ln GP	lnOP	lnER	FII	lnSP500
lnSENSEX	1.00										
lnNifty	1.00	1.00									
lnIIP	0.95	0.96	1.00								
lnMS	0.94	0.94	0.99	1.00							
lnSRIR	-0.15	-0.16	-0.22	-0.20	1.00						
lnWPI	0.94	0.94	0.99	1.00	-0.16	1.00					
lnGP	0.94	0.94	0.92	0.93	-0.07	0.94	1.00				
lnOP	0.71	0.72	0.82	0.88	-0.12	0.88	0.75	1.00			
lnER	0.90	0.91	0.95	0.94	-0.18	0.94	0.88	0.74	1.00		
FII	0.72	0.73	0.79	0.81	-0.09	0.82	0.63	0.87	0.73	1.00	
lnSP500	0.41	0.41	0.39	0.39	-0.19	0.40	0.42	0.29	0.39	0.27	1.00

Source: Author calculation. World Development Indicators 2023

**Table 2.3: ADF Unit Root Test for the Log Value of All Variables**

Data in Levels			Data in First-Difference			
Panel (a): Model with intercept only			:ln I(1) vs :ln I(0) H			
Variables	t-statistic	Opt. Lag	Prob.	t-statistic	Opt. Lag	Prob.
(a) lnSENSEX	-0.490	1	0.889	-13.779***	0	0.000
(b) lnNIFTY	-0.516	1	0.885	-13.473***	0	0.000
(c) lnIIP	-1.617	1	0.473	-26.782***	0	0.000
(d) lnWPI	-2.002	1	0.286	-10.604***	0	0.000
(e) lnMS	-2.233	1	0.195	-19.944***	0	0.000
(f) lnSRIR	-4.132***	2	0.001	-16.814***	1	0.000
(g) lnGP	0.743	0	0.993	-15.155***	0	0.000
(h) lnOP	-1.311	1	0.625	-14.208***	0	0.000
(i) lnER	-0.469	1	0.894	-13.174***	0	0.000
(j) lnS&P500	-1.539	0	0.513	-15.759***	0	0.000
(k) lnFII	-5.541***	2	0.000	-13.328***	3	0.000
Panel(b): Model with intercept & trend						
Variables	t-statistic	Opt. Lag	Prob.	t-statistic	Opt. Lag	Prob.
(a) lnSENSEX	-2.132	1	0.525	-13.759***	0	0.000
(b) lnNIFTY	-2.305	1	0.429	-13.453***	0	0.000
(c) lnIIP	-0.846	1	0.957	-26.882***	0	0.000
(d) lnNWPI	-1.677	1	0.759	-10.808***	0	0.000
(e) lnMS	0.133	1	0.996	-20.205***	0	0.000
(f) lnSRIR	-4.159***	2	0.006	-16.789***	1	0.000
(g) lnGP	-1.383	0	0.864	-15.228***	0	0.000
(h) lnOP	-1.609	1	0.787	-14.221***	0	0.000
(i) lnER	-1.725	1	0.738	-13.156***	0	0.000
(j) lnS&P500	-1.742	0	0.730	-15.752***	0	0.000
(k) lnFII	-11.097***	0	0.000	-13.707***	3	0.000
Panel (c): the Critical Values <sup>#</sup>						
	Model with intercept only		Model with intercept & trend			
1% level	-3.453		-3.991			
5% level	-2.872		-3.426			
10% level	-2.572		-3.136			

Source: Author’s own calculations, World Development Indicators 2023.

<sup>#</sup>The critical values are taken from Enders (2010).

\*\*\*implies significant at 1% level, \*\*implies significant at 5% level, \*implies significant at 10% level

**Table-2.4: PP Unit Root Test for the Log Value of All Variables**

Data in Levels			Data in First Difference			
Panel (a): Model with intercept only			$H_0: \ln Y_t \sim I(1)$ vs $H_1: \ln Y_t \sim I(0)$			
Variables	t-statistic	Prob.	Order of Int.	t-statistic	Prob.	Order of Int.
(a) lnSENSEX	-0.546	0.878	I(1)	-14.123***	0.000	I(0)
(b) lnNIFTY	-0.452	0.875	I(1)	-13.727***	0.000	I(0)
(c) lnIIP	-1.765	0.397	I(1)	-28.429***	0.000	I(0)
(d) lnWPI	-1.948	0.310	I(1)	-10.557***	0.000	I(0)
(e) lnMS	-1.595	0.305	I(1)	-19.729***	0.000	I(0)
(f) lnSRIR	-6.604***	0.000	I(0)	-27.659***	0.000	I(0)
(g) lnGP	-0.534	0.988	I(1)	-15.261***	0.000	I(0)
(h) lnOP	-1.404	0.581	I(1)	-14.270***	0.000	I(0)
(i) lnER	-0.844	0.804	I(1)	-13.258***	0.000	I(0)
(j) lnS&P500	-1.539	0.531	I(1)	-16.101***	0.000	I(0)
(k) lnFII	-10.999***	0.000	I(0)	-44.229***	0.000	I(0)
Panel(b): Model with intercept & trend						
Variables	t-statistic	Prob.	Order of Int.	t-statistic	Prob.	Order of Int.
(a) lnSENSEX	-2.365	0.397	I(1)	-14.107***	0.000	I(0)
(b) lnNIFTY	-2.486	0.335	I(1)	-13.709***	0.000	I(0)
(c) lnIIP	-1.180	0.912	I(1)	-27.538***	0.000	I(0)
(d) lnWPI	-1.766	0.719	I(1)	-10.808***	0.000	I(0)
(e) lnMS	-0.429	0.986	I(1)	-19.975***	0.000	I(0)
(f) lnSRIR	-6.776***	0.000	I(0)	-27.613***	0.000	I(0)
(g) lnGP	-1.456	0.842	I(1)	-15.284***	0.000	I(0)
(h) lnOP	1.619	0.784	I(1)	-14.272***	0.000	I(0)
(i) lnER	-1.864	0.670	I(1)	-13.238***	0.000	I(0)
(j) lnS&P500	-1.742	0.730	I(1)	-16.086***	0.000	I(0)
(k) lnFII	-11.679***	0.000	I(0)	-44.079***	0.000	I(0)
Panel (c): the Critical Values <sup>#</sup>						
	Model with intercept only		Model with intercept & trend			
1% level	-3.453		-3.991			
5% level	-2.872		-3.826			
10% level	-2.572		-3.136			

Source: Author's own calculations, World Development Indicators 2023.

**Table-2.5: KPSS Stationarity Test for the Log Value of All Variables**

Data in Levels		Data in First Difference		
Panel (a): Model with intercept only		H 0: $\ln Y_t \sim I(0)$ vs H1: $\ln Y_t \sim I(1)$		
Variables	LM-statistic	Order of Integration	LM-statistic	Order of Integration
(a) lnSENSEX	1.860***	I(1)	0.059	I(0)
(b) lnNIFTY	1.890***	I(1)	0.052	I(0)
(c) lnIIP	1.987***	I(1)	0.349	I(0)
(d) lnWPI	1.990***	I(1)	0.292	I(0)
(e) lnMS	2.005***	I(1)	0.411	I(0)
(f) lnSRIR	0.348	I(0)	0.037	I(0)
(g) lnGP	1.827***	I(1)	0.334	I(0)
(h) lnOP	1.841***	I(1)	0.148	I(0)
(i) lnER	1.528***	I(1)	0.093	I(0)
(j) lnS&P500	1.319***	I(1)	0.136	I(0)
(k) lnFII	2.122***	I(1)	0.176	I(0)
Panel (b): Model with intercept & trend				
Variables	LM-statistic	Order of Integration	LM-statistic	Order of Integration
(a) lnSENSEX	0.223***	I(1)	0.046	I(0)
(b) lnNIFTY	0.219***	I(1)	0.041	I(0)
(c) lnIIP	0.229***	I(1)	0.120	I(0)
(d) lnWPI	0.125*	I(1)	0.127	I(0)
(e) lnMS	0.149**	I(1)	0.183	I(0)
(f) lnSRIR	0.185**	I(0)	0.029	I(0)
(g) lnGP	0.405***	I(1)	0.165	I(0)
(h) lnOP	0.185**	I(1)	0.079	I(0)
(i) lnER	0.219***	I(1)	0.093	I(0)
(j) lnS&P500	0.204**	I(1)	0.106	I(0)
(k) lnFII	0.179**	I(0)	0.030	I(0)
Panel (c): the $\tau$ Critical Values*				
Model with intercept only		Model with intercept & trend		
1% level	0.739	0.216		
5% level	0.463	0.146		
10% level	0.347	0.119		

Source: Author's own calculations, World Development Indicators 2023.

\* The critical values are taken from Kwiatkowski et al. (1992).

\*\*\*implies significant at 1% level, \*\*implies significant at 5% level, \*implies significant at 10% level.

**Table-2.6: VAR Lag Order Selection Criteria**

Endogenous variables: lnSENSEX, lnIIP, lnMS, lnWPI, lnGP, lnER SA, lnOP, lnS&P500						
Exogenous variables: C						
Lag	LogL	LR	FPE	AIC	SC	HQ
0	504.11	NA	3.65E-12	-3.63	-3.53	-3.59
1	4246.59	7238.20	7.21E-24	-30.58	-29.63*	-30.20
2	4361.79	216.06	4.96e-24*	-30.96*	-29.16	-30.24*
3	4408.12	84.17	5.67E-24	-30.83	-28.18	-29.77
4	4448.44	70.90	6.78E-24	-30.66	-27.16	-29.25
5	4498.19	84.55	7.59E-24	-30.55	-26.21	-28.81
6	4557.84	97.89*	7.94E-24	-30.52	-25.34	-28.44
7	4602.41	70.53	9.32E-24	-30.38	-24.35	-27.96
8	4653.62	78.03	1.05E-23	-30.28	-23.41	-27.52
9	4701.83	70.64	1.22E-23	-30.17	-22.45	-27.07
10	4750.22	68.06	1.42E-23	-30.05	-21.49	-26.61
11	4808.49	78.55	1.56E-23	-30.01	-20.60	-26.23
12	4859.55	65.84	1.82E-23	-29.92	-19.66	-25.80

Source: Author’s own calculations, World Development Indicators 2023.

\*Indicates lag order selected by the criterion.

**REFERENCE**

1. Andreas Hoffmann and Bjorn Urbansky (2003) *Policy Shifts and Financial Instability in Emerging Markets: A Hayekian View*, University of Leipzig, Institute for Economic Policy, Grimmaische Strabe 12, D-04109 Leipzig, Email: ahoffmann@wifa.uni-leipzig.de, urbansky@wifa.uni-leipzig.de.
2. Anthony and Gibson (2008) *Financial Integration, Economic Instability and Trade Structure in Emerging Markets*, *Journal of International Money and Finance* 27 (2008) 654–675.
3. Barry Eichengreen (2004) *The Challenge of Financial Instability*, Berkeley Cambridge University Press, 2004.
4. Claudiu T. Albulescu (2011) *Economic and Financial Integration of CEECs: The Impact of Financial Instability*, *AUCO Czech Economic Review* 5 (2011) 27–45 *Acta Universitatis Carolinae Oeconomica*.
5. Dr. S. Jayaraj (2016) *Analysis of Financial Integration in India: A VECM approach*, *IOSR Journal of Business and Management (IOSR-JBM) e-ISSN: 2278-487X, P-ISSN: 2319-7668. Volume 18, Issue 1. Ver. II (Jan. 2016), PP 27-38 www.iosrjournals.org*.
6. Eswar S. Prasad (2010) *Financial sector regulation and reforms in emerging markets: An overview*, National bureau of economic research 1050 Massachusetts Avenue Cambridge, MA 02138 October 2010 Working Paper 16428 <http://www.nber.org/papers/w16428>.
7. Gargi Sanati (2010) *Integration of India’s Financial Markets on the Domestic and International Fronts: An Empirical Analysis of the Post-Liberalization Period*, working paper 431, and Centre for Development Studies, [www.cds.edu](http://www.cds.edu).
8. Gianni De Nicolo and Alexander Tieman (2006) *Economic Integration and Financial Stability: A European Perspective*, *International Monetary Fund (IMF) working paper WP/06/296*, December 2006.
9. Mahajan, Nayia & Verma, Satish. (2015). *International Financial Integration and Economic Growth in India: An Empirical Investigation*. *Eurasian Journal of Business and Economics*. 8. 121-137. 10.17015/ejbe.2015.016.07.
10. Mitsuhiro Osada, Masashi Saito (2010) *Financial Integration and Economic Growth: An Empirical Analysis Using International Panel Data from 1974-2007*, Bank of Japan Working Paper Series 2-1-1 Nihonbashi-Hongokuchu, Chuo-ku, Tokyo 103-0021, Japan Research and Statistics Department.
11. Rajanna, Niranjana. (2017). *Financial Integrational Effects on Macroeconomic Instability in India*. *Margin: The Journal of Applied Economic Research*. 11. 097380101668787. 10.1177/0973801016687879.
12. Samuel Muthoga, Almasi Obere, Kimani mbru, Diana Mukwate- Muchai (2013) *Regional financial integration and economic growth in the East African Community*, *International Journal of Economics and Management Sciences Vol. 2, No. 9, 2013, pp. 64-76*.
13. Tekin, Bilgehan. (2021). *Modeling the relation of financial integration- economic growth with gmm and qr methods*.
14. Zolkover, A. & Bozhenko, V.. (2020). *Approaches To Macroeconomic Stability Assessment*. *Visnik Sumskogo derzavnogo universitetu*. 303-308. 10.21272/1817-9215.2020.3-34.