Journal DOI: 10.36713/epra1013 | SJIF Impact Factor (2025): 8.619 ISSN: 2347-4378
EPRA International Journal of Economics, Business and Management Studies (EBMS)
Volume: 12 | Issue: 7 | July 2025 -Peer-Reviewed Journal

AN EMPIRICAL ANALYSIS OF THE IMPACT OF MACRO-ECONOMIC FACTORS ON STOCK MARKET RETURNS

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Article DOI: https://doi.org/10.36713/epra23078
DOI No: 10.36713/epra23078

ABSTRACT

This study investigates how key macroeconomic variables interest rates, inflation, GDP growth, exchange rates, and money supply affect stock market returns. Using time-series econometric techniques such as multiple regression, VAR, and co-integration analysis, the research identifies both short-term and long-term relationships. Data is collected from reliable financial institutions to ensure accuracy. The findings highlight significant correlations, suggesting these economic indicators play a crucial role in shaping investor behaviour and market movements. Despite limitations like data constraints and market volatility, the study offers valuable insights for investors, policymakers, and financial analysts.

SDG:

This project supports SDG 10 (Reduced Inequalities) and SDG 8 (Decent Work and Economic Growth) by promoting financial inclusion and economic understanding. It also relates to SDG 9 (Industry, Innovation and Infrastructure) through the use of advanced econometric methods, and SDG 16 (Peace, Justice and Strong Institutions) by contributing to transparent policy formulation.

KEYWORDS: *Macroeconomic Variables, Stock Returns, Investor Behaviour, Econometric Analysis, Financial Markets.*

INTRODUCTION

Stock markets are essential to economic development, serving as platforms for investment and capital mobilization. Their performance often reflects the broader health of the economy. Key macroeconomic indicators such as interest rates, inflation, GDP growth, exchange rates, and money supply play a significant role in shaping stock market trends by influencing corporate earnings, investor confidence, and overall market sentiment. In India, where financial markets are rapidly evolving, major indices like the Nifty 50 and BSE Sensex respond actively to both domestic and global economic shifts. This study examines the relationship between macroeconomic factors and stock market returns in India using advanced econometric models like VAR, ARCH, and GARCH, aiming to offer valuable insights for investors, policymakers, and researchers.

LITERATURE REVIEWS

1.Chen, Roll, and Ross (1986): This seminal study tested the **Arbitrage Pricing Theory (APT)** by evaluating how macroeconomic factors such as industrial production, inflation, term structure, and risk premiums influence U.S. stock returns. Using monthly data and a multifactor regression framework, they concluded that unexpected changes in macroeconomic indicators significantly affect stock prices, thereby validating the APT model. Their work laid the foundation for modern multifactor asset pricing models.

2. Mukherjee and Naka (1995): This paper employed the **Vector Error Correction Model (VECM)** to analyse both short- and long-run relationships between Japanese stock market indices and macroeconomic variables such as money supply (M2), inflation (CPI), exchange rate, interest rates, and industrial production. They discovered strong long-run co-integration, suggesting that macroeconomic fundamentals play a vital role in stock market movements in Japan.

3. Maysami et al. (2004): Focusing on **Singapore**, this study used a VECM framework to determine the long-run equilibrium between macroeconomic variables and stock prices. Key indicators included exchange rates, money

supply, and inflation. They concluded that Singapore's stock market is sensitive to inflation and exchange rate shocks, indicating that economic stability plays a critical role in investor behaviour.

4. Gjerde and Sattem (1999): This Norwegian study adopted a **VAR and Granger causality** framework to examine how inflation, oil prices, and interest rates impact stock market returns. The authors found a significant Granger causal relationship from oil prices and inflation to stock returns, highlighting Norway's dependence on the oil sector and its inflation sensitivity.

5. Naka, Mukherjee, and Tufte (2001): Using Indian data, this study implemented a VECM with variables like CPI, Index of Industrial Production (IIP), and money supply. The results showed that inflation negatively affects stock prices, while money supply had a positive influence. This suggests the importance of monetary policy in influencing investor sentiment in emerging markets like India.

METHODOLOGY

This study uses a quantitative approach with secondary annual data from 2005 to 2024 to analyse the impact of macroeconomic factors on Nifty 50 stock returns in India. Data is collected from reliable sources such as the World Bank, Bloomberg, Yahoo Finance, and government financial agencies. The key variables include GDP growth, inflation, interest rates, and exchange rates. Econometric models like Multiple Linear Regression (MLR), Vector Auto Regression (VAR), ARCH, and GARCH are used to examine both the direction and volatility of relationships. Data analysis is conducted using E-Views and Excel, with hypothesis testing to determine the significance of macroeconomic effects.

OBJECTIVES OF THE STUDY

- To analyse the impact of macroeconomics factors on stock market returns by using Vector Auto-regression (VAR) to study the relationships between inflation, interest rates, GDP, exchange rates and Nifty 50.
- To analyze the volatility behavior of stock returns(nifty-50) through ARCH and GARCH models in response to macroeconomic shocks.
- To evaluate the linear relationship between macroeconomic factors and stock market returns(nifty-50) using multiple regression analysis.
- To provide recommendations for investors and policymakers based on empirical findings.

DATA ANALYSIS AND INTERPRETATIONS

VAR analysis:

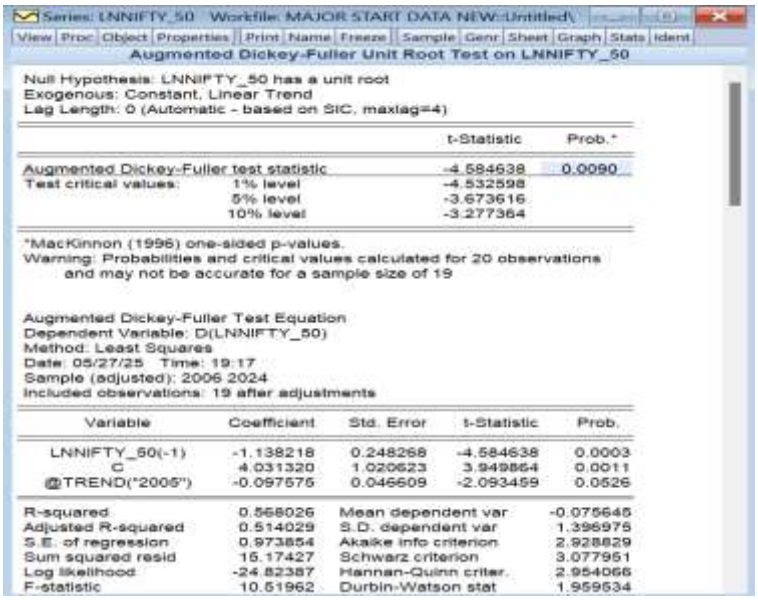
On the other hand, the VAR approach is employed when we wish to simultaneously examine the relationship between several time series. For instance, the VAR model shows us how factors like GDP, inflation, and exchange rate and interest rates affect one another over time. if that is of interest to us. The VAR model examines multiple time series simultaneously, in contrast to the Box-Jenkins technique, which only examines one. This feature of the VAR model helps to explain complicated systems with numerous interrelated components.

Stationary Check: Which comes before VAR analysis, verifies that time series statistics like variance and mean do not alter over time. Differentiating the data makes it stationary if it is not already stationary. Visual assessment and statistical tests, such as Augmented Dickey-Fuller test can be used to determine stationarity.

Null hypothesis (H0): The series Nifty-50 has a unit root.

Alternative hypothesis (H1): The series Nifty-50 doesn't has a unit root.

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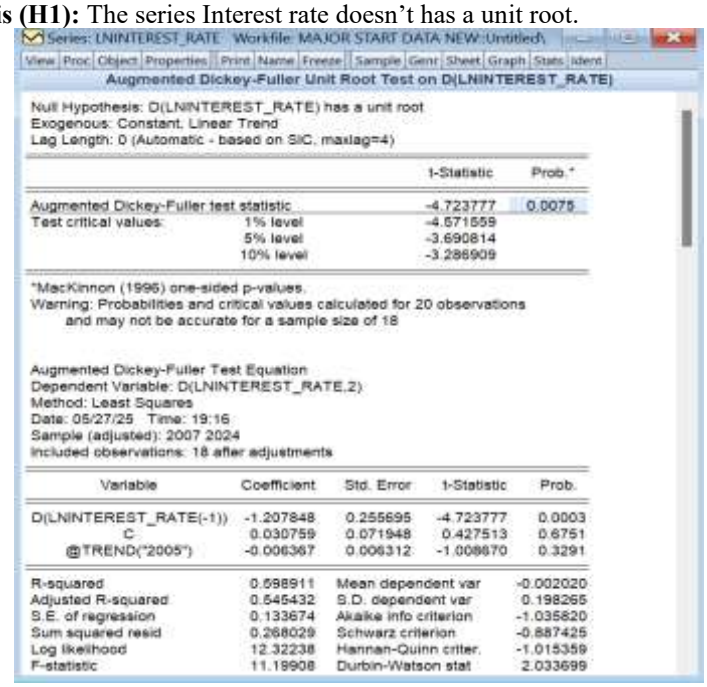


Interpretation

As the p-value of Nifty-50 returns becomes less than 0.05 at levels after conducting "Augmented Dickey-Fuller" test. So, we fall to reject the null hypothesis means the Nifty-50 variable doesn't has unit root. Thus, the data has converted into stationary.

Null hypothesis (H0): The series Interest rate has a unit root.

Alternative hypothesis (H1): The series Interest rate doesn't has a unit root.



Interpretation: As the p-value of Interest rate becomes less than 0.05 at 1st difference after conducting "Augmented Dickey-Fuller" test. So, we fall to reject the null hypothesis means the Interest rate variable doesn't has unit root. Thus, the data has converted into stationary.

Null hypothesis (H0): The series Inflation rate has a unit root.

Alternative hypothesis (H1): The series Inflation rate doesn't has a unit root

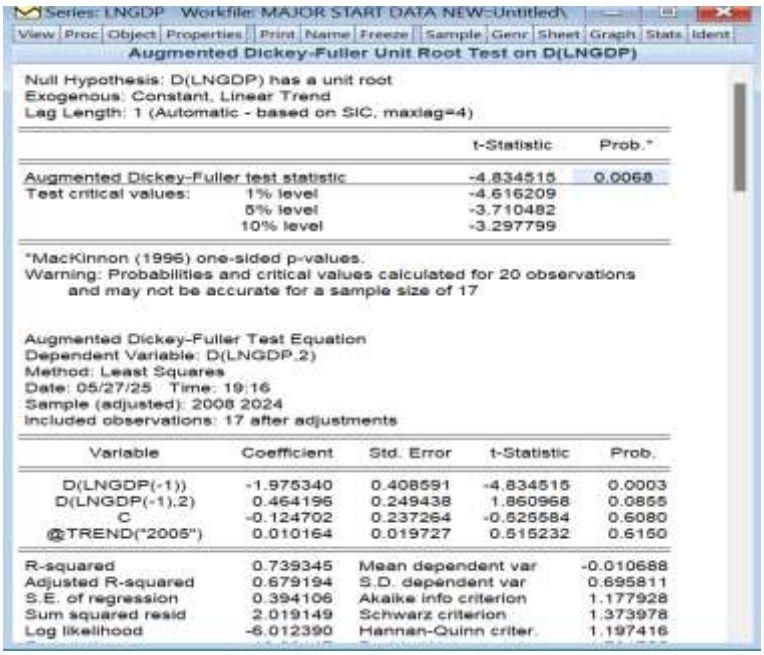
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Interpretation: As the p-value of Inflation rate becomes less than 0.05 at 1st difference after conducting "Augmented Dickey-Fuller" test. So, we fall to reject the null hypothesis means the Inflation rate variable doesn't has unit root. Thus, the data has converted into stationary.

Null hypothesis (H0): The series GDP has a unit root.

Alternative hypothesis (H1): The series GDP doesn't has a unit root.

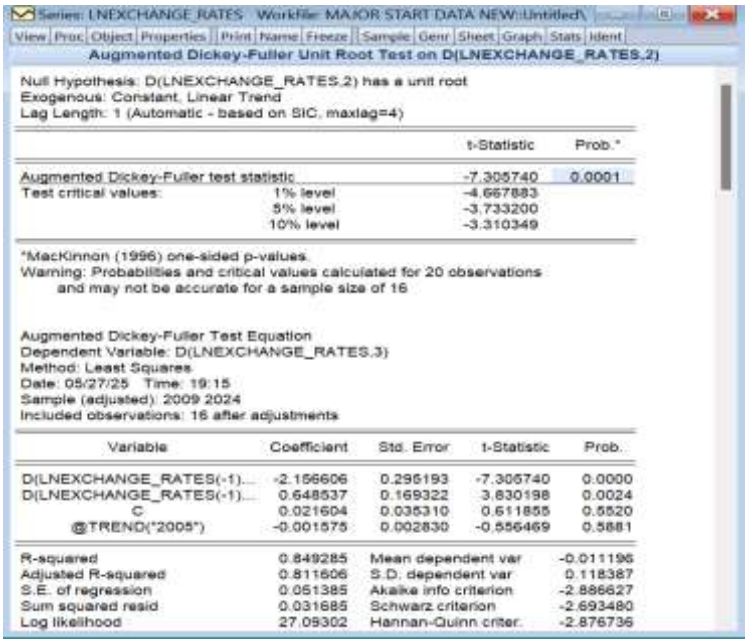


Interpretation: As the p-value of GDP becomes less than 0.05 at 1st difference after conducting "Augmented Dickey-Fuller" test. So, we fall to reject the null hypothesis means the GDP variable doesn't has unit root. Thus, the data has converted into stationary

Null hypothesis (H0): The series Exchange rate has a unit root.

Alternative hypothesis (H1): The series Exchange rate doesn't has a unit root.

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Series: LNEXCHANGE_RATES Workfile: MAJOR START DATA NEW::Untitled\

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Augmented Dickey-Fuller Unit Root Test on D(LNEXCHANGE_RATES,2)

Null Hypothesis: D(LNEXCHANGE_RATES,2) has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 1 (Automatic - based on SIC, maxlag=4)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-7.305740	0.0001
Test critical values:	1% level	-4.667883	
	5% level	-3.733200	
	10% level	-3.310349	

*MacKinnon (1996) one-sided p-values.
Warning: Probabilities and critical values calculated for 20 observations and may not be accurate for a sample size of 16

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(LNEXCHANGE_RATES,3)
Method: Least Squares
Date: 05/27/25 Time: 19:15
Sample (adjusted): 2009 2024
Included observations: 16 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LNEXCHANGE_RATES(-1))....	-2.156606	0.295193	-7.305740	0.0000
D(LNEXCHANGE_RATES(-1),2)....	0.648537	0.169322	3.830198	0.0024
C	0.021604	0.035310	0.611855	0.5520
@TREND("2005")	-0.001575	0.002830	-0.556469	0.5881

R-squared	0.849285	Mean dependent var	-0.011196
Adjusted R-squared	0.811606	S.D. dependent var	0.118387
S.E. of regression	0.051385	Akaike info criterion	-2.886627
Sum squared resid	0.031685	Schwarz criterion	-2.693480
Log likelihood	27.09302	Hannan-Quinn criter.	-2.876736

Interpretation: As the p-value of Exchange rate becomes less than 0.05 at 1st difference after conducting "Augmented Dickey-Fuller" test. So, we fall to reject the null hypothesis means the Exchange rate variable doesn't has unit root. Thus, the data has converted into stationary.

LAG LENGTH CRITERIA

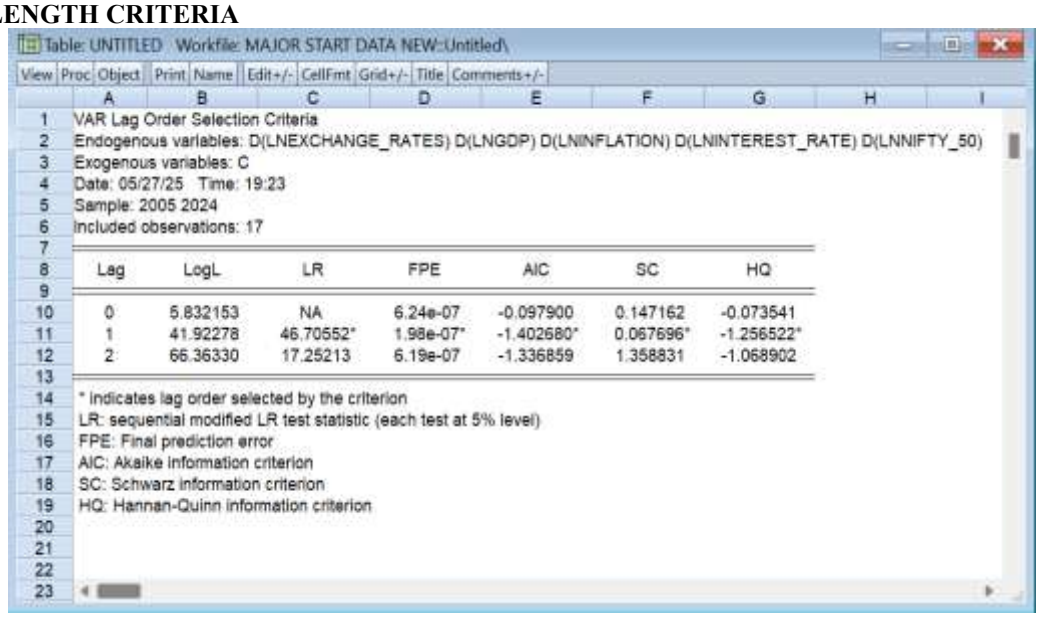


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VAR Lag Order Selection Criteria
Endogenous variables: D(LNEXCHANGE_RATES) D(LNGDP) D(LNINFLATION) D(LNINTEREST_RATE) D(LNNIFTY_50)
Exogenous variables: C
Date: 05/27/25 Time: 19:23
Sample: 2005 2024
Included observations: 17

Lag	LogL	LR	FPE	AIC	SC	HQ
0	5.832153	NA	6.24e-07	-0.097900	0.147162	-0.073541
1	41.92278	46.70552*	1.98e-07*	-1.402680*	0.067696*	-1.256522*
2	66.36330	17.25213	6.19e-07	-1.336859	1.358831	-1.068902

* 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

Interpretation: The lag 1 has been selected based on it has lower AIC value, lower FPE value, and lower SC value it provides a better model fit while minimizing prediction errors. which indicates that the less information a model loss. And it also accurately captures relationship between the variables.

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VAR ESTIMATION

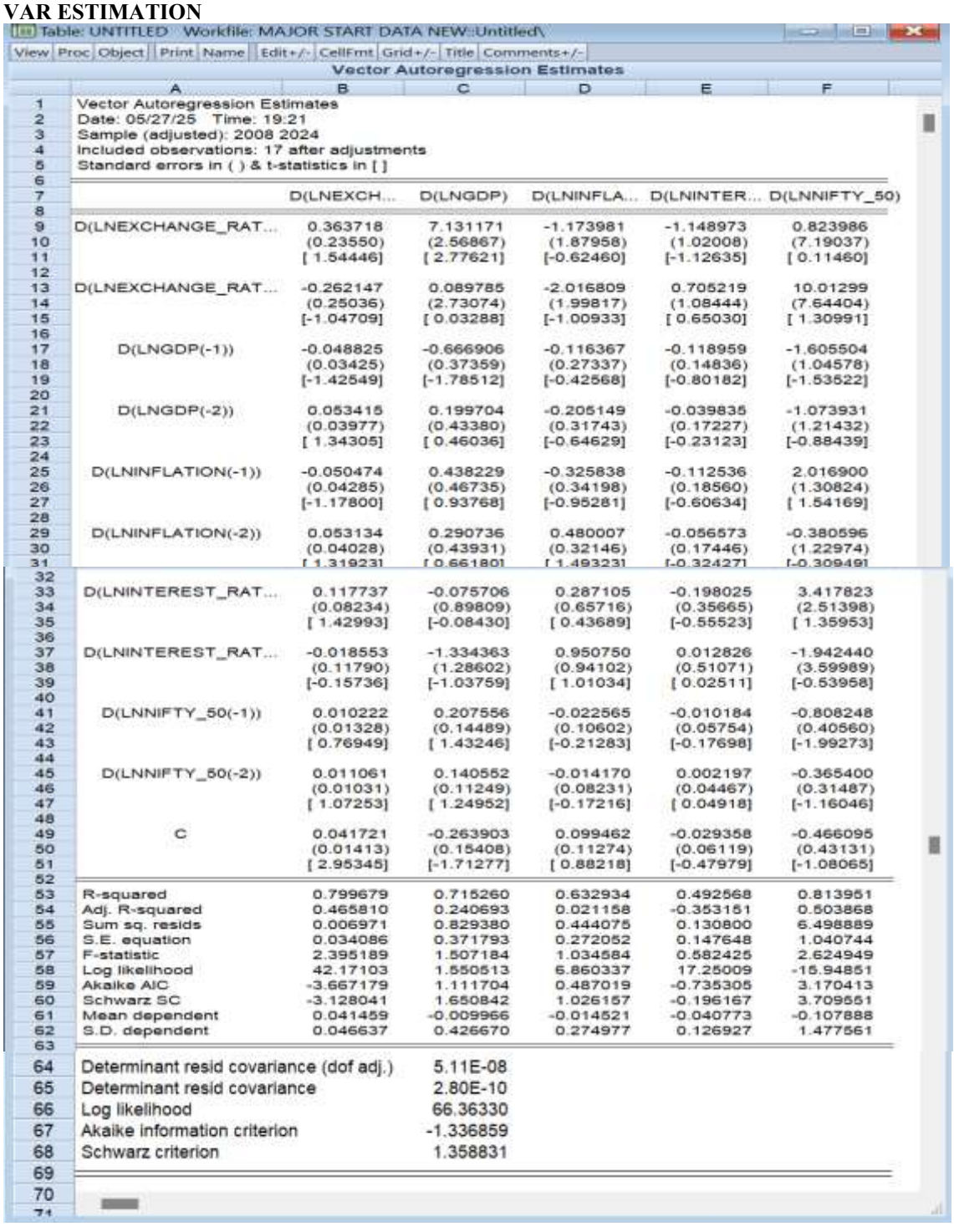


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Vector Autoregression Estimates

Vector Autoregression Estimates
Date: 05/27/25 Time: 19:21
Sample (adjusted): 2008 2024
Included observations: 17 after adjustments
Standard errors in ( ) & t-statistics in [ ]

	D(LNEXCH...	D(LNGDP)	D(LNINFLA...	D(LNINTER...	D(LNNIFTY_50)
D(LNEXCHANGE_RAT...	0.363718	7.131171	-1.173981	-1.148973	0.823986
	(0.23550)	(2.56867)	(1.87958)	(1.02008)	(7.19037)
	[1.54446]	[2.77621]	[-0.62460]	[-1.12635]	[0.11460]
D(LNEXCHANGE_RAT...	-0.262147	0.089785	-2.016809	0.705219	10.01299
	(0.25036)	(2.73074)	(1.99817)	(1.08444)	(7.64404)
	[-1.04709]	[0.03288]	[-1.00933]	[0.65030]	[1.30991]
D(LNGDP(-1))	-0.048825	-0.666906	-0.116367	-0.118959	-1.605504
	(0.03425)	(0.37359)	(0.27337)	(0.14836)	(1.04578)
	[-1.42549]	[-1.78512]	[-0.42568]	[-0.80182]	[-1.53522]
D(LNGDP(-2))	0.053415	0.199704	-0.205149	-0.039835	-1.073931
	(0.03977)	(0.43380)	(0.31743)	(0.17227)	(1.21432)
	[1.34305]	[0.46036]	[-0.64629]	[-0.23123]	[-0.88439]
D(LNINFLATION(-1))	-0.050474	0.438229	-0.325838	-0.112536	2.016900
	(0.04285)	(0.46735)	(0.34198)	(0.18560)	(1.30824)
	[-1.17800]	[0.93768]	[-0.95281]	[-0.60634]	[1.54169]
D(LNINFLATION(-2))	0.053134	0.290736	0.480007	-0.056573	-0.380596
	(0.04028)	(0.43931)	(0.32146)	(0.17446)	(1.22974)
	[1.31923]	[0.66180]	[1.49323]	[-0.32427]	[-0.30949]
D(LNINTEREST_RAT...	0.117737	-0.075706	0.287105	-0.198025	3.417823
	(0.08234)	(0.89809)	(0.65716)	(0.35665)	(2.51398)
	[1.42993]	[-0.08430]	[0.43689]	[-0.55523]	[1.35953]
D(LNINTEREST_RAT...	-0.018553	-1.334363	0.950750	0.012826	-1.942440
	(0.11790)	(1.28602)	(0.94102)	(0.51071)	(3.59989)
	[-0.15736]	[-1.03759]	[1.01034]	[0.02511]	[-0.53958]
D(LNNIFTY_50(-1))	0.010222	0.207556	-0.022565	-0.010184	-0.808248
	(0.01328)	(0.14489)	(0.10602)	(0.05754)	(0.40560)
	[0.76949]	[1.43246]	[-0.21283]	[-0.17698]	[-1.99273]
D(LNNIFTY_50(-2))	0.011061	0.140552	-0.014170	0.002197	-0.365400
	(0.01031)	(0.11249)	(0.08231)	(0.04467)	(0.31487)
	[1.07253]	[1.24952]	[-0.17216]	[0.04918]	[-1.16046]
C	0.041721	-0.263903	0.099462	-0.029358	-0.466095
	(0.01413)	(0.15408)	(0.11274)	(0.06119)	(0.43131)
	[2.95345]	[-1.71277]	[0.88218]	[-0.47979]	[-1.08065]
R-squared	0.799679	0.715260	0.632934	0.492568	0.813951
Adj. R-squared	0.465810	0.240693	0.021158	-0.353151	0.503868
Sum sq. resids	0.006971	0.829380	0.444075	0.130800	6.498889
S.E. equation	0.034086	0.371793	0.272052	0.147648	1.040744
F-statistic	2.395189	1.507184	1.034584	0.582425	2.624949
Log likelihood	42.17103	1.550513	6.860337	17.25009	-15.94851
Akaike AIC	-3.667179	1.111704	0.487019	-0.735305	3.170413
Schwarz SC	-3.128041	1.650842	1.026157	-0.196167	3.709551
Mean dependent	0.041459	-0.009966	-0.014521	-0.040773	-0.107888
S.D. dependent	0.046637	0.426670	0.274977	0.126927	1.477561

Determinant resid covariance (dof adj.)	5.11E-08
Determinant resid covariance	2.80E-10
Log likelihood	66.36330
Akaike information criterion	-1.336859
Schwarz criterion	1.358831

Interpretation: The VAR model examines how macroeconomic factors interact with Nifty 50 returns using adjusted, stationary data. Results show limited but notable relationships, with past Nifty 50 returns positively influencing exchange rate changes, while GDP has little effect. Most variables show weak links, though a few are statistically significant. The model offers insights into how economic changes can impact stock market performance, helping investors and policymakers make informed decisions.

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GANGER CAUSALITY TEST

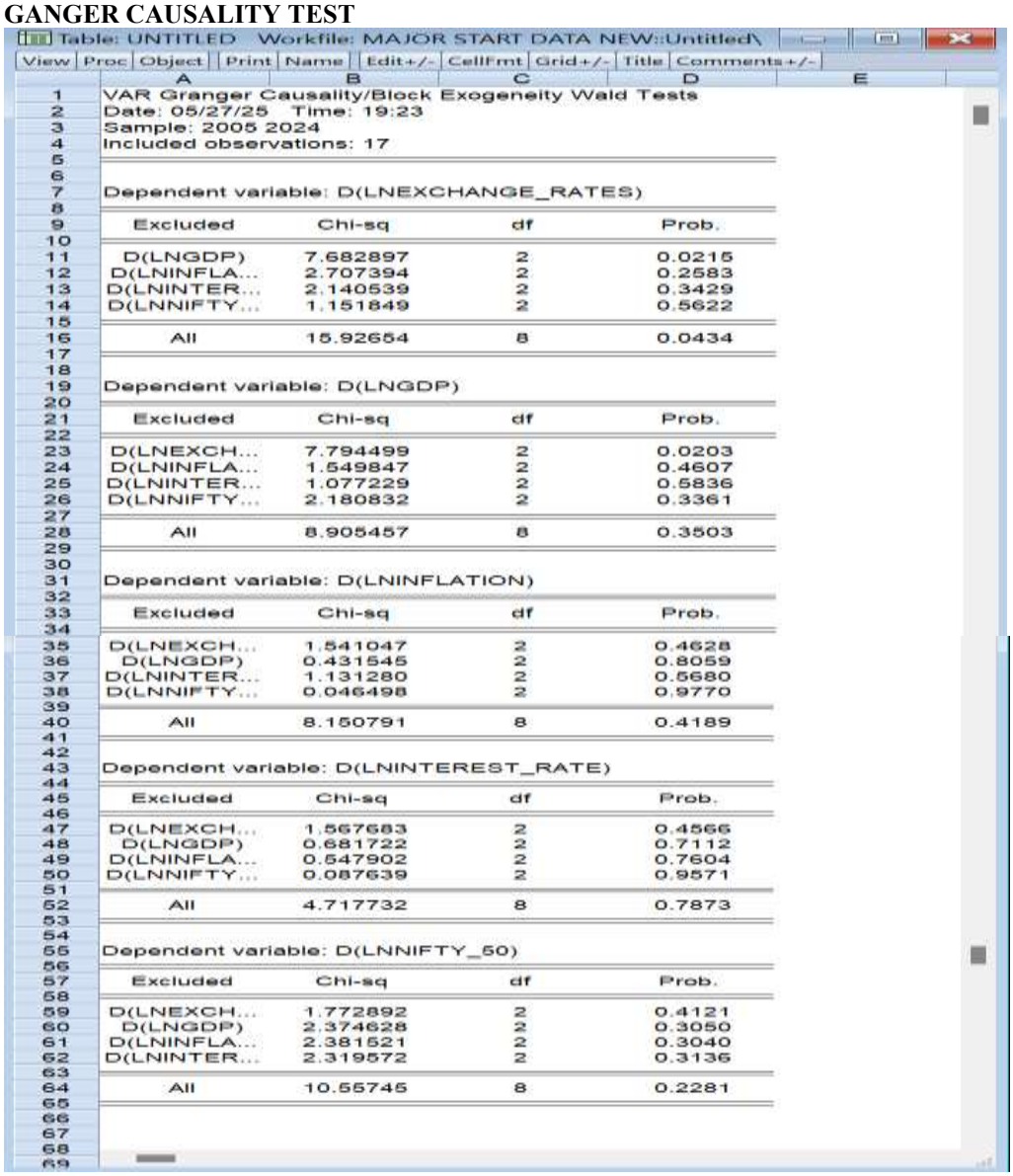


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VAR Granger Causality/Block Exogeneity Wald Tests
Date: 05/27/25 Time: 19:23
Sample: 2005 2024
Included observations: 17

Dependent variable: D(LNEXCHANGE_RATES)

Excluded	Chi-sq	df	Prob.
D(LNGDP)	7.682897	2	0.0215
D(LNINFLA...	2.707394	2	0.2583
D(LNINTER...	2.140539	2	0.3429
D(LNNIFTY...	1.151849	2	0.5622
All	15.92654	8	0.0434

Dependent variable: D(LNGDP)

Excluded	Chi-sq	df	Prob.
D(LNEXCH...	7.794499	2	0.0203
D(LNINFLA...	1.549847	2	0.4607
D(LNINTER...	1.077229	2	0.5836
D(LNNIFTY...	2.180832	2	0.3361
All	8.905457	8	0.3503

Dependent variable: D(LNINFLATION)

Excluded	Chi-sq	df	Prob.
D(LNEXCH...	1.541047	2	0.4628
D(LNGDP)	0.431545	2	0.8059
D(LNINTER...	1.131280	2	0.5680
D(LNNIFTY...	0.046498	2	0.9770
All	8.150791	8	0.4189

Dependent variable: D(LNINTEREST_RATE)

Excluded	Chi-sq	df	Prob.
D(LNEXCH...	1.567683	2	0.4566
D(LNGDP)	0.681722	2	0.7112
D(LNINFLA...	0.547902	2	0.7604
D(LNNIFTY...	0.087639	2	0.9571
All	4.717732	8	0.7873

Dependent variable: D(LNNIFTY_50)

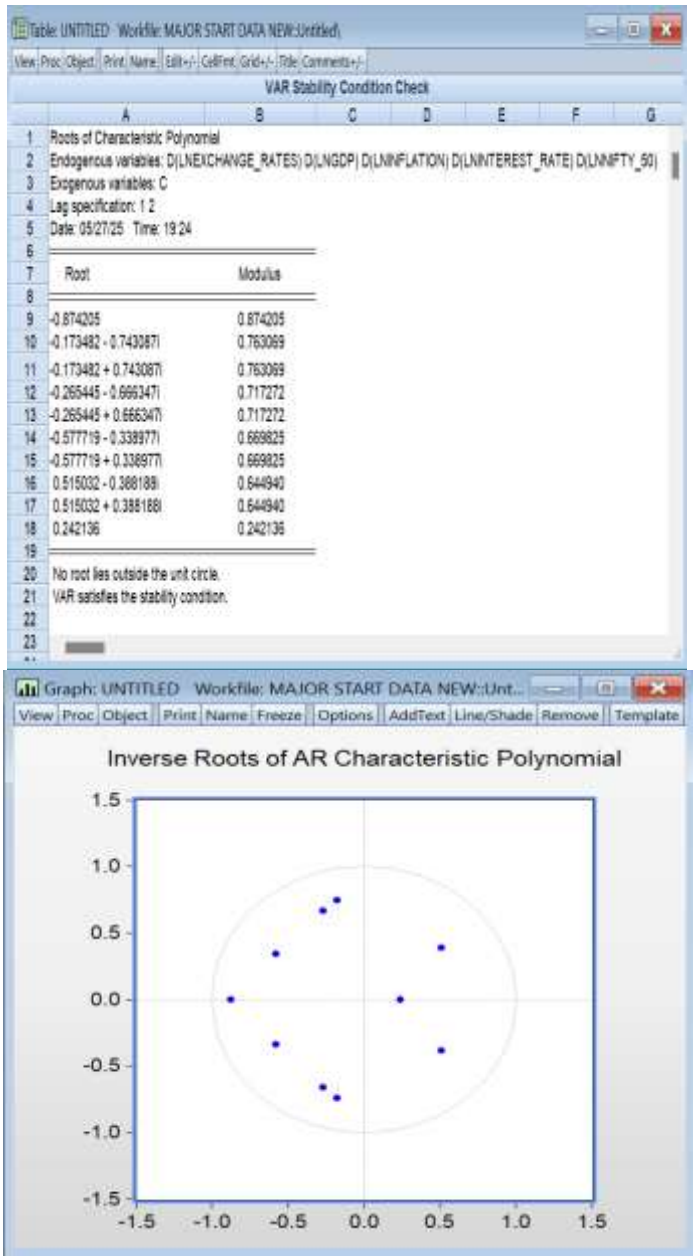
Excluded	Chi-sq	df	Prob.
D(LNEXCH...	1.772892	2	0.4121
D(LNGDP)	2.374628	2	0.3050
D(LNINFLA...	2.381521	2	0.3040
D(LNINTER...	2.319572	2	0.3136
All	10.55745	8	0.2281

Interpretation: The Granger causality test reveals a two-way predictive relationship between GDP and exchange rates, with both showing significant p-values below 0.05. This means changes in GDP can help predict exchange rate movements and vice versa. However, inflation, interest rates, and Nifty 50 returns do not show significant causal effects on other variables, as their p-values exceed the 0.05 threshold. Overall, only GDP and exchange rate exhibit meaningful predictive connections in the analysis.

Diagnostic check: Analyse the residuals by looking for signs of normality, heteroscedasticity, and autocorrelation.

AR root table: The AR root table in VAR is used to access the stability of the model. Stability plays a crucial role in producing reliable and accurate forecasting. AR root table, the modules should be less than 1, having all unit circle implies that the system is stable over time.

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VAR Stability Condition Check

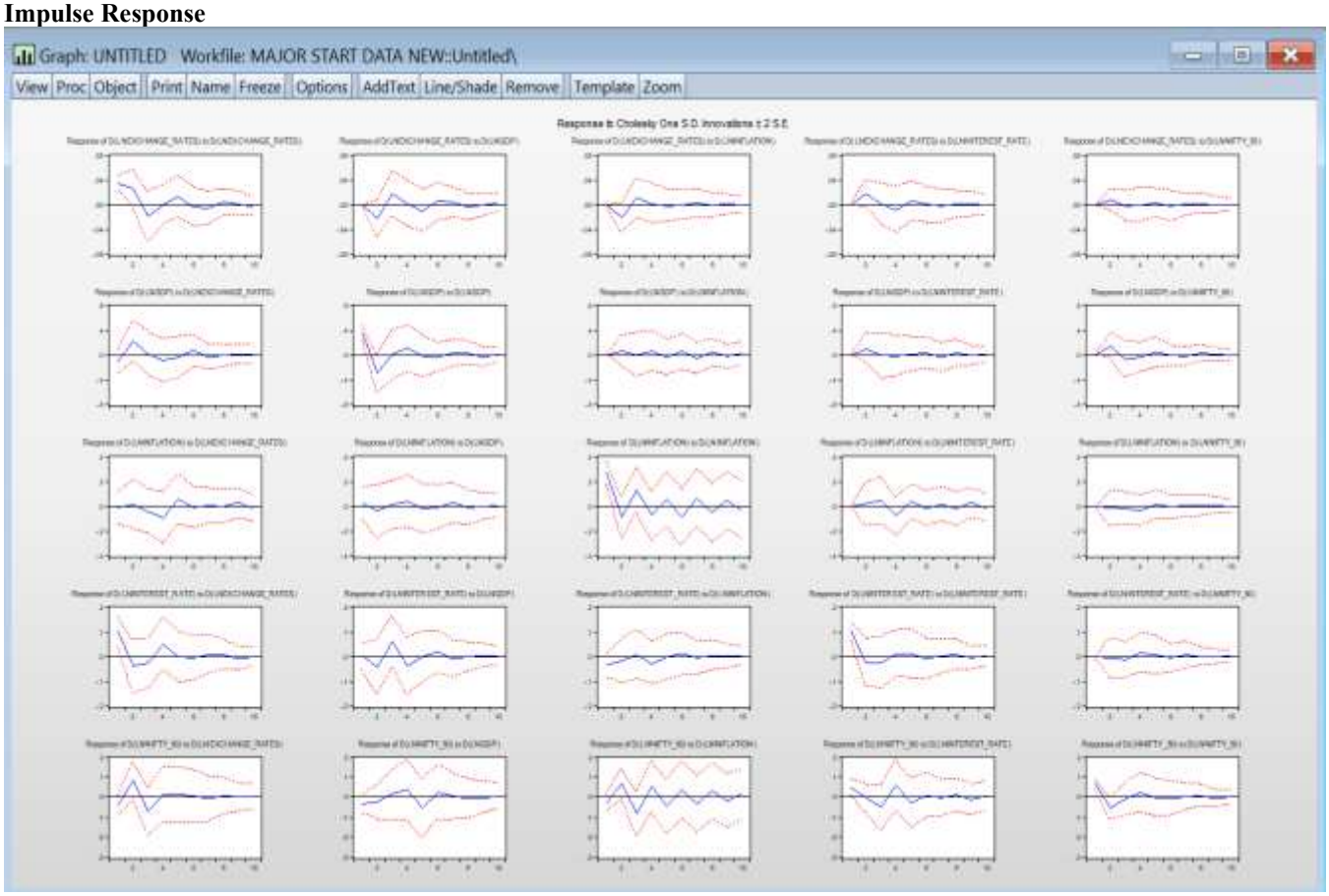
	A	B	C	D	E	F	G
1	Roots of Characteristic Polynomial						
2	Endogenous variables: D(LNEXCHANGE_RATES) D(LNGDP) D(LNINFLATION) D(LNINTEREST_RATE) D(LNNIFTY_50)						
3	Exogenous variables: C						
4	Lag specification: 1 2						
5	Date: 05/27/25 Time: 19:24						
6							
7	Root	Modulus					
8							
9	-0.874205	0.874205					
10	-0.173482 - 0.743087i	0.763069					
11	-0.173482 + 0.743087i	0.763069					
12	-0.265445 - 0.666347i	0.717272					
13	-0.265445 + 0.666347i	0.717272					
14	-0.577719 - 0.338977i	0.669825					
15	-0.577719 + 0.338977i	0.669825					
16	0.515032 - 0.388188i	0.644940					
17	0.515032 + 0.388188i	0.644940					
18	0.242136	0.242136					
19							
20	No root lies outside the unit circle.						
21	VAR satisfies the stability condition.						
22							
23							

Interpretation

All the modulus values listed are less than 1(0.874205, 0.763069, 0.717272.etc)
"No root lies outside the unit circle. VAR satisfies the stability condition."

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Impulse Response



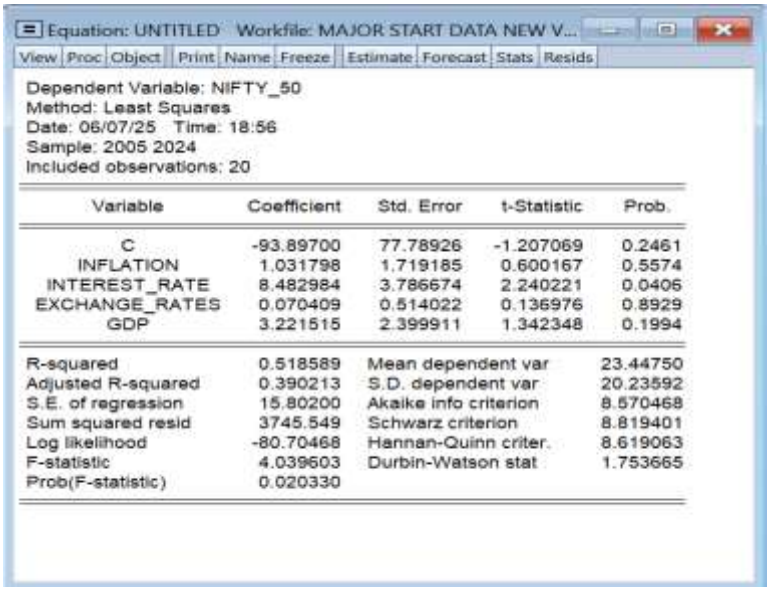
Interpretation

The analysis reveals that exchange rate shocks raise inflation and reduce GDP and stock returns. GDP shocks briefly boost the stock market but have little effect on other variables. Inflation leads to higher interest rates, which then lower both inflation and market returns. Interest rate shocks slow down economic growth and negatively impact stocks. Stock market movements have limited influence on macroeconomic variables, showing that they are mostly driven by economic conditions.

Regression Analysis

Regression analysis is a statistical method used to model and analyse the relationship between a dependent variable and independent variable. The main goal is to know how the changes independent variable brings changes in dependent variable.

Journal DOI: 10.36713/epra1013 | SJIF Impact Factor (2025): 8.619 ISSN: 2347-4378
EPRA International Journal of Economics, Business and Management Studies (EBMS)
Volume: 12 | Issue: 7 | July 2025 -Peer-Reviewed Journal



Equation: UNTITLED Workfile: MAJOR START DATA NEW V...

View | Proc | Object | Print | Name | Freeze | Estimate | Forecast | Stats | Resids

Dependent Variable: NIFTY_50
Method: Least Squares
Date: 06/07/25 Time: 18:56
Sample: 2005 2024
Included observations: 20

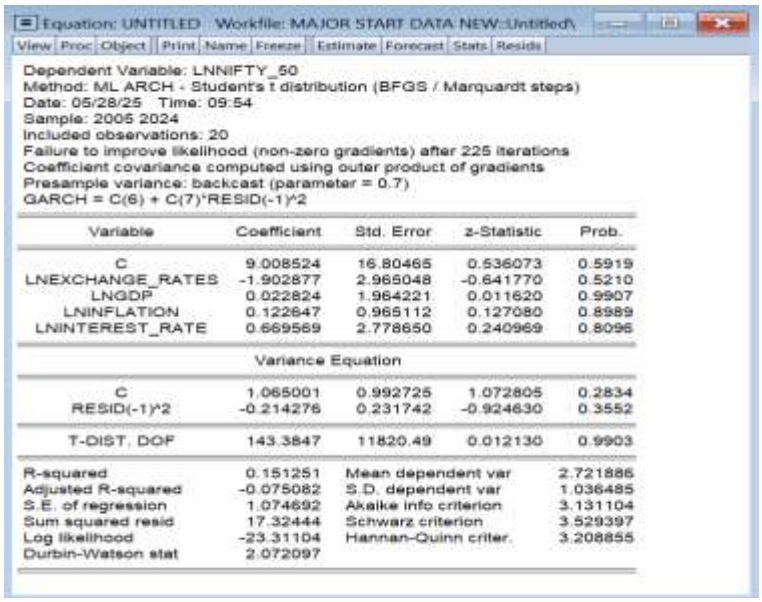
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-93.89700	77.78926	-1.207069	0.2461
INFLATION	1.031798	1.719185	0.600167	0.5574
INTEREST_RATE	8.482984	3.786674	2.240221	0.0406
EXCHANGE_RATES	0.070409	0.514022	0.136976	0.8929
GDP	3.221515	2.399911	1.342348	0.1994

R-squared	0.518589	Mean dependent var	23.44750
Adjusted R-squared	0.390213	S.D. dependent var	20.23592
S.E. of regression	15.80200	Akaike info criterion	8.570468
Sum squared resid	3745.549	Schwarz criterion	8.819401
Log likelihood	-80.70468	Hannan-Quinn criter.	8.619063
F-statistic	4.039603	Durbin-Watson stat	1.753665
Prob(F-statistic)	0.020330		

Interpretation

The multiple linear regression analysis (2005–2024) examines how inflation, interest rate, exchange rate, and GDP affect the Nifty 50 index. Among these, only the interest rate shows a statistically significant positive impact on Nifty 50, indicating that a rise in interest rates tends to increase the index. Other variables GDP, inflation, and exchange rate—show positive but statistically insignificant effects. The model explains about 51.86% of the variation in Nifty 50, with the overall model being statistically significant ($p = 0.0203$). The Durbin-Watson value of 1.75 indicates low autocorrelation, confirming the reliability of the results.

ARCH MODEL: The ARCH (Autoregressive Conditional Heteroskedasticity) model is particularly relevant for this analysis as it captures how the volatility of NIFTY-50 stock returns changes over time. It assumes that the current period's conditional variance depends on past squared error terms. This is especially important when analysing the effect of macroeconomic indicators—such as inflation, interest rates, GDP growth, and exchange rates—as these variables often cause fluctuations in market uncertainty and risk levels.



Equation: UNTITLED Workfile: MAJOR START DATA NEW::Untitled\

View | Proc | Object | Print | Name | Freeze | Estimate | Forecast | Stats | Resids

Dependent Variable: LNNIFTY_50
Method: ML ARCH - Student's t distribution (BFGS / Marquardt steps)
Date: 05/28/25 Time: 09:54
Sample: 2005 2024
Included observations: 20
Failure to improve likelihood (non-zero gradients) after 225 iterations
Coefficient covariance computed using outer product of gradients
Presample variance: backcast (parameter = 0.7)
GARCH = C(6) + C(7)*RESID(-1)^2

Variable	Coefficient	Std. Error	z-Statistic	Prob.
C	9.008524	16.80465	0.536073	0.5919
LNEXCHANGE_RATES	-1.902877	2.965048	-0.641770	0.5210
LNGDP	0.022824	1.964221	0.011620	0.9907
LNINFLATION	0.122647	0.965112	0.127080	0.8989
LNINTEREST_RATE	0.669569	2.778650	0.240969	0.8096
Variance Equation				
C	1.065001	0.992725	1.072805	0.2834
RESID(-1)^2	-0.214276	0.231742	-0.924630	0.3552
T-DIST. DOF	143.3847	11820.49	0.012130	0.9903

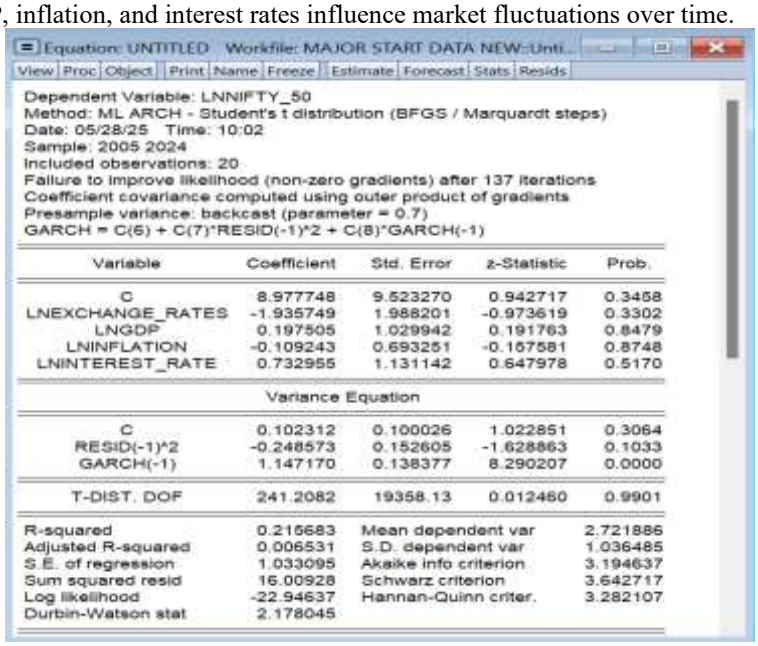
R-squared	0.151251	Mean dependent var	2.721886
Adjusted R-squared	-0.075082	S.D. dependent var	1.036485
S.E. of regression	1.074692	Akaike info criterion	3.131104
Sum squared resid	17.32444	Schwarz criterion	3.529397
Log likelihood	-23.31104	Hannan-Quinn criter.	3.208855
Durbin-Watson stat	2.072097		

Interpretation

The ARCH model applied to Nifty 50 returns from 2005 to 2024 shows that past volatility has no significant effect on current volatility, as indicated by an insignificant ARCH term ($p = 0.3552$). The negative coefficient is also theoretically invalid, suggesting possible model issues. The Durbin-Watson value of 2.07 shows no serious autocorrelation. Overall, the model does not effectively capture market volatility, indicating that a more suitable model like GARCH may offer improved results.

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GARCH MODEL: The GARCH model analyses volatility in Nifty 50 returns by accounting for past shocks and previous volatility levels. It effectively captures volatility clustering and is used here to assess how factors like exchange rates, GDP, inflation, and interest rates influence market fluctuations over time.



Equation: UNTITLED Workfile: MAJOR START DATA NEW::Unti...

View | Proc | Object | Print | Name | Freeze | Estimate | Forecast | Stats | Resids

Dependent Variable: LNNIFTY_50
Method: ML ARCH - Student's t distribution (BFGS / Marquardt steps)
Date: 05/28/25 Time: 10:02
Sample: 2005 2024
Included observations: 20
Failure to improve likelihood (non-zero gradients) after 137 iterations
Coefficient covariance computed using outer product of gradients
Presample variance: backcast (parameter = 0.7)
GARCH = C(6) + C(7)*RESID(-1)^2 + C(8)*GARCH(-1)

Variable	Coefficient	Std. Error	z-Statistic	Prob.
C	8.977748	9.523270	0.942717	0.3458
LNEXCHANGE_RATES	-1.935749	1.988201	-0.973619	0.3302
LNGDP	0.197505	1.029942	0.191763	0.8479
LNINFLATION	-0.109243	0.693251	-0.157581	0.8748
LNINTEREST_RATE	0.732955	1.131142	0.647978	0.5170
Variance Equation				
C	0.102312	0.100026	1.022851	0.3064
RESID(-1)^2	-0.248573	0.152605	-1.628863	0.1033
GARCH(-1)	1.147170	0.138377	8.290207	0.0000
T-DIST. DOF	241.2082	19358.13	0.012460	0.9901

R-squared	0.215683	Mean dependent var	2.721886
Adjusted R-squared	0.006531	S.D. dependent var	1.036485
S.E. of regression	1.033095	Akaike info criterion	3.194637
Sum squared resid	16.00928	Schwarz criterion	3.642717
Log likelihood	-22.94637	Hannan-Quinn criter.	3.282107
Durbin-Watson stat	2.178045		

Interpretation: The GARCH (1,1) model shows that while macroeconomic factors like GDP, inflation, interest rate, and exchange rate do not significantly affect short-term Nifty 50 returns, the model effectively captures persistent volatility. The significant GARCH term indicates that past volatility strongly influences current market fluctuations. The use of a Student's t-distribution also helps account for extreme market movements, making the model suitable for analysing and forecasting financial market risk.

FINDINGS

1. Interest rate was the only significant factor affecting Nifty 50 returns, showing a positive link that may reflect investor confidence or shifts from fixed income to equities.
2. Inflation, GDP, and exchange rate showed expected trends but were not statistically significant, possibly due to limited data or complex indirect influences.
3. The GARCH model revealed strong volatility persistence, indicating that periods of high or low market fluctuations tend to continue over time.
4. Granger causality analysis found a two-way relationship between GDP and exchange rate, showing their mutual impact on each other.
5. Impulse response results showed that inflation shocks reduce stock returns, while interest rate hikes dampen both inflation and market performance, underlining monetary policy's influence.
6. The ARCH model was ineffective in capturing volatility, while the GARCH model performed better, highlighting a strong negative effect of exchange rates on Nifty 50 returns.

SUGGESTIONS

1. Investment strategies should factor in interest rate changes, as they significantly impact Nifty 50 returns.
2. Future studies should use more frequent and extended data to better capture the effects of inflation, GDP, and exchange rates.
3. Given persistent volatility, investors should adopt risk management tools that incorporate volatility forecasting, especially in unstable markets.
4. Policymakers must account for the strong link between GDP and exchange rates when designing economic policies.
5. Inflation shocks negatively affect stock returns, so early response systems and inflation-targeting measures are essential.
6. GARCH models are more effective than ARCH for analysing market volatility and should be used in future research and financial planning.

LIMITATIONS

1. The study is limited by the availability and reliability of financial and economic data, which may affect result accuracy.
2. It does not account for non-economic factors like politics, investor sentiment, or global events, which can influence market behaviour.
3. The fixed time frame (2005–2024) may restrict the relevance of findings to future or different economic conditions.
4. Results are specific to India and may not apply to other countries or different market structures.

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