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IMPACT OF MACROECONOMIC FACTORS ON THE INDIAN STOCK MARKET

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ABSTRACT

The research paper investigates the impact of selected macroeconomic factors on the Indian stock market performance. Using a comprehensive dataset spanning key macroeconomic indicators and stock market performance metrics, the statistical analysis techniques to examine the relationship between macroeconomic variables and stock market movements is employed. The study focuses on understanding how changes in Foreign Portfolio Net Investments, Index of Industrial Production, Consumer Price Index and Exchange Rate can influence investor sentiment and trading behaviour in the Indian stock market. The findings of this research contribute to a deeper understanding of the dynamics between macroeconomic factors and stock market performance in India, providing valuable insights for investors, policymakers, and financial institutions.

Keywords: Foreign Portfolio Net Investments (FPI), Index of Industrial Production (IIP), Consumer Price Index (CPI), Exchange Rate(ER), NIFTY, Indian Stock Market, Inflation.

INTRODUCTION

Stock markets have played a vital role in assessing economic health since the thirteenth century, with significant milestones including the establishment of the first modern exchange in Amsterdam and the Dutch East India Company becoming the first publicly traded firm. Despite challenges like the 1720 market crash, investors adapted, leading to the evolution of stock trading. India entered the scene in the 18th century with securities trading initiated by the East India Company. Today, India ranks among the top global markets, with the Sensex demonstrating robust growth, placing it in the top 5 by market capitalization.

Economic Factors Influencing Stock Market of India

The Indian stock market is influenced by various economic factors which dictate and give direction to the performance of the equity market. In order to make informed decisions in the stock market, it is important to analyse these factors.

- **Inflation Rates:** inflation rates can erode the purchasing power and impact corporate profitability. This leads to changes in investing sentiments.
- **Foreign Portfolio Net Investment (FPI):** refers to investments made by foreign individuals, institutions or entitles into financial assets such as stocks, bonds and money market instruments in another country.
- **Index of Industrial Production (IIP):** is an economic indicator that measures the volume of production in the industrial sector of an economy.
- **Currency Exchange Rates:** the stock market is directly impacted by the exchange rate between the Indian rupee and any foreign currency.

LITERATURE REVIEW

Kushwaha, S., Kafle, S. C., & Khanal, B. (2023) in their study on the "Impact of GDP and inflation on stock market in India: a case study of BSE Index" focus on highlighting the role of GDP and inflation rate on the stock market performance in India for a period lasting between 1980-2021.

Jaggaiah, Kethan, & Basha, M., S. (2022) in their study titled "*Analyzing the Effect of Macroeconomic Variables on National Stock Exchange: Evidence from India*" investigate the influence of macroeconomic variables on the stock market performance for the period of 1st January 2012 to 31st December 2022. Using RBI website as a source, variables such as IIP, WPI, Money Supply (M3), Interest Rates, Trade Deficit, Foreign Institutional Investments, Exchange Rate, Crude Oil Price and Gold Prices were analysed,

ultimately supporting the hypothesis that certain selected macroeconomic variables have no causal effect on the stock market performance.

Yadav, M. P., Khera, A., & Mishra, N. (2021). In their research titled *"Empirical Relationship Between Macroeconomic Variables and Stock Market: Evidence from India"* have discussed the changes in market price behaviour with macroeconomic variables using BSE Sensex to represent the Indian stock market and exchange rate between US dollar and INR and CPI to represent macroeconomic variables.

Bhattacharjee, A., & Das, J. (2021) in their study on "*Investigating the Long-run and the Short-run Relationship Between Domestic Macroeconomic Forces and Indian Equity Market: Evidence based on ARDL Bounds Testing Approach"* have utilized the autoregressive distributed lag (ARDL) bounds testing approach & pair-wiser granger causality test to establish a correlation between domestic macroeconomic factors and returns from the equity markets for the period lasting between January 2012 to December 2019

Baranidharan, & Dhivya. (2019). In their study titled "*Empirical Relationship Among Various Macroeconomic Variables on Indian Stock Market and Japanese Stock Market*" investigate the relationship between the macroeconomic variables such as inflation, interest rate, exchange rate, index of industrial production and Foreign Exchange Reserves on the stock indices of India and Japan namely SENSEX and Nikkei. For this analysis, the data is collected for the period lasting between 1st April, 2013 to 31st March, 2019.

Gautam, R., Singh, A., & Singh, A., Fouzdar. (2019) in their research titled "*Macroeconomic Variables and Indian Stock Market Returns: An Empirical Analysis*" focus on examining the relationship between Indian stock market returns using Nifty 50 as the index against four macroeconomic variables namely Consumer Price Index (CPI), Index of Industrial Production (IIP), Exchange Rate (ER) and Foreign Exchange Reserves (FX) for the period between 2000-2017.

Misra, Dr. (2018), in their study *"An investigation of the macroeconomic factors affecting the Indian stock market*" focuses on the rapid growth of the Indian economy on the global platform over a decade. The dependency of the stock market performance on factors such as money supply, gold prices, FII, exchange rate and IIP is shown with the use of Johansen Cointegration, Granger Causality and Vector Error Correction Model (VCEM) for the period between 1999-2017.

Agrawal, S., & Sangeetha. (2018) in their study "The Impact of Macroeconomic determinants on the Performance of the Indian Stock Market", have discussed the analysis of stock market trends along with the influence of various macroeconomic determinants on the same. For this study, the authors have utilized

monthly data over the period April 2008 to March 2018 using 10 variables such as gold prices, interest rates, inflation etc and a stock market index -CNX Nifty..

Aggarwal, P., & Saqib, N. (2017) in their study titled "*Impact of Macro Economic Variables of India and USA on Indian Stock Marke*t". The study analyses how macroeconomic variables from the USA and India impact the Indian stock market performance from 2001-2016, using monthly data. Key factors considered include Foreign Institutional Investment (FII), exchange rates, global prices, fiscal deficits, industrial Production Indices (IIP), Wholesale Price Index (WPI) inflation from India, and interest rates, inflation, and GDP from USA. It aims to provide investors with valuable insights to guide their decision-making process.

Alam, N. (2017) in his study titled "*Analysis of the impact of select macroeconomic variables on the Indian Stock Market: A heteroscedastic cointegration approach*" discusses the impact of macroeconomic variables on the Indian stock market performance for the period of 2005-2013 with variables like inflation, short-term and long-term interest rates, index of industrial production, exchange rate and money supply and their monthly data is measured against stock market indices such as CNX Nifty and BSE SENSEX. Statistical tests such as Johansen test of cointegration, OLS and GARCH (1, 1) model is used to validate the results.

Sanningammanavara, K., & Kumar, K. K. (2014) in their study titled "Economic Indicators and Stock Market Performance - An Empirical Case of India.", The study employs a Correlation Coefficient Model to investigate the influence of macroeconomic variables on the Indian stock market, finding that GDP, gross capital formation (GCF), and gross domestic savings (GDS) positively affect SENSEX performance.

Reddy, D. V. (2012) in their research titled "Impact of Inflation and GDP On Stock Market Returns In India", examines the relationship between Real GDP, interest rates, and inflation rate on stock market returns for quoted companies from 1997 to 2009, finding a dependency of 95.6 units on these factors. Additionally, it suggests governmental measures to reduce inflation by enhancing the living standards of Indian citizens.

Makan, C., Ahuja, A. K., & Chauhan, S. (2012) in their study titled "*A study of the effect of macroeconomic variables on stock market: Indian Perspective"* explore the relationship between BSE indices and macroeconomic variables from April 2005 to March 2012, utilizing tests including ADF, correlation, regression analysis, and Granger causality. It provides valuable insights for investors, policymakers, traders, and researchers to make informed decisions based on data-driven analysis.

Paramati, S. R., & Gupta, R. (2011) in their research titled "*An Empirical Analysis of Stock Market Performance and Economic Growth: Evidence from India*" analyses stock market performance and economic growth from April 1996 to March 2009 using IIP and GDP data. Findings suggest short-term correlation, highlighting economic growth's role in stock market development.

Srivastava, A. (2010). In his study titled "Relevance of Macro Economic factors for the Indian Stock Market", explores stock markets' role in redirecting savings and serving as economic barometers, discussing models like DCFM, CAPM, and APM and their limitations in imperfect markets like India. It investigates the impact of macroeconomic factors on the Indian stock market, suggesting domestic issues have a more significant long-term influence on emerging economies like India compared to global factors.

RESEARCH OBJECTIVE

1. To identify and assess the magnitude and direction of the impact of macroeconomic factors on stock market returns and volatility in the Indian context.

FRAMING OF RESEARCH HYPOTHESIS

The hypothesis constructed for this research will help us in examining the objectives of this study in a systematic manner.

First, we speculate that there exist various macroeconomic factors that tend to influence the movement of the stock market performance. The hypothesis formed for this speculation is as follows:

- **Null Hypothesis (H0):** There is a significant impact of the selected macroeconomic variables on the Indian stock market performance
- **Alternate Hypothesis (H1):** There is no significant impact of the selected macroeconomic variables on the Indian stock market performance.

TECHNIQUES FOR DATA ANALYSIS

Quantile Regression: The technique used for this analysis is Quantile Regression. Unlike calculating the conditional mean of the target across different values of the features, using least squares in regular linear regression method, Quantile regression estimates the conditional median of the target.

- **Regression Model:** When the conditions of the regular linear regression are not met (linearity, homoscedasticity, independence or normality), quantile regression, which is an extension of linear regression, is used. Here, the model is estimated using stock market Index-Nifty 50 as the dependent variable and the macroeconomic variables as the independent variables.
- **Slope Equality Test:** This test is employed to assess whether the relationship between the stock market and selected macroeconomic factors remains constant across different quantiles of the stock market returns distribution.
- **Ramsey RESET Test:** is conducted to check for any misspecification that might have occurred in regression model.

HYPOTHESIS TESTING AND METHODS

This research follows a quantitative approach to investigate the relationship or correlation that the chosen variables might have on the stock market performance. The statistical method used for this research is Quantile Regression Analysis which is a form of Robust regression analysis.

1. Quantile Regression Model

- The conditional Quantile Regression Model is used to estimate the extent to which a set of independent variables impact a dependent variable and is based on the conditional median.
- When some variables are normally distributed and some variables are not. It's a violation of OLS model. This lack of normality or linearity among the variables is the reason why a robust regression method is used

2. Model Specification:

Quantile regression minimizes a weighted sum of the positive and negative error terms:

$$\tau \sum_{y_i > \hat{\beta}_\tau{}' X_i} |y_i - \hat{\beta}_\tau{}' X_i| + (1-\tau) \sum_{y_i < \hat{\beta}_\tau{}' X_i} |y_i - \hat{\beta}_\tau{}' X_i|$$

Where τ is the quantile level.

- The vector coefficient β' provides the magnitude, direction and the strength of the relationship that the variables share with the stock market index.
- If the coefficient shows a positive and a statistically significant nature i.e., the p value is lesser than the significance level chosen (in this model, 0.05 or 95units), then it means that the variables have a significant

impact on the dependent variable, stock market performance (NIFTY). A negative statistically significant coefficient would indicate that there is no significant impact of the variables on NIFTY

DATA ANALYSIS & INTERPRETATION

This section of the research focusses on the various analytical methods that were used in order to identify the impact of the selected macroeconomic variables (FPI net investments, IIP, ER and CPI). Following are the results obtained from such tests:

Table 1: Descriptive Statistics

	NIFTY	CPI	ER	FPI_NET_INVEST	IIP
Mean	26832.16	141.0472	69.15501	5244.040	122.9951
Median	26824.15	137.8000	68.08700	6446.450	123.1000
Maximum	43750.30	181.0000	82.56100	71046.47	151.7000
Minimum	10494.40	106.7000	54.38500	-118203.1	54.00000
Std. Dev.	9190.352	19.94560	6.556610	25615.74	13.62268
Skewness	0.212397	0.334291	0.255184	-0.801871	-0.981099
Kurtosis	2.185948	2.057725	2.434377	6.697217	6.994917
Jarque-Bera	4.321047	6.841287	2.974571	83.23719	101.5241
Probability	0.115265	**0.032691**	0.225985	**0.000000**	**0.000000**
Sum	3300355.	17348.80	8506.066	645016.9	15128.40
Sum Sq. Dev.	1.03E+10	48534.89	5244.674	8.01E+10	22640.44
Observations	123	123	123	123	123

1. **JARQUE-BERA TEST**: this test statistic measures the difference of skewness and kurtosis of the series with those from the normal distribution. For this test the following hypothesis is framed:

   Null Hypothesis (H0): The distribution is not a normal distribution

   Alternate Hypothesis (Ha): The distribution is a normal distribution.

ANALYSIS

- As the dependent variable NIFTY_50 and independent variable ER are normally distributed, the Jacque-Bera value for the remaining independent variables -FPI and IIP is significantly higher than the rest, indicating that they are not normally distributed.
- **Probability:** The acceptable probability to accept the null hypothesis should be lesser than 0.05 i.e, $p<0.05$. Looking at the probability values of the variables following can be observed:

  The null hypothesis is rejected for NIFTY ($p=0.115265$) and ER ($p=0.225985$) i.e., these two variables are in a normal distribution.

  The null hypothesis is accepted for CPI ($p=0.032691$), FPI_NET_INVEST ($p=0.00$) and IIP ($p=0.00$) i.e., these variables are not normally distributed.

Table 2: Quantile Regression (Median)

Dependent Variable: NIFTY
Method: Quantile Regression (Median)
Date: 04/06/24 Time: 17:14
Sample: 2013M04 2023M06
Included observations: 123
Huber Sandwich Standard Errors & Covariance
Sparsity method: Kernel (Epanechnikov) using residuals
Bandwidth method: Hall-Sheather, bw=0.19536
Estimation successfully identifies unique optimal solution

Variable	Coefficient	Std. Error	t-Statistic	Prob.
CPI	**683.0869**	**58.45634**	**11.68542**	**0.0000**
ER	**-912.7723**	**172.7963**	**-5.282360**	**0.0000**
FPI_NET_INVEST	-0.013281	0.015809	-0.840085	0.4026
IIP	**91.70553**	**41.89957**	**2.188699**	**0.0306**
C	-17203.56	7132.057	-2.412146	0.0174

Pseudo R-squared	0.736386	Mean dependent var	26832.16
Adjusted R-squared	**0.727450**	S.D. dependent var	9190.352
S.E. of regression	2543.351	Objective	118748.2
Quantile dependent var	26824.15	Restr. objective	450462.7
Sparsity	6607.163	Quasi-LR statistic	401.6423
Prob(Quasi-LR stat)	**0.000000**		

Hypothesis:

For an effective mode of conducting Quantile regression, following hypothesis are formulated:

Null Hypothesis (H0): There is no significant relationship between the dependent and independent variables.

Alternate Hypothesis (H1): There is a significant relationship between the dependent and independent variables

ANALYSIS: According to this model, if the probability of the independent variable is less than 0.05, it is significant and will have an impact on the dependent variable.

Interpretation of the variables is as follows:

- The analysis indicates significant relationships between certain economic indicators and NIFTY stock market returns. CPI &IIP show significant impacts, with CPI leading to a 683.089 unit increase and IIP to a 91.7 unit increase in NIFTY for a one-unit increase in their medians. Conversely, ER exhibits a significant 912.77 unit decrease in NIFTY for a one-unit increase in its median. FPI_NET_INVEST lacks significance but has a minor impact, with a 0.013 unit decrease in NIFTY for a one-unit increase in its median.

GOODNESS OF FIT OF QUANTILE REGRESSION

- **Adjusted R-squared:** exhibits a value of 0.727450 or 72.74% which indicates that the model has a goodness of fit of the same percentage. This also means that 72.74% variation in the conditional median of the dependent variable NIFTY i.e., stock market returns is due to CPI, ER and IIP.
- **Probability (Quasi L-R statistic):** with a probability value less than the required value of 0.05, it can be concluded that the model is fit.

Table 3: Quantile Process Estimates

Quantile Process Estimates
Equation: UNTITLED
Specification: NIFTY CPI ER FPI_NET_INVEST IIP C
Estimated equation quantile tau = 0.5
Number of process quantiles: 10
Display all coefficients

	Quantile	Coefficient	Std. Error	t-Statistic
CPI	0.100	484.6031	78.54305	6.169905
	0.200	494.9727	78.84981	6.277411
	0.300	553.9222	87.12589	6.357723
	0.400	663.0791	62.16111	10.66711
	0.500	683.0869	58.45634	11.68542
	0.600	675.3038	47.79257	14.12989
	0.700	679.8907	41.34507	16.44430
	0.800	691.2495	36.51759	18.92922
	0.900	674.8344	40.85368	16.51833
ER	0.100	-496.0563	171.4834	-2.892736
	0.200	-507.1691	186.1002	-2.725247
	0.300	-568.6291	213.6507	-2.661489
	0.400	-855.2729	164.5686	-5.197059
	0.500	-912.7723	172.7963	-5.282360
	0.600	-843.4123	153.7486	-5.485660
	0.700	-835.6135	135.7563	-6.155248
	0.800	-854.1725	119.0380	-7.175631
	0.900	-813.1167	133.7106	-6.081170
FPI_NET_INVEST	0.100	0.006617	0.011888	0.556624
	0.200	0.001167	0.015525	0.075165
	0.300	-0.003293	0.018815	-0.175027
	0.400	-0.021968	0.014754	-1.488946
	0.500	-0.013281	0.015809	-0.840085
	0.600	0.000256	0.015240	0.016773
	0.700	0.002699	0.014587	0.184997
	0.800	-0.000858	0.013272	-0.064681
	0.900	0.003990	0.014632	0.272705
IIP	0.100	119.2658	83.40984	1.429876
	0.200	152.1819	67.42533	2.257043
	0.300	126.4553	46.68742	2.708551
	0.400	113.1621	45.20393	2.503369
	0.500	91.70553	41.89957	2.188699
	0.600	70.86528	23.24414	3.048737
	0.700	77.88205	21.15653	3.681229
	0.800	84.30762	18.59522	4.533832
	0.900	97.41127	16.74039	5.818936
C	0.100	-25374.19	5265.299	-4.819136
	0.200	-29002.01	5340.482	-5.430598
	0.300	-28837.15	5802.555	-4.969733
	0.400	-21677.31	6218.528	-3.485923
	0.500	-17203.56	7132.057	-2.412146
	0.600	-17649.29	6126.888	-2.880629
	0.700	-19281.04	5680.161	-3.394453
	0.800	-19985.43	5003.173	-3.994550

ANALYSIS:

This statistic helps to identify the relationship between each quantile of every independent variable and the dependent variable. The default no. of quantiles selected Is 10, which are represented under the Quantile column, segregated for each variable.

The observations for other independent variables are as follows:

- Quantile analysis reveals distinct returns. CPI shows an increase from 484.6031 TO 683.0869 units at the 10^{th} to 5^{th} quantile, then a decline and subsequent rise. ER demonstrates a consistent decrease from -496.0563 to -912.7773 units at the 10^{th} to 5^{th} quantile, with fluctuations afterward. FPI lacks significance, while IIP fluctuations, rising from 119.2658 to 152.1819 units at the 10^{th} to 2^{nd} quantile, then declining and rising again.

Interpretation of the Quantile Process Estimates:

FPI Net investment on Nifty is significant at 2nd quantile, 7th quantile and 9th quantile only.

The fact that the line is within the upper and lower boundaries suggests that the model is capturing the underlying relationships between the predictor variables and the conditional distribution of the response variable well.

Goodness of Fit: This alignment between the model's predictions and the observed data within the boundaries suggests a good fit of the quantile regression model to the data.

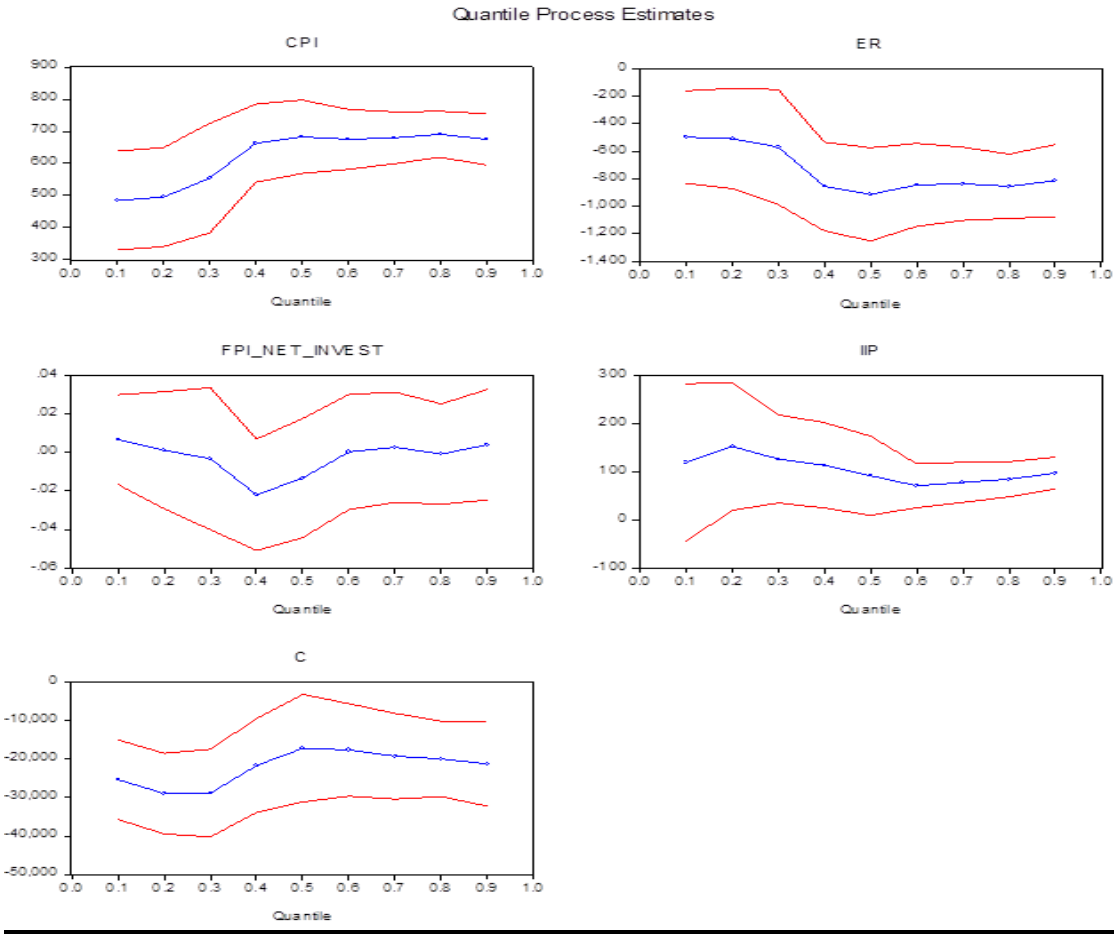

Fig. 1: Quantile Process Estimates Graphs

ANALYSIS:

The same variation in the previous table can be observed in the respective graphs of independent variables using a trend line. The blue line indicates the dependent variable's variation (NIFTY) with respect to CPI, ER, FPI_NET_INVEST and IIP indicated using the red line

Table 4: Slope Equality Test

Quantile Slope Equality Test
Equation: UNTITLED
Specification: NIFTY CPI ER FPI_NET_INVEST IIP C
Estimated equation quantile tau = 0.5
Number of test quantiles: 10
Test statistic compares all coefficients

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Wald Test	35.47527	32	0.3077

Restriction Detail: b(tau_h) - b(tau_k) = 0

Quantiles	Variable	Restr. Value	Std. Error	Prob.
0.1, 0.2	CPI	-10.36957	64.96166	0.8732
	ER	11.11281	146.9600	0.9397
	FPI_NET_INVEST	0.005450	0.011712	0.6417
	IIP	-32.91612	63.57870	0.6047
0.2, 0.3	CPI	-58.94955	58.38418	0.3126
	ER	61.45996	141.2072	0.6634
	FPI_NET_INVEST	0.004460	0.012330	0.7176
	IIP	25.72661	44.23852	0.5609
0.3, 0.4	CPI	-109.1569	57.82240	0.0591
	ER	286.6439	144.5187	0.0473
	FPI_NET_INVEST	0.018675	0.012317	0.1295
	IIP	13.29314	29.53097	0.6526
0.4, 0.5	CPI	-20.00777	37.45064	0.5932
	ER	57.49936	104.8223	0.5833
	FPI_NET_INVEST	-0.008688	0.009353	0.3529
	IIP	21.45660	26.90341	0.4251
0.5, 0.6	CPI	7.783095	35.44684	0.8262
	ER	-69.35994	101.7017	0.4952
	FPI_NET_INVEST	-0.013536	0.009472	0.1530
	IIP	20.84026	26.87383	0.4381
0.6, 0.7	CPI	-4.586933	28.83431	0.8736
	ER	-7.798828	93.18562	0.9333
	FPI_NET_INVEST	-0.002443	0.009443	0.7959
	IIP	-7.016769	14.20137	0.6212
0.7, 0.8	CPI	-11.35876	27.52000	0.6798
	ER	18.55899	89.51523	0.8358
	FPI_NET_INVEST	0.003557	0.009760	0.7155
	IIP	-6.425570	13.94899	0.6451
0.8, 0.9	CPI	16.41511	32.40494	0.6125
	ER	-41.05576	105.1094	0.6961
	FPI_NET_INVEST	-0.004848	0.011531	0.6741
	IIP	-13.10365	14.78700	0.3755

Interpretation of the Slope equality test in quantile regression:

The slope equality test is used to assess whether the relationships between the predictor variables and the response variable are the same across different quantiles of the conditional distribution.

Interpretation: If the p-value associated with the slope equality test is below a chosen significance level (e.g., 0.05), the null hypothesis of equal slopes across quantiles is rejected. This indicates that there are significant differences in the effects of the predictors on the response variable across quantiles, suggesting heterogeneity in the relationships.

At 0.3 and 0.4 quantiles, the p value of the CPI and Exchange Rates are significant which shows significant differences in the effects of the Nifty variable across the quantiles, suggesting the heterogeneity in the relationship.

Table 5: Ramey RESET Test

Ramsey RESET Test
Equation: UNTITLED
Specification: NIFTY CPI ER FPI_NET_INVEST IIP C
Omitted Variables: Squares of fitted values

	Value	df	Probability
QLR L-statistic	9.367032	1	0.0022
QLR Lambda-statistic	9.093783	1	0.0026

L-test summary:

	Value
Restricted Objective	118748.2
Unrestricted Objective	111953.5
Scale	1450.762

Lambda-test summary:

	Value
Restricted Log Obj.	11.68476
Unrestricted Log Obj.	11.62584
Scale	0.012959

Unrestricted Test Equation:
Dependent Variable: NIFTY
Method: Quantile Regression (Median)
Date: 04/06/24 Time: 17:20
Sample: 2013M04 2023M06
Included observations: 123
Huber Sandwich Standard Errors & Covariance
Sparsity method: Kernel (Epanechnikov) using residuals
Bandwidth method: Hall-Sheather, bw=0.19536
Estimation successfully identifies unique optimal solution

Variable	Coefficient	Std. Error	t-Statistic	Prob.
CPI	1049.550	134.1801	7.821956	0.0000
ER	-1318.610	198.1117	-6.655890	0.0000
FPI_NET_INVEST	-0.017405	0.013752	-1.265691	0.2081
IIP	120.1574	25.06981	4.792913	0.0000
C	-36549.98	7664.493	-4.768741	0.0000
FITTED^2	-9.39E-06	3.48E-06	-2.700112	0.0080

Pseudo R-squared	0.751470	Mean dependent var	26832.16
Adjusted R-squared	0.740849	S.D. dependent var	9190.352
S.E. of regression	2575.332	Objective	111953.5
Quantile dependent var	26824.15	Restr. objective	450462.7
Sparsity	5803.049	Quasi-LR statistic	466.6639
Prob(Quasi-LR stat)	0.000000		

Test Statistic: The Ramsey RESET test statistic is typically based on comparing the fit of the original regression model with the fit of the augmented model. Common test statistics include the F-statistic or likelihood ratio (LR) statistic, which assess the joint significance of the additional polynomial terms.

Null Hypothesis: the regression model is correctly specified and captures the true relationship between the variables without any omitted variables or functional form misspecification. If the p-value is below a chosen significance level (e.g., 0.05), the null hypothesis of correct specification is rejected.

Interpretation in Context:

In summary, a p-value of 0.0022 in the Ramsey RESET test indicates strong evidence against the null hypothesis of correct specification, suggesting that the regression model may suffer from some form of misspecification that needs to be addressed to improve its accuracy and reliability.

Table 6: Correlation Matrix

	NIFTY	CPI	ER	FPI_NET_INVEST	IIP
NIFTY	**1.000000**	0.940697	0.842377	-0.028554	0.726250
CPI	**0.940697**	1.000000	0.955180	-0.067805	0.668889
ER	**0.842377**	0.955180	1.000000	-0.107983	0.594600
FPI_NET_INVEST	**-0.028554**	-0.067805	-0.107983	1.000000	0.021463
IIP	**0.726250**	0.668889	0.594600	0.021463	1.000000

The correlation coefficient is a statistical measure that indicates the strength and direction of the linear relationship between two variables. It can range from -1 to 1, where -1 indicates a perfect negative correlation, 0 indicates no correlation, and 1 indicates a perfect positive correlation.

NIFTY has a strong positive correlation with CPI and ER while it has a moderate positive correlation with IIP. This suggests that the NIFTY index tends to move in the same direction as the Consumer Price Index, Exchange Rate & Industrial Input Price. NIFTY has a weak negative relation with FPI, indicating that it moves in opposite directed with very less magnitude.

LIMITATIONS OF THE STUDY

While the study provides sufficient evidence initially, the limitations of the study also have to be acknowledged keeping future research point of view in mind. Following are some of the limitations that may have arisen from the study:

1. **Omitted Variables:** Various confounding factors, which have not been accounted for in this study, such as geopolitical events, market sentiment and exogenous shocks can bias analysis and obscure the true relationship between the variables of interest.
2. **Linear Relations**: this research has developed a linear relationship between FPI, IIP, ER and CPI and NIFTY 50 index.
3. **Frequency of Data**; This research is established using monthly data in order to capture a better and more detailed frequency of data.
4. **Time Series Bias:** The research and analysis is employed on the data lasting between the period 2013 to 2024, which is a sample selection bias. Excluding the previous time periods from the analysis could limit the generalizability of the findings.

CONCLUSION

Based on the analysis of the impact of CPI, FPI, IIP and ER on the Indian stock market performance, it can be concluded that these macroeconomic variables have varying degrees of influence on the NIFTY index. The findings reveal that a positive correlation exists between CPI and NIFTY indicating that higher consumer price levels are associated with higher stock market performance, possibly reflecting expectations of economic growth.

The negative correlation between FPI_NET_INVEST and NIFTY suggests that foreign portfolio investment outflows may adversely affect the Indian stock market performance.

The positive correlation between CPI & ER with NIFTY remain consistent indicating that higher consumer price levels and a stronger exchange rate are associated with a higher stock market performance. Higher industrial production levels are associated with better stock market performance, which is reflected by the positive correlation between IIP and NIFTY, which further shows the positive sentiment surrounding economic growth.

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