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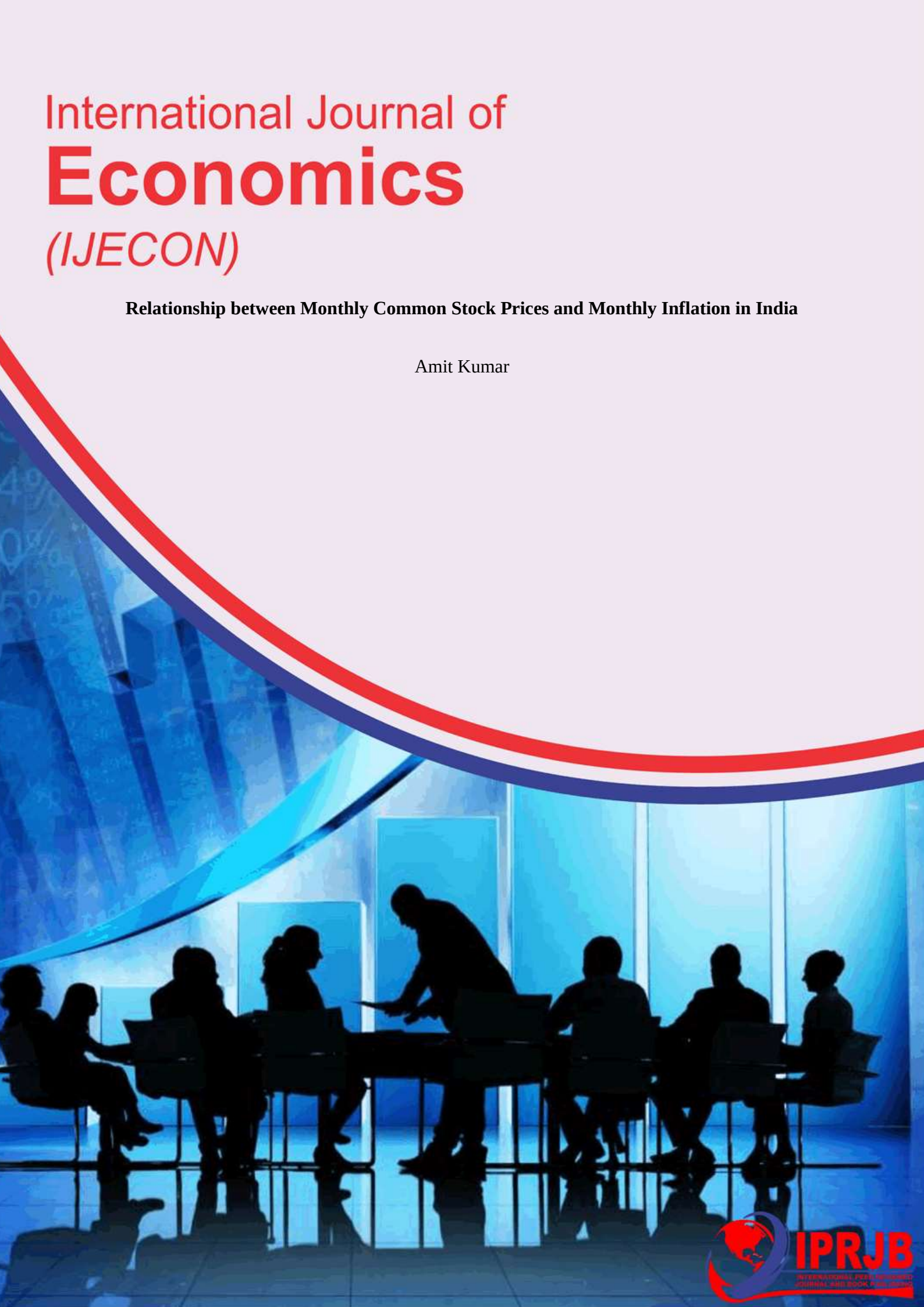

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Abstract

Purpose: The purpose of the study is to scrutinise whether monthly inflation rate and monthly common stock prices are interlinked and if they are linked, then what is the kind of affiliation among the variables.

Methodology: The paper has used the vector autoregression model (VAR) to determine whether there exists a relationship between monthly common stock prices and monthly inflation rates or not.

Findings: The paper's findings can be summarised as no cointegration exists between monthly inflation rates and monthly stock prices, meaning there is no relationship (neither long nor short) between inflation and common stock prices. The other insight that can be concluded from the research is that there also doesn't exist any cause-and-effect relationship between the inflation rate & monthly common stocks.

Keywords: *Inflation, Stock Prices, Demonetisation, Cointegration, Vector Auto-Regression*

INTRODUCTION

Inflation refers to an increase in the mean general price level for all products and services over a specific duration or the rate at which a currency's value depreciates. The fall in the country's purchasing power can also be termed inflation. A numerical estimate of the magnitude with which purchasing power is lost is frequently depicted in the rise of the mean price index of a basket of chosen goods and services in an economy. As a result, monetary policymakers' primary priority is keeping inflation at a steady level because the country's economic progress is reflected by the inflation rate in a given country. As a result, its price stability also determines a country's performance in the global market.

This research aims to comprehend whether there exists any relationship between monthly inflation rates and monthly common stock prices and to do so, we must first grasp what stock prices are. Let's have a look at what Stock is. The stock exchange is a public market where the stakeholders buy and sell new and old securities over the counter and via the stock exchange. As stocks represent fragmented ownership of a corporation, the stock exchange may be a site where these stocks can be executed by the capitalists. As the stock market channelises the funds of enterprises, a well-functioning exchange is important for a country's economic growth. According to general economic theory, when the inflation rate rises, an economy performs poorly. Fearing to lose their money, the financial investors sell their stocks. The increase in the supply of stock assets on the market caused by an increase in inflation causes a fall in stock prices, implying that inflation and stock prices have a negative or inverse connection.

The research also examines the effects of economic shocks that occurred during the study period and impacted the country's stock prices and inflation rate. Therefore, it would be interesting to find out what relationship is there between the monthly inflation rates and monthly common stocks. If they are interlinked, then it would be interesting to find out the nature of the relationship.

LITERATURE REVIEW

The question "How effectively can an investor hedge against inflation with a very diversified portfolio of common stocks" was asked by Bodie (1976), and the data used in the paper were annual, quarterly and monthly from 1953 to 1972. The methodology of the study was the Mean-variance model Markowitz and Tobin for portfolio and the results concluded that the real equity returns are negatively related to both the unanticipated and the anticipated inflation rate.

The paper by Fama and Schwert (1977) used the data for the period 1953 to 1971, and they used the linear regression methods to find out which financial assets were hedges against inflation (both expected and unexpected). The results concluded that the estate of the US government was a complete hedge against both unexpected and expected inflations.

The paper by Egypt Omran and Pointon (2001) scrutinised the impact of inflation rates on the conduct of Egypt's stock market. The Error Correction Mechanism (ECM) model was used in the paper for analysis, and the results showed that a negative relationship exists between inflation and market activity and liquidity.

The paper by AL-Zoubi and AL-Sharkas (2010) scrutinised the relationship between stock prices and inflation in countries such as Kuwait, Jordan, Morocco and Saudi Arabia the data used was from 2000 to 2009, and the data frequency was monthly. The model used in the study was the Unrestricted vector Autoregressive (UVAR) model. The results turned out to be consistent with the hypothesis of Fisher, which states that there exists a positive relationship

between stock prices and inflation.

The paper by Mousa, Al-Safi, Hasoneh and Abo-orabi (2012) analysed the annual data for the period of 1998 to 2007 for the country Jordan and tried to establish the relationship between inflation and common stock prices. The study concluded that not every company offers a perfect hedge against inflation, some of the companies exhibited a negative relationship, while some of the companies also exhibited a positive relationship.

Data Source

The criteria for selecting the variables for the study are based on the existing literature and evidence from the empirical studies. The National Stock Exchange index (NSE) substitutes the monthly common stock price (MCSP), and the monthly inflation rate is taken as it is for the study. The monthly data frequency for the duration of Jan 2014- March 2022 is used in this research paper, and the source of the data is RBI (Reserve Bank of India) for monthly inflation rates and the National Stock Exchange source for monthly common stock prices.

Descriptive statistics for the inflation and stock prices for complete data are represented in Table 1, and the line graphs for both variables (inflation and stock prices) are shown in Graph 1 and Graph 2, respectively. Graph 1 represents monthly inflation which shows that there is no specific trend in the case of inflation; it experienced both upward and downward trends. Figure 2 shows a graphical representation of monthly common stock prices, showing a continuous upward trend in India's stock prices from 2014 to 2022.

Table 1: Descriptive Statistics

Variable	Observation	Mean	Std. Dev.	Min	Max
Inflation	99	4.962626	1.599024	1.46	8.6
NSE	99	10582.64	2891.147	6089.5	17671.65

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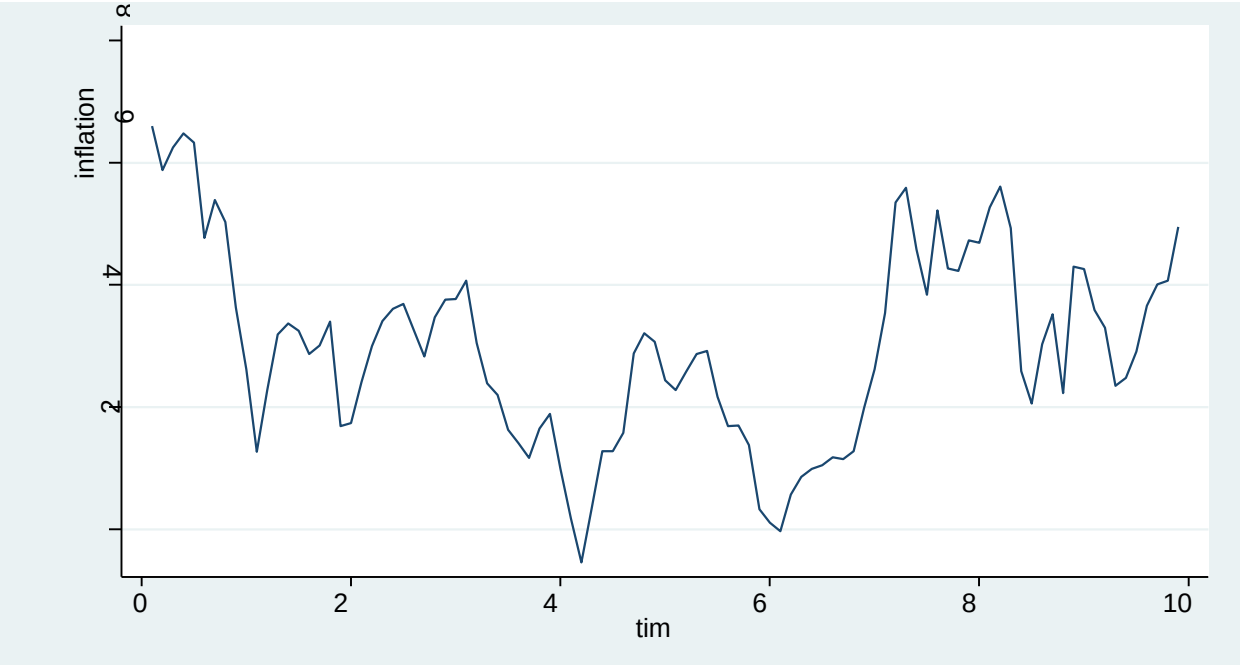

Figure 1: Monthly Inflation Rates

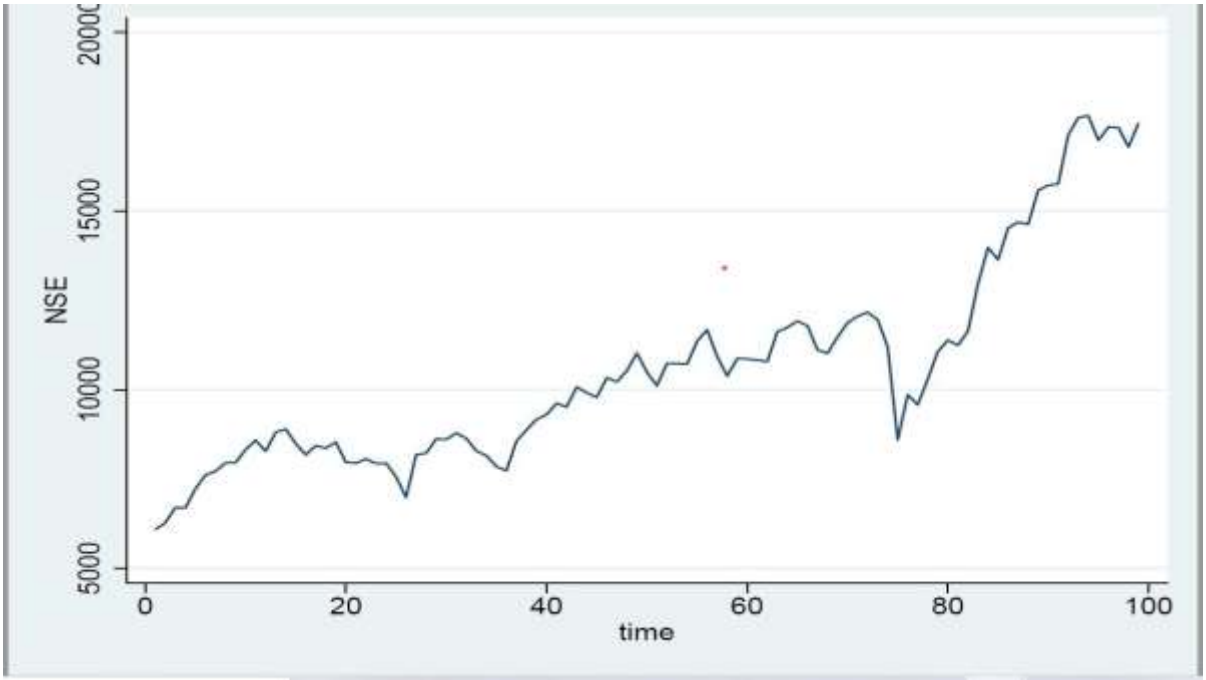

Figure 2: Monthly Common Stock Prices

Table 2: Regression of Inflation

Source	SS	Df	MS
Model	0	0	.
Residual	250.574119	98	2.55687876
Total	**250.574119**	**98**	**2.55687876**

Inflation	Coef.	Std. err.	T	P>|t|	[95% conf.	Interval]
_cons	4.962626	0.160708	30.88	0.000	4.643707	5.281546

Table 3: Regression of Stock Prices

Source	SS	Df	MS
Model	0	0	.
Residual	819155710	98	83587319
Total	**819155710**	**98**	**83587319**

NSE	Coef.	Std. err.	T	P>|t|	[95% conf.	Interval]
Cons	10582.64	290.5712	36.42	0.000	10006.01	11159.27

METHODOLOGY

The paper has used the vector autoregression model (VAR) to determine whether there exists a relationship between monthly common stock prices and monthly inflation rates or not.

To fulfil the objective of the study various steps need to be followed.

i. Testing for a unit root in the presence of structural breaks and determining the order of integrating for two variables by employing tests devised by Zivot- Andrews Test. A series is said to be stationary when its mean, variance and covariance are constant over time.

ii. The CO-integration test identifies scenarios where two or more non-stationary time series are integrated to determine whether they have a long-run or short-run relationship. The Johansen co-integration can be applied in this respect.

iii. Granger-The granger-causality used to determine the correlation among the time series. It is used to determine the way the relation flows, whether from inflation to stock prices or vice versa. If there is co-integration, there should be Granger-causality in at least one direction. If there is causality, then it implies that a variable can predict another variable with which it is cointegrated.

RESULTS

Stationarity Test

The test of stationarity of the series is done by performing a unit root test. A series is said to be stationary when the data is independent of the time for which data is taken. The paper used the Zivot-Andrew test for determining whether the data is stationary or not and, at the same time whether there exist any structural breaks or not.

Null Hypothesis (No): Non-Stationary Series Alternative Hypothesis (Na): Stationary Series

Table 5 below represents the outcome of the Zivot-Andrew test, and Figure 4 will show whether there were any structural breaks or not during the time of the study.

Sample: 1 -99 Number of observations = 99

H_o: No structural breaks

Table 5: Zivot-Andrew Test

Statitics	test statistics	1% critical value	5% critical value	10% critical value
recursive	1.3358	1.1430	0.9479	0.850

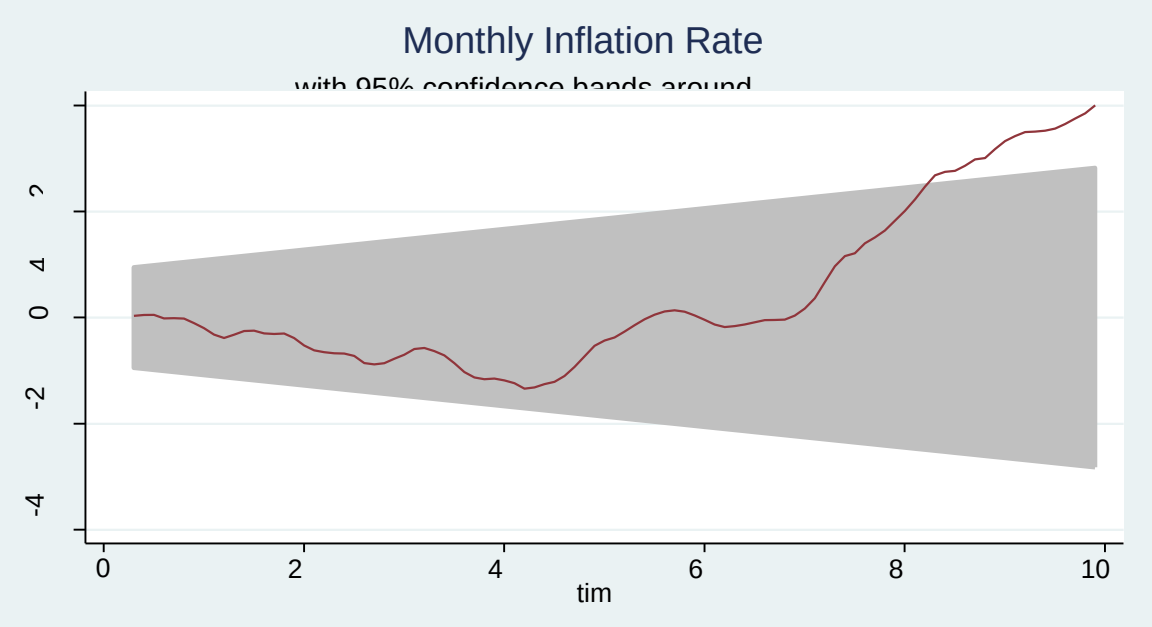

Figure 4: Andrew Zivot Test (With Structural Breaks)

It can be concluded by analysing table 5 that the data is non-stationary because the test statistic (1.3358) is exceeding the 5% critical value (0.9479), hence according to Zivot-Andrew test, the null hypothesis is not rejected and null hypothesis is that data is non-stationary. But by looking at the Figure above, there exists a structural break during the year 2020 and not during the year of demonetisation which was also the period of economic shock for the country. Hence, the data is non-stationary, with one structural break.

Co-integration Test

The cointegration test is used to determine what kind of relationship exists between the variables taken for study. The paper has applied Johansen Cointegration to determine the level between the monthly inflation rate and monthly common stock prices.

Null Hypothesis (NO): Variables are not cointegrated

Alternative Hypothesis (NA): Variables are cointegrated

The results of Johansen cointegrated are shown in table 6 below, and the analysis is below the table.

Table 6: Johansen Cointegration Test

Trend: constant	**Number of obs = 97**
sample : 3-99	**Lags = 2**

Maximum rank	**Parms**	**LL**	**Eigenvalues**	**Trace statistics**	**5% Critical Value**
0	6	-849.8665		9.4125*	15.41
1	9	-846.29094	0.07107	2.2614	3.76
2	10	-845.16024	0.02304		

From the above table, the paper can conclude that since trace statistics are at a lower level than that of a five per cent critical value, hence there is not enough evidence to reject the null hypothesis and therefore no cointegration is present between the monthly stock prices and monthly inflation. Hence, no long-run association can be concluded from the above analysis. The paper used a vector autoregression model to determine the short-term association among the chosen variables.

Vector Autoregression Model

In view to establish the relation among the multiple variables as they change over time, the vector autoregression model is used. The single variables auto-regressive models are generalised by enabling multivariate time series by the VAR model. The Granger Causality test determines the cause-and-effect relation between the monthly inflation rate and common stocks. If the p-value from the analysis is below 0.05, then the null hypothesis will not be rejected because of lack of evidence, it means that the lagged x values do not explain the variation in y and vice versa.

Table (7) below shows the results of the VAR model for the data taken in the study and the table shows the results from performing the Granger Causality test on the data.

Table 7: Vector Auto-Regression Model

Number of observations	**97**	**Sample**	**3-99**
AIC	17.65267	Log likelihood	-848.1544
HQIC	17.73	FPE	159055.4
SBIC	17.86502	Det (sigma_ml)	134856.4

Equation	**Parms**	**RMSE**	**R-sq**	**Chi2**	**P>Chi2**
Inflation	4	0.7367	0.9806	4905.418	0.0000
NSE	4	526.115	0.9977	42555.9	0.0000

	Coef.	Std. Err.	Z	P>lzl	95% Conf. Interval Lower Bound	95% Conf. Interval Upper Bound
Inflation						
Inflation						
L1.	1.139629	0.10070	11.32	0.00	0.9422	1.337008
L2.	-0.18290	0.10398	-1.76	0.079	-0.3867	0.0209018
NSE						
L1.	-8.80e-06	0.0001395	-0.06	0.95	-0.00028	0.0002646
L2	0.0000279	0.0001386	0.2	0.84	-0.00024	0.0002996

	Coef.	Std. Err.	Z	P >|z|	[95% Conf.	Interval]
NSE						
Inflation						
L1.	-145.21	71.91101	-2.02	0.043	-286.15	-4.271517
L2.	158.4989	74.2539	2.13	0.033	12.963	304.034
Nse						
L1.	0.98966	0.09960	9.94	0.000	0.79444	1.1848
L2.	-0.00728	0.09899	-0.07	0.941	-0.201308	0.1867

Table 8: Granger Causality Wald Tests

Equation	Excluded	Chi2	Df	Prob > chi2
Inflation	Nse	5.5563	2	0.062
Inflation	ALL	5.5563	2	0.062
nse	Inflation	0.19508	2	0.907
Nse	ALL	0.19508	2	0.907

The results which can be concluded from the above are that inflation has no cause-effect relation with the national stock prices as the p-value in both cases, let it be 0.062 or 0.907, are greater than 0.05, hence the null hypothesis is not rejected, which means that the variation in NSE is not explained by the variation in Inflation and vice versa is also true.

CONCLUSION

The paper analyzed the dynamic interaction between monthly common stock prices and monthly inflation data from India from Jan 2014 to March 22. The paper's analysis contributed to the literature by using (VAR) vector autoregression methodology, and more precisely, the Johansen Cointegration and Granger Causality test and Andrew Zivot test. The outcome that can be concluded from this paper is restricted to a specific variable chosen, a specific time duration, and a certain methodology. Hence, the paper's outcome may vary when any of the above variables changes. The paper's findings can be summarized as there exists no cointegration between monthly inflation rates and monthly stock prices, to be more precise, we can state that there exists no long-run relationship between the monthly inflation and monthly common stock prices. It can be concluded by performing the Johansen Cointegration test, which concluded that the null hypothesis can't be rejected based on the abovementioned data. The other insight that can be concluded from the research is that no cause-and-effect association among the variables chosen exists. This can be concluded by performing the Granger Causality test. Hence, there exists no relationship between the common stock prices and the monthly inflation rate of India between the period of 2014-2022.

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