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Do Exogenous Shocks in Macroeconomic Variables Respond to Changes in Stock Prices?

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ABSTRACT

The research aims to examine the unexpected changes in stock prices due to external shocks given to the macroeconomic variables to forecast future stock market returns. **The study applies** two econometric models such as "Variance Decomposition" (VDC) and "Impulse Response Function" (IRF) for examining the exogenous shocks in macroeconomic variables respond to changes in stock prices. Monthly time series data of five significant macroeconomic variables Real Exchange Rate, Interest Rate, Consumer Price Index (CPI), Crude Oil Prices, and Trade Openness, taken as independent variables and BSE SENSEX as a dependent variable. The research period is from Jan 2009 to Dec 2019. The study has taken the responsibility to reveal a few strong evidences for changes in stock prices due to exogenous shocks in Exchange Rate, Trade Openness, Inflation, and Interest rate along with crude oil prices. According to the results, changes in the stock market are due to external factors like changes in dividend policy or capital loss, and some changes in the stock market are due to its own innovative shocks. This study suggests to reduce unexpected changes in stock prices frequently, companies should control capital loss and focus on stable return/dividend policies. There are divergent views in the literature review in the context of measures of these variables, however no research has been done on exogenous shocks in macroeconomic variables to BSE SENSEX for the Indian stock market with this particular data set and duration.
Keywords: BSE Sensex; exchange rate; interest rate; consumer price index; crude oil prices; trade openness; variance decomposition; impulse response function

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ОРИГИНАЛЬНАЯ СТАТЬЯ

Реагируют ли экзогенные шоки в макроэкономических переменных на изменение цен на акции?

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АННОТАЦИЯ

Цель исследования — изучить неожиданные изменения цен на акции в результате внешних шоков, вызванных макроэкономическими переменными, для прогнозирования будущих доходов фондового рынка. Авторы **применяют** две эконометрические модели, такие как «Variance Decomposition» (VDC) и «Impulse Response Function» (IRF) для изучения того, как внешние шоки в макроэкономических переменных влияют на изменения цен на акции. Ежемесячные временные ряды данных пяти значимых макроэкономических переменных: реального обменного курса, процентной ставки, индекса потребительских цен (ИПЦ), цен на сырую нефть и открытости торговли, взяты в качестве независимых переменных, и BSE SENSEX — в качестве зависимой переменной. Период исследования — с января 2009 по декабрь 2019 г. Выявлено несколько убедительных доказательств изменения цен на акции в результате экзогенных шоков, связанных с обменным курсом, открытостью торговли, инфляцией и процентной ставкой наряду с ценами на сырую нефть. Согласно полученным результатам изменения на фондовом рынке вызывают внешние факторы, такие как изменения в дивидендной политике или потери капитала, а некоторые изменения на фондовом рынке вызваны собственными инновационными шоками. Авторы рекомендуют компаниям контролировать потери капитала и сосредоточиться на стабильной доходности/дивидендной политике, чтобы снизить частоту неожиданных изменений цен на акции. В обзоре литературы представлены различные мнения в контексте мер этих переменных, но исследования экзогенных шоков макроэкономических переменных на BSE SENSEX для индийского фондового рынка с таким конкретным набором данных и продолжительностью не проводились.

Ключевые слова: BSE Sensex; обменный курс; процентная ставка; индекс потребительских цен; цены на сырую нефть; открытость торговли; дисперсионное разложение; функция импульсного отклика

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INTRODUCTION

An appreciation factor in the context of the stock market investigated is the ability of the Various communities to improve the financial important indicators, mostly cash inflows [1]. The share market is always susceptible to additional price-shaping information, which can be relevant for market developments and future trends. The factors related to price formulation generally include macroeconomic variables but sometimes inner and subjective factors impact the investor's behavior which may affect the entire conduct of the whole stock market and its volatility (which grows along with the growing numbers of market participants), the developments of technologies and impact of globalization [2]. In determining the share price, macroeconomic factors such as inflation, money supply, and commodity prices always play a significant role. "The monetary policy represents the most efficient instrument in different countries" [3]. Because the overall development of the monetary policy is the essential instrument for influencing the business and economy, now this is essential to comprehend the impact of the variations on the Indian capital market in macroeconomic factors. Stock markets always have an essential role in allocating resources to their most productive applications [4]. As per the Arbitrage Pricing Theory, macroeconomic factors like unexpected inflation, industrial production, and interest rate highly affect the stock market [5]. It is widely accepted in financial economics that macroeconomic variables have a strong effect on stock markets. The association between the stock market and macroeconomic variables creates attention for researchers and policymakers [6]. It is also attracted, economists and financial investors. In some developed economies, the nature of the stock market and macroeconomic variables may be different from the developing economy.

The investigations had practical significance because a deep understanding of the behavior of the stock market allows firms to work more efficiently [7]. By gaining knowledge about this relationship, governments can establish the economy and the stock market, attracting more investors and firms that can control the economic situation [8]. It can be the first step towards a strong economy. In 1965, Efficient Market Theory was introduced in the security market [9]. According to the definition of "A market where a large number of rational profit maximizers actively competing with each other and try to predict the future market values of individual security and the current information of the stock market easily available for everyone." Although this definition provides an understanding of what the efficient market is? Fama (1991) renamed the three concepts as inner information, event studies, as well as predictability for semi-strong form, strong form, along with weak side [10]. Different additional knowledge about what is meant by the available data makes clear what the efficient market is.

The weak state of the market itself confines just one subset of public information, basically historical data, i.e., As a result, the current asset values integrate all relevant previous information, such as dividend payments, trading volume as well as prior asset prices [11]. The previous nature of the stock market has not given any future prediction — Asset prices are predicted to evolve in accordance with the EMH theory on the hypothesis that they do [12]. From the standpoint of an investor, whatever information is accessible in the market should not result in an unusual profit in the stock market, regardless of the source of the information [13]. An investor can not beat the market consistently. This is compatible with a financial concept, according to which the highest price that investors are ready to pay is equal to the present value of future cash flows. An investment's present value is often assessed using a discount rate that signifies the uncertainty degree related with the investment based on all available information [14]. As the BRICS nations' economic and social transformations have progressed over the past several decades, they have made a significant contribution to the development of the financial sector [15]. It is widely known that economic growth is the most powerful driver for reducing inequalities by reducing the disparities in economic growth positively [16]. An effective financial system is essential for enhancing economic growth and development [17]. Many empirical studies have shown that a scarce financial market can be a source of financial imperfection and income inequalities [18]. The Indian economy has demonstrated a remarkable performance on the international platform in the last decade [19]. According to the global monetary fund, in GDP terms, the economy of India is the third-largest economy as well as the seventh-largest economy in the world [19, 20]. Indian officials have declared that their country was classed as a Newly Industrialized Country by the Central Intelligence Agency [21].

LITERATURE REVIEW

An analysis with sectoral stock indices was conducted to investigate the impulse changes due to exogenous shocks in certain macroeconomic variables in the short as well as long run. Results were found as the sectoral stock indices fluctuated and responded with shocks to FDI, imports, and exports at a certain level of variation [22]. The financial integration had been investigated between four major stock markets in the SAARC region. Results confirmed that Bangladesh's market fluctuates more than other markets, and the stock prices are changing due to different innovative changes in macroeconomic variables [23]. The reactions of oil prices as well as the currency rate to inflation have been considerable, according to the results of the Impulse Response Function. Within the first few months, the relationship between inflation and labour costs became considerable. Economic policies, fiscal and monetary policies play a vital role in controlling inflation. The price of crude oil had been an external element in which it has been necessary to find alternate means of reducing the inflationary effect [24]. Liquidity in the stock market increases after the increased price of oil from the demand side. Imagine that the oil price shocks originate on both the demand and supply sides of the oil industry. As a result, the liquidity of the stock market is adversely correlated with oil prices in such circumstances [25]. After the 2008 Global financial crisis, the U.S. financial risk structure changed. After Q.E. (quantitative easing) announcements, This occurs as a result of the risk spillover shifting from purchased to non-purchased resources [26]. The impact of quantitative easing on real economy quantifying in the research filtered an unobservable propensity to Q.E. and delivered impulse responses to the Q.E. shocks. Other approaches reveal that the business cycle is studied in terms of unexpected policy shocks. Q.E. shocks lead to a decrease in interest rates and an increase in stock prices [27]. Based on the VAR model impulse response function results found strong evidence that FIIs destabilize the stock market, especially with selling activities, and significantly increase the share price volatility [28]. By estimating the VAR-BEKK model, in the Greater China Area evidence was found of return and volatility spillovers among stock markets. The results of the impulse response function are used to measure the influence of the financial crisis on unanticipated conditional stock price volatility in the short term. The Greater China capital market is highly responsive to exogenous shocks [29]. The research examined the association between key macroeconomic variables such as government policies, disposable income, inflation rate, stock prices, and exchange rate. A strong long-run cointegration relationship had been seen between stock market returns along with macroeconomic variables. Increases in the inflation rate eroded the panorama of the positive performance of the Sensex, but it was not significant [30]. The study employed certain macroeconomic factors and analysed their influence on stock market returns in order to create a (CCA) canonical association analysis model for ZSE "Zimbabwe stock exchange". Most of the movements in the money supply, exchange rate, consumer price index, unemployment rate, mining along with the industrial index, and other economic indicators have an impact on stock returns. A key contribution to the development of the CCA model came from the stock returns of Barclays, Bindura, Hwange, Ariston, and Falcon [30, 31]. The findings of the multivariate analysis demonstrated a long-run causality between stock indexes and the T-bill rate, but no short-run relationship was discovered. The findings of the variance decomposition suggest that the stock index has a high degree of relative homogeneity, and the impulse response function demonstrates that the stock market responds positively to shocks in macroeconomic variables that are innovative [32]. The Nepalese monetary authority was only able to impact the stock market in the short term, and not in the long term [33]. Bank stock prices have been significantly affected by the changes in the inflation rate, interest rate, along with Exchange rate in the duration from 2000 to 2015. In this duration, the government ensured a stable macroeconomic environment and moderated policy-making for monetary policy. Banks are also having the responsibility for not engaging the speculations in foreign currencies. The fluctuations in currency value also affect bank stock prices [34]. Money supply, T-bill rate, exchange rate, and federal fund rate were suitable targets for the government for stabilizing the Islamic capital market as well as inspiring more capital flows into the market. When the interest rate rises at either the national or international level, the investors more will buy compliant stocks [35]. A long-run relationship and a substantial short-run relationship had been found between stock prices as well as macroeconomic variables in the stock market of Malaysia. The exchange rate has a negative association with the stock price value. Money supply papers have immediate favourable liquidity impacts and negative long-run effects on stock prices as a result of money supply expansion [35, 36]. Some macroeconomic factors, for example, treasury bill rate, customer pricing index, and money supply have a considerable impact on the stock market variables when the variables are measured in the past. The stock market, on the other

hand, has no effect on the macroeconomic indicators that have been picked. After analyzing with Variance Decomposition and impulse response function only a minority of the forecast variance error of the market index. Three principles were identified through factor analysis such as interest rate, exchange rate, as well as inflation. A statistically substantial association has been discovered between stock market indicators as well as macroeconomic factors. It is discovered that there is a one-way causation from the stock market to the actual economy. It was discovered that there were around five cointegration linkages between macroeconomic factors along with stock market indicators. Maybe diverse macro dimensions are responsible for stock price movements [36]. It has been discovered that there are significant disparities between the portfolios when the OLS approach is applied. In the serial connection problem discussed by utilizing Durbin-Watson statistics a big difference had been found among the market portfolios against macroeconomic variables against variation of R. No evidence was suggested in other market portfolios [1, 36]. Both long-run and short-run links between macroeconomic factors and stock prices have been established in this study. For the Sri Lankan stock market, the validity of the semi-strong form of the EMH theory was demonstrated, as was the existence of an opportunity for investors to make investments in both the domestic and foreign equity markets. Several methodological weaknesses were found during the research [37].

Statement of the Problem

After reviewing a lot of research papers from the last decades, it was found that no research has been done on exogenous shocks in macroeconomic variables to BSE Sensex for the Indian stock market with this particular data set and period. Thus, the study has taken the responsibility to reveal strong evidence for changes in stock prices due to exogenous shocks in macroeconomic variables.

Need of the Study

In the last two decades, Global financial markets, particularly the capital market, have undergone a significant transformation. The successive changes in macroeconomic variables have been the underlying reasons for these shifts in the economy. These modifications resulted in a major rise in the volatility of the stock market and the number of trades. In the context of measurements of these variables, there are a variety of points of view expressed in the literature review. The Indian economy has undergone tremendous changes in the last decades. The present study is expected to add some key contributions to the present literature. This study will examine the level of changes in macroeconomic variables due to innovative external shocks, which may cause a change in share prices in stocks listed in BSE Sensex. This study is expected to offer some acumens to policymakers, investors, and portfolio managers.

OBJECTIVES

To examine the unexpected changes in stock prices due to the external shocks given to the macroeconomic variables (i.e., Exchange Rate, Inflation, Interest Rate, Crude Oil Prices, and Trade Openness) to forecast the future stock market returns.

HYPOTHESIS

H0: Stock prices do not respond to an external shock from any of the macroeconomic variables.

H1: Stock prices respond to an external shock from any of the macroeconomic variables.

RESEARCH METHODOLOGY

Sample Selection

The present study includes the estimation findings for the unexpected changes in stock prices due to external shocks given to macroeconomic variables using the monthly frequency data. We have taken five macroeconomic variables, i.e., Exchange Rate (EXR), Crude Oil Prices (C.O.), Interest Rate (I.R.), Consumer Price Index (CPI), and Trade Openness and BSE SENSEX (B.S.) for stock prices.

Source of Data

The source of data is https://fred.stlouisfed.org/ & www.bseindia.com.

Period Taken for the Study

The period of the study is taken from January 2009 to December 2019

Tools & Models used in the Study

E-views 11 is used for the analysis. For converting time series data into stationary series Augmented Dicky Fuller Test had been applied. The Impulse Response Function has been used to examine the external shocks Variance Decomposition Model and check the impulse responses.

Model Specification

$$LBS = \alpha 0 + \alpha 1LCO + \alpha 2CPI + \alpha 3LEXR + \alpha 4LIR + \\ + \alpha 5LTO + \mathcal{E}t.$$

Table 1

Results of Variance Decomposition

Variance Decomposition of DBS:							
Period	S.E.	DBS	DCO	DCA	DEXTER	DIR	DTO
1	1089.165	100.0000	0.000000	0.000000	0.000000	0.000000	0.000000
2	1106.142	97.29432	1.533761	0.324406	0.094107	0.752060	0.001350
3	1131.913	96.16228	1.785321	0.319205	0.232665	0.722288	0.778235
4	1134.004	95.85114	1.780334	0.380576	0.231825	0.833000	0.923124
5	1134.731	95.79291	1.787323	0.381532	0.247423	0.850064	0.940752
6	1134.849	95.77335	1.787888	0.386212	0.247406	0.850327	0.954817
7	1134.875	95.77037	1.788449	0.386194	0.247860	0.852088	0.955042
8	1134.877	95.77007	1.788473	0.386296	0.247865	0.852238	0.955059
9	1134.878	95.77002	1.788510	0.386298	0.247866	0.852246	0.955064
10	1134.878	95.77000	1.788510	0.386298	0.247866	0.852249	0.955073
Variance Decomposition of DCO:							
Period	S.E.	DBS	DCO	DCPI	DEXTER	DIR	DTO
1	4.968296	0.064685	99.93531	0.000000	0.000000	0.000000	0.000000
2	5.350178	2.228039	96.26406	0.107869	0.291521	1.019707	0.088805
3	5.381352	2.493096	95.72546	0.295593	0.348509	1.036288	0.101059
4	5.392125	2.739793	95.34631	0.318969	0.351754	1.066785	0.176387
5	5.393157	2.739539	95.33409	0.321746	0.355290	1.066781	0.182553
6	5.393622	2.742391	95.32288	0.322281	0.359785	1.068995	0.183664
7	5.393652	2.742428	95.32201	0.322507	0.359849	1.069003	0.184202
8	5.393663	2.742443	95.32178	0.322514	0.359875	1.069156	0.184236
9	5.393664	2.742457	95.32175	0.322515	0.359876	1.069160	0.184238
10	5.393664	2.742459	95.32175	0.322515	0.359877	1.069160	0.184238
Variance Decomposition of DCPI:							
Period	S.E.	DBS	DCO	DCPI	DEXTER	DIR	DTO
1	0.728475	6.635239	0.105598	93.25916	0.000000	0.000000	0.000000
2	0.742328	7.966931	0.145100	91.51259	0.215895	0.044889	0.114593
3	0.760494	8.309864	1.186148	87.22171	0.478072	1.087939	1.716266
4	0.763803	8.337282	1.382817	86.46902	0.521916	1.183103	2.105863
5	0.764073	8.333694	1.382311	86.40814	0.564171	1.198845	2.112840
6	0.764276	8.329917	1.381626	86.36283	0.564088	1.215673	2.145863
7	0.764309	8.329448	1.382427	86.35523	0.564866	1.216641	2.151393
8	0.764321	8.329352	1.382581	86.35277	0.564853	1.219111	2.151328
9	0.764322	8.329331	1.382600	86.35239	0.564851	1.219167	2.151657
10	0.764323	8.329320	1.382600	86.35230	0.564854	1.219210	2.151714
Variance Decomposition of DEXR:							
Period	S.E.	DBS	DCO	DCPI	DEXTER	DIR	DTO
1	1.330815	14.14855	0.004007	0.057641	85.78980	0.000000	0.000000
2	1.433250	16.10615	0.212214	3.652014	76.23171	3.625078	0.172833
3	1.474954	16.71446	1.051329	5.545052	71.99604	4.501969	0.191147

Table 1 (continued)

Variance Decomposition of DEXR:							
Period	**S.E.**	**DBS**	**DCO**	**DCPI**	**DEXTER**	**DIR**	**DTO**
4	1.483369	17.20902	1.118085	5.486907	71.18695	4.489730	0.509303
5	1.484276	17.20873	1.147853	5.507854	71.11378	4.498001	0.523780
6	1.484882	17.21150	1.152670	5.504787	71.06012	4.528039	0.542879
7	1.484952	17.21107	1.152585	5.506950	71.05356	4.527995	0.547839
8	1.484976	17.21106	1.152683	5.506868	71.05122	4.530236	0.547940
9	1.484979	17.21102	1.152679	5.506894	71.05097	4.530295	0.548148
10	1.484980	17.21102	1.152682	5.506909	71.05087	4.530376	0.548148
Variance Decomposition of DIR:							
Period	**S.E.**	**DBS**	**DCO**	**DCPI**	**DEXTER**	**DIR**	**DTO**
1	0.400924	4.30E-05	1.255395	0.064041	0.614634	98.06589	0.000000
2	0.402214	0.170434	1.261692	0.064925	0.881465	97.58133	0.040153
3	0.409696	0.169739	1.228133	0.727353	1.251220	96.58273	0.040822
4	0.410004	0.299136	1.232075	0.728171	1.249815	96.44587	0.044937
5	0.410367	0.310222	1.242527	0.779892	1.267747	96.32801	0.071604
6	0.410461	0.332449	1.247422	0.780643	1.267593	96.28405	0.087845
7	0.410478	0.333234	1.247884	0.782902	1.267504	96.27977	0.088709
8	0.410488	0.334407	1.248111	0.782961	1.267505	96.27587	0.091150
9	0.410489	0.334425	1.248106	0.783074	1.267512	96.27569	0.091192
10	0.410489	0.334454	1.248108	0.783072	1.267511	96.27559	0.091263
Variance Decomposition of DTO:							
Period	**S.E.**	**DBS**	**DCO**	**DCPI**	**DEXTER**	**DIR**	**DTO**
1	4.452876	0.391262	0.010824	0.266691	1.022135	0.082661	98.22643
2	5.092322	4.809630	0.628899	0.205265	1.022690	0.063329	93.27019
3	5.209225	5.463493	1.128258	0.323462	1.176100	2.747543	89.16114
4	5.246499	5.439944	1.142569	0.323952	1.159757	3.169740	88.76404
5	5.256885	5.452165	1.138108	0.344805	1.155294	3.197613	88.71201
6	5.259247	5.447832	1.137124	0.348671	1.155373	3.274045	88.63696
7	5.259513	5.447286	1.137199	0.349876	1.155623	3.277364	88.63265
8	5.259602	5.447222	1.137341	0.350509	1.155620	3.278131	88.63118
9	5.259619	5.447187	1.137366	0.350507	1.155620	3.278582	88.63074
10	5.259621	5.447236	1.137367	0.350526	1.155623	3.278586	88.63066
Cholesky Ordering: DBS DCO DCPI DEXR DIR DTO							

Source: E-Views 11.

DATA ANALYSIS AND DISCUSSION

Variance Decomposition Results

The Variance Decomposition analysis provides the percentage values of forecasted error variance in a single variable, based on the forecasted error variance. The empirical results are illustrated in *Table 1*, which shows that 95.77% of stock prices changed by innovative shocks. The crude oil prices have a more significant impact, around 1.78%, whereas trade openness has contributed a .95% impact on the BSE. However, the analysis explains the maximum percentage of variation after the prices of crude oil

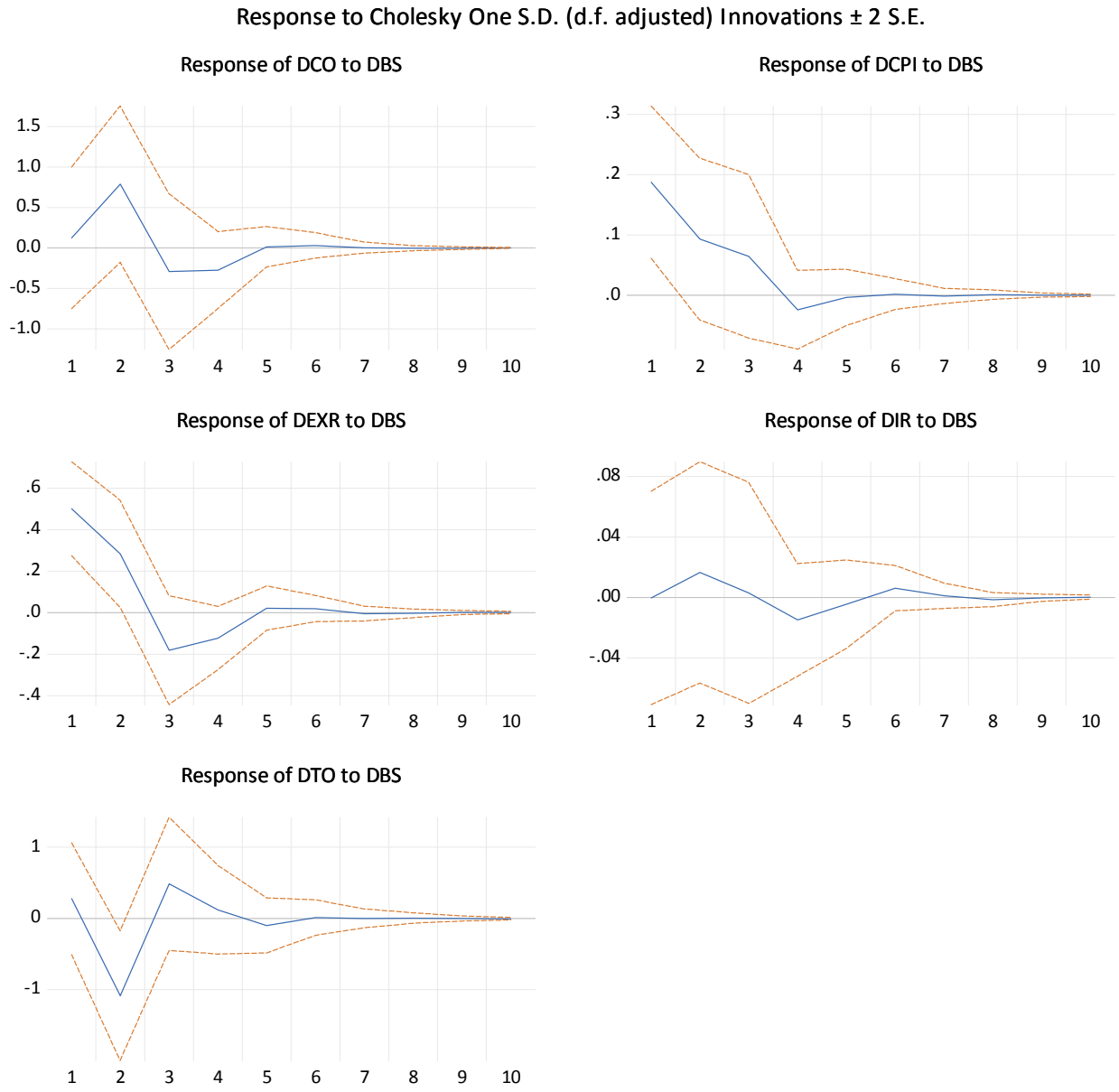

Fig. **Combined Graph of Impulse Response Function Analysis**
Source: E-Views 11.

which affect the stock market. The contribution of other variables is very minimal.

Impulse Response Functions

As a result of an external change, the impulse response function depicts the reaction of some dynamic system. Using this method, you may figure out how sensitive each of the dependent variables in the VAR is when a shock is applied to the variable in question. Graph No. 2 shows the estimation from the impulse response function of the stock market index as against the "own shocks" along with shocks of crude oil prices, interest rate, exchange rate trade openness, and inflation. Results in *Fig.* are represented in graphs. Results show the impulse response in crude oil prices to BSE SENSEX in the first graph that shows the value of crude oil prices is rising from the first period. After a short period, it will be declined, and after the sixth period, it is stable. Results show in the second graph, the impulse response in CPI (Consumer price index) to BSE SENSEX, which shows the value of CPI is declining, and after a short period, it was rising. Results show in the third graph the impulse response in Exchange Rate to BSE SENSEX, which shows the value of the Exchange Rate is declining and after a short time period it is rising. Results in *Table 2* show the impulse response in the Inflation Rate to BSE SENSEX in the fourth graph, which shows the Inflation Rate is rising from the first period. After a short period, it will be declined, and after the sixth

Table 2

Results of Impulse Response Function

Period	DCO	DCPI	DEXTER	DIR	DTO
1	0.126360	0.187647	0.500580	−0.000263	0.278532
	(0.43736)	(0.06307)	(0.11295)	(0.03530)	(0.39167)
2	0.788540	0.093221	0.283325	0.016603	−1.081499
	(0.48197)	(0.06718)	(0.12858)	(0.03656)	(0.45473)
3	−0.290192	0.064486	−0.181019	0.003031	0.485133
	(0.48039)	(0.06773)	(0.13128)	(0.03657)	(0.46710)
4	−0.273168	−0.024064	−0.122651	−0.014763	0.121700
	(0.23717)	(0.03276)	(0.07617)	(0.01861)	(0.31048)
5	0.015201	−0.003674	0.021367	−0.004423	−0.096495
	(0.12394)	(0.02331)	(0.05335)	(0.01461)	(0.19312)
6	0.031102	0.001920	0.019263	0.006139	0.012481
	(0.07820)	(0.01283)	(0.03155)	(0.00751)	(0.12448)
7	0.004399	−0.001244	−0.005076	0.001171	0.001280
	(0.03382)	(0.00636)	(0.01778)	(0.00417)	(0.06703)
8	−0.002762	0.000954	−0.003524	−0.001415	0.005733
	(0.01591)	(0.00383)	(0.01034)	(0.00231)	(0.03571)
9	−0.002106	0.000307	0.000673	−0.00018	0.000333
	(0.00824)	(0.00177)	(0.00515)	(0.00118)	(0.01798)
10	0.000762	−8.28E-05	0.000741	0.000225	−0.003882
	(0.00331)	(0.00097)	(0.00280)	(0.00070)	(0.00872)
Cholesky Ordering: DBS DCO DCPI DEXR DIR DTO					
Standard Errors: Analytic					

Source: E-Views 11.

period, it is stable. Results show the impulse response in Trade Openness to BSE SENSEX in the fifth graph, which shows the value of Trade openness is declining. After a short period, it rises, and after the fifth period, it is stable.

Findings

1. According to the results, the Null Hypothesis H0 is rejected.

2. In order to predict the short and long-run shocks, variance decomposition is utilized for the study; VDC analysis results show that a significant unexpected change in stock prices is due to external factors like changes in dividends, and also most of the changes are due to exogenous shocks in macroeconomic variables which have been taken for the study in-sample period and some changes in the stock market are due to its own innovative shocks.

3. VDC Analysis results show that Crude oil prices have a more significant effect on BSE SENSEX, whereas other macroeconomic variables have moderate effects on the BSE SENSEX.

4. The results of IRF show that all macroeconomic variables are changing due to impulse changes in BSE SENSEX due to exogenous shocks.

SUGGESTIONS

1. To reduce these unexpected changes frequently, companies should control the capital loss and focus on some stable policies regarding dividends.

2. Changes in stock market returns are more affected by changes in crude oil prices in India. The reason could be, the companies in Energy, Industrial and Material sectors raise the value of shares to rise in oil prices. Raising prices in oil is a positive signal to the investors in India to increase the amount of investment.

3. A hike in oil prices will have a positive impact on other commodity prices like Gold prices.

4. And if there is a hike in share prices, commodities prices will go down in the coming years.

CONCLUSION

An attempt was made in this research work to investigate the impact of macroeconomic factors on the Indian stock market. The empirical study began with testing stationarity of the time-series data, and lag length criteria were decided. Finally, the model's short-run and long-run shocks were predicted using the Impulse Response Function as well as Variance Decomposition analysis, respectively. According to the findings, crude oil prices have a greater influence on the BSE Sensex than other factors, with other variables having a small impact. The results of VDC analysis discover that stock prices change due to their innovative shocks. The macroeconomic variables were selected based on the existing literature and the availability of the resources.

LIMITATIONS OF THE STUDY

The study has considered a limited number of macroeconomic variables, i.e., Exchange Rate, Consumer Price Index, Interest Rate, Crude Oil Prices, along with Trade Openness and stock index i. e BSE Sensex. Other macroeconomic variables could have a considerable impact on the movement of the stock market. In contrast, Other stock indexes are just as important for assessing the overall influence of macroeconomic factors on stock market performance as the Dow Jones Industrial Average.

SCOPE OF FURTHER RESEARCH

Further study might re-examine the difficulties raised in this work using a more complete data collection that includes more macroeconomic solid factors and stock indexes, in addition to the data set used in this paper. Research can be enhanced by including the study of a structural break in the time series data due to the Covid-19 pandemic. The Indian market also can be examined by comparing it with the stock market of developed countries at the international level.

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