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A Comparative Study on the Effects of Oil Price Changes on Commodity Prices, Stock Market and Indian Production

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Abstract:- Increases in oil prices are often assumed to lead to higher inflation and slower economic growth. Inflation causes commodity prices to rise, stock market fluctuations, and a stagnant effect on Indian production. The price of things created with petroleum products directly relates to oil prices in terms of inflation. The cost of heating, manufacturing, and transportation are just a few examples of indirect costs that are impacted by oil prices.High oil prices can also have a negative impact on the demand for other items since they lower wealth and increase uncertainty about the long-term (Sek et al 2015). One approach to think about the impact of rising oil costs is to think of them as a tax on consumers (Kilian & Zhou 2021). Imported oil is the simplest illustration of this.

Keywords:- *ADF Test, ARDL, Nonlinear ARDL Model, Oil Price, Commodity Prices.*

I. INTRODUCTION

A 25-year low of $11 per barrel in February 1999 was quickly followed by a first-week high of $35 per barrel in the past five years, according to the Fund's reference price. Global oil prices are expected to rise by about $5 per barrel in 2001 compared to the most recent World Economic Outlook (WEO) published in late September, according to futures markets.

It's important to note that oil prices have a direct impact on the stock market. Recent years have seen an increase in interest in figuring out how oil price fluctuations affect the stock market. Investors and economists benefit from the many factors influencing stock indices in a variety of ways. As a global phenomenon, the change in oil prices affects every country on the planet. The price of oil has a greater impact on a developing country like India.

An empirical study of the stock market, commodities, and Indian production have all been impacted by changes in oil prices, and the results are presented here. The fluctuation of oil prices has a direct impact on the state of the domestic economy. The rest of the document is structured as follows: Section 2 provides a literature review; Section 3 explains the data; Section 4 summarizes the methodology; Section 5 discusses the findings, and Section 6 concludes.

Increased prices were extensively discussed in the most recent World Economic Outlook. OPEC's recent production increases, which resulted in an increase in stock levels, have contributed to the recent decline in oil prices, which has been evident since late November. This slowdown in global economic activity reflects higher oil prices to some degree, but it also reflects lower oil prices. After falling to just over $22 a barrel on December 20th, the Fund's benchmark price has since risen to just under $24 on futures markets, which suggest that the average oil price in 2001 will be only $1 higher than the original WEO baseline. It's possible that the recent spike in oil prices won't last as long as previously thought, and that the resulting impact on economic growth and inflation will be less severe.

In terms of the overall economy, oil prices have a significant impact on financial markets. The study of the link between oil prices and the financial markets has become a fundamental topic for businesses. Oil price fluctuations are one of the most important factors that investors look into when making investment decisions.

Factors such as economics and politics The financial markets take these factors into account. The literature on financial management divides the factors that affect stock indices into company-specific and general factors. This is how the stock market works. Operating factors and financial factors are the two main categories of special variables that have an impact on a company's performance. Operational and financial costs, as well as the number of shares and company reputation, dividends, book value per share and investor expectations, are known as diversifiable or irregular risks. among the most significant are the financial markets.

Components that are affected by oil prices as a whole the study of the link between oil prices and the financial markets has become a fundamental topic for businesses. Investors investigate whether oil price fluctuations are a significant influence on stock indices and, consequently, on their decisions to fund and invest. Stock indices are influenced by a wide range of factors. To put it another way, because the index represents a large group of stocks, it is affected by all factors that affect the market value of a company's shares, as well as those that affect the overall index or the market as a whole by economic, financial, and political factors. The financial markets take these factors into account. According to the literature on financial management, the factors that affect stock indices are divided into those that are specific to companies and those that are general. Operating factors and financial factors are the two main categories of special variables that have an impact on a company's performance. Operational and financial costs, as well as the number of shares and company reputation, dividends, book

value per share and investor expectations, are known as diversifiable or irregular risks.

II. LITERATURE REVIEW

Research on the dynamic relationship between crude oil price, inflation, and economic growth has been conducted by researchers such as Zhang and Bhattacharya (2001), Gómez-Loscos et al. (2012), Hamilton (1996), Jones et al. (2004) and Hooker (1996). There are three main ways in which our article adds to the body of knowledge. Following Shin et al., we divide the oil price into positive and negative components (2014). It is useful for determining the inflationary and economic growth effects of a positive or negative partial sum of the oil price. As a second step, we run a degree of non-stationary (DNS) test, which is not a traditional unit root test. This test is superior to others in terms of its ability to accurately measure without destroying the data's features (Huang et al., 1998). Finally, our research is based on monthly data beginning in April 1997, just before the financial crisis of early 1998.

Higher oil prices, according to the study conducted by Cashin et al. in 2000, lead to a 0.3 percent drop in the industrial countries' gross domestic product (GDP), further exacerbating inflation in the short term. Another finding of the study was that a $5 per barrel increase in oil prices in India would result in 1.3% higher inflation and a 0.1% lower annual GDP growth. In their analysis of the Indian economy, Bhattacharya and Bhattacharya (2001) found that a 20 percent increase in oil prices leads to a 1.3 percent increase in other commodities' inflation and a 2.1 percent decrease in output growth. Although its magnitude gradually diminishes, the impact of such a shock lasts nearly two years. The short-term inflationary pressure shock caused by an increase in oil prices may be delayed, but it will eventually transform into a much bigger shock, they've also said. As the oil shock of the 1970s showed, if oil prices rise further, a wage-price spiral will be created, which will have an indirect effect on the prices of all commodities using oil as an input. Both the price of oil and other commodities would rise if its price were to rise broadly. Commodities are being stockpiled at an unprecedented rate in anticipation of a future price increase, and this will lead to a spike in prices immediately. It is expected that a cost-push effect in the economy will begin after an average production cycle in the economy is completed. In a developing country like India, where 29.5 percent of the population lives below the poverty line, inflation will disrupt the country's economic growth, leading to a situation of uncertainty, depreciation in the exchange rate, and a fall in aggregate demand, and thus shaping into hyperinflation at the domestic levels. ' Since 1974, the price of oil has fluctuated greatly.

Petroleum prices, particularly in emerging economies, are highly volatile and have a significant impact on other important macroeconomic variables. Since oil prices have an impact on inflation and economic growth, researchers and policymakers are keeping a close eye on them. Oil prices rose from about US$3 per barrel in 1970 to about US$40 per barrel in 1979 during the first oil crisis of the 1970s. Consumer Prices Index (CPI; the base year of 1982, compiled by the US Bureau of Labor Statistics) also jumped from 41.20 to 86.30 between 1972 and 1980. As previously stated, oil prices rose from $15 per barrel in 1998 until they reached nearly $140 in 2008. Similarly, the US CPI increased from 164.30 in January 1999 to 214.82 in July 2011. (April 2008). With the help of our research, we tried to determine how crude oil prices in India and the rate of inflation in India are linked over time. Oil price spikes have plagued the global economy since the first one in the 1970s, and each one has resulted in cost-push inflation (also known as supply-side inflation). Because crude oil is a primary input in manufacturing, an increase in its price raises production costs, causing a company to reduce output. This is known as supply-side inflation. However, it's impossible to ignore the inflationary impact of oil price fluctuations on demand. There will be a decrease in disposable income and purchasing power, which affects consumption. If oil price shocks encourage entrepreneurs to switch from less energy-intensive capital to more energy-intensive capital, investment may also be affected, which could have a negative impact on economic growth.From the works of Brown and Yücel (2002), Tang et al. (2010) and Varghese (2017), we can deduce six channels through which the effect of crude oil price shocks can be transmitted to an economy.

III. DATA SOURCES AND METHODOLOGY

- *Data Sources*

In this study, monthly data from 2005 to 2022 is used. For the price of crude oil, gold, silver, IIP, natural gas, the Nifty, and the US dollar, we used nominal data from Yahoo Finance, the CMIE database. The ADF test, VAR model, Impulse Responses, Block Exogeneity test (Wald Test), and Vector decomposition have been utilized in this article.

- *Methodology*

Empirical studies based on time series data are based on the presumption that the underlying.

Do oil prices and stock markets move in tandem or in opposite directions? The complex and time varying relationship between oil prices and stock markets has caught the attention of the financial press, investors, policymakers, researchers, and the general public in recent years. In light of such attention, this paper reviews research on the oil price and stock market relationship. The majority of papers we survey study the impacts of oil markets on stock markets, whereas, little research in the reverse direction exists. Our review finds that the causal effects between oil and stock markets depend heavily on whether research is performed using aggregate stock market indices, sectorial indices, or firm-level data and whether stock markets operate in net oil-importing or net oil-exporting countries. Additionally, conclusions vary depending on whether studies use symmetric or asymmetric changes in the price of oil, or whether they focus on unexpected changes in oil prices. Finally, we find that most studies show oil price volatility transmits to stock market volatility, and that including measures of stock market performance improves forecasts of oil prices and oil price volatility. Several important avenues for further research are identified.

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When determining whether a time series is stationary or not, the ADF test is employed to make the determination. Table 1 shows the descriptive analysis of functions so it can be interpreted there is less chances of error and all the macro variables impact on Nifty

- *Applied Statistical Tool*

The methods of econometrics were used to discover the connections between the various time series. Initially, the data was used to observe the statistical behaviour of each variable that was used in the descriptive analysis of the data set. Economics methods have been used to investigate the correlation between series. Initially, descriptive statistics are used to observe the statistical behaviour of each variable. The purpose of descriptive statistics is to examine the data's distribution to determine Mean, Standard Deviation, Variance, Skewness, and Kurtosis. This helps to discover how time series respond. All seven variables were subjected to descriptive analysis in order to determine the basic characteristics of the variables under investigation.

Table 1: The descriptive analysis of functions so it can be interpreted there is fewer chances of error and all the macro variables impact on crude Oil.

	DLOG(CR...	DLOG(IIP)	DLOG(SIL...	DLOG(GOLD)	DLOG(NG)	DLOG(USD)	DLOG(NIFTY)
Mean	0.003391	0.002243	0.008089	0.006687	0.000499	-0.001221	0.009909
Median	0.002405	0.005067	0.002507	0.004568	0.000000	-0.001344	0.010475
Maximum	0.633269	0.139244	0.275527	0.129863	0.486205	0.097996	0.247376
Minimum	-0.865333	-0.437325	-0.199929	-0.198512	-0.513949	-0.104132	-0.306665
Std. Dev.	0.119463	0.059460	0.077000	0.049704	0.145128	0.026906	0.064203
Skewness	-1.409718	-2.079401	0.255470	-0.210669	0.088229	-0.314095	-0.891204
Kurtosis	19.17034	16.91540	3.865475	3.995648	4.872918	4.987241	7.421485
Jarque-Bera	2335.054	1836.883	8.796343	10.22735	30.81845	38.18881	198.8569
Probability	0.000000	0.000000	0.012300	0.006014	0.000000	0.000000	0.000000
Sum	0.705416	0.468846	1.690692	1.404239	0.104316	-0.257595	2.080841
Sum Sq. Dev.	2.954204	0.735390	1.233237	0.516322	4.380938	0.152025	0.861502
Observations	208	209	209	210	209	211	210

Table 2: The Result of ADF test:

		t-Statistic	Prob.*
Gold	Augmented Dickey-Fuller test statistic	-1.80903	0.3754
IIP	Augmented Dickey-Fuller test statistic	-2.33813	0.411
Nifty	Augmented Dickey-Fuller test statistic	-1.92495	0.6379
NG	Augmented Dickey-Fuller test statistic	-2.78043	0.2062
silver	Augmented Dickey-Fuller test statistic	-2.36492	0.3969
crude_oil	Augmented Dickey-Fuller test statistic	-2.83811	0.1854

Table 2 shows, Using a P-value of more than 5%, we conclude that all series are non-stationary and accept the null hypothesis. All series must be stationary in order to estimate the Vector Autoregression (VAR) model.

Table 3 shows the log value of the macroeconomic variable and to analyse the impact of

Variables	**Test**	**t-statistic**	**P value**
Dlog(Crude oil)	Augmented Dickey-Fuller test statistic	-14.3222	0.00000
Dlog(Gold)	Augmented Dickey-Fuller test statistic	-16.0153	0.00000
Dlog(IIP)	Augmented Dickey-Fuller test statistic	-3.89396	0.01400
Dlog(Nifty)	Augmented Dickey-Fuller test statistic	-14.1561	0.00000
Dlog(NG)	Augmented Dickey-Fuller test statistic	-16.1238	0.00000
Dlog(silver)	Augmented Dickey-Fuller test statistic	-14.6034	0.00000

Above, we can see that all the variables were non-stationary at atrend and intercept level. Non-stationary results were found because the p-values of all other variables were larger than the critical p-value. But after applying transformations series have been converted to stationary now VAR can be applied to check the impact of the variable on the movement of other described variables.

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Roots of Characteristic Polynomial
Endogenous variables: DLOG(SILVER) DLOG(NG) DLOG(CRUDE_OIL) DLOG(NIFTY) DLOG(USD) DLOG(IIP) DLOG(GOLD)
Exogenous variables: C
Lag specification: 1 2
Date: 07/29/22 Time: 08:15

Root	Modulus
-0.378050 - 0.297808i	0.481260
-0.378050 + 0.297808i	0.481260
-0.226411 - 0.388720i	0.449850
-0.226411 + 0.388720i	0.449850
0.422663	0.422663
0.166862 - 0.378986i	0.414093
0.166862 + 0.378986i	0.414093
0.087378 - 0.397075i	0.406575
0.087378 + 0.397075i	0.406575
-0.275743 - 0.132918i	0.306107
-0.275743 + 0.132918i	0.306107
-0.271503 - 0.087300i	0.285193
-0.271503 + 0.087300i	0.285193
0.244924	0.244924

No root lies outside the unit circle.
VAR satisfies the stability condition.

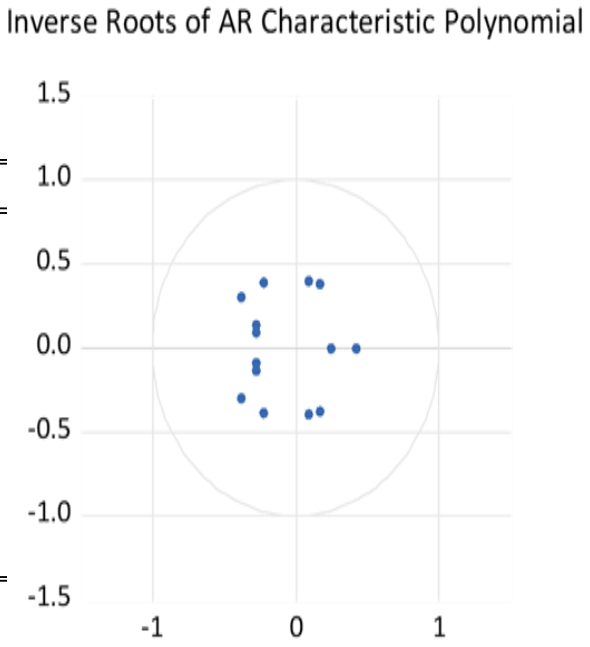


Fig 1: The Inverse Root graph and Roots of Polynomial Endogenous Variables

The Inverse Root graph (figure 1) explains the data is inside the circle. Hence it is not spurious in nature and it can be justified easily due to the roots (dots of blue color) are within the circle so it can be assumed that there is the stability of the model. The table shows the Exogeneity and can be explained as all the roots must be less than 1.As the modulus of roots of characteristic is less than 1 it can be concluded that the model has stability.

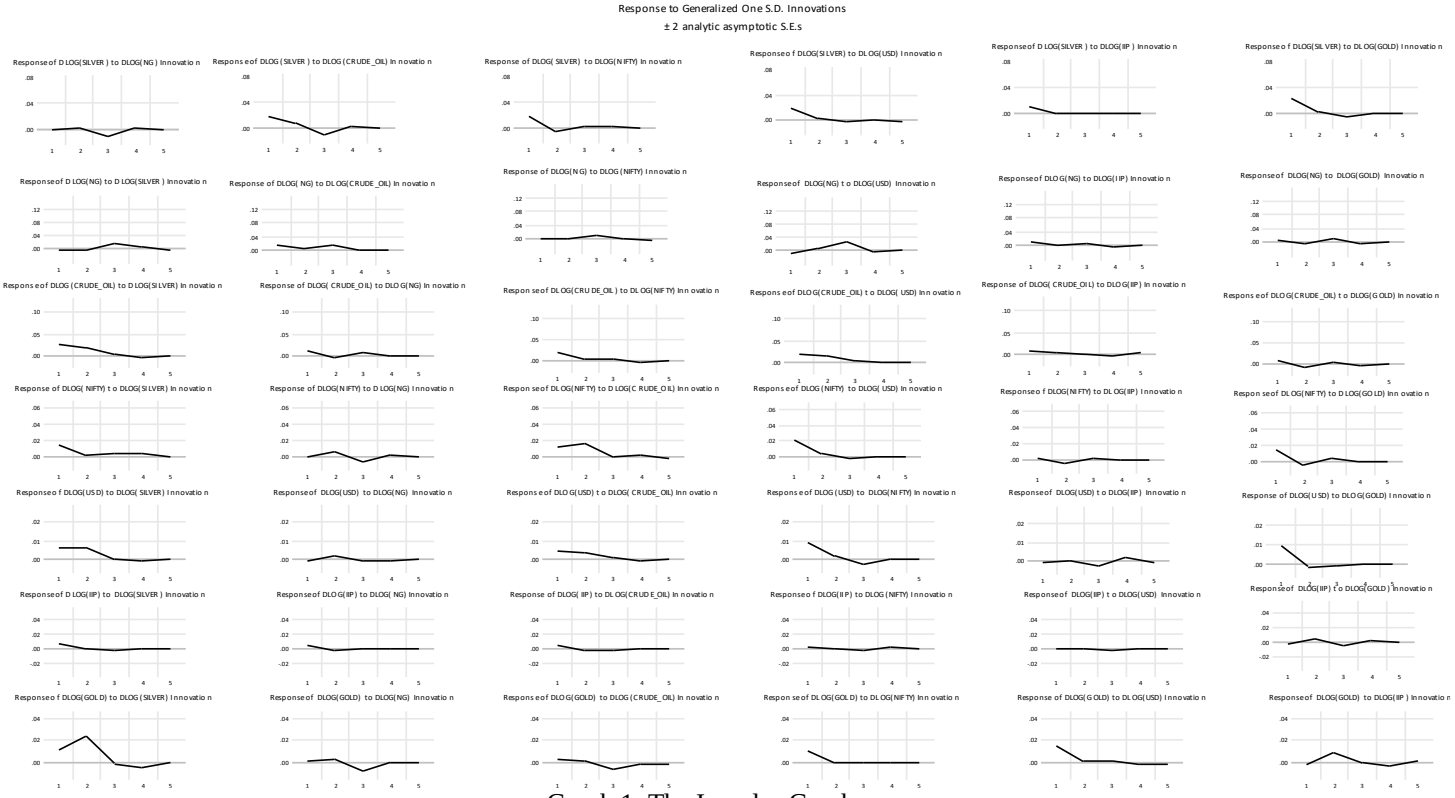
Table 4: VAR Lag Order Selection Criteria

VAR Lag Order Selection Criteria
Endogenous variables: DLOG(SILVER) DLOG(NG) DLOG(CRUDE_OIL) DLOG...
Exogenous variables: C
Date: 07/29/22 Time: 08:17
Sample: 2005M01 2022M08
Included observations: 203

Lag	LogL	LR	FPE	AIC	SC	HQ
0	1849.024	NA	3.10e-17	-18.14802	-18.03377*	-18.10180
1	1936.057	167.2055*	2.13e-17*	-18.52273*	-17.60874	-18.15296*
2	1969.992	62.85565	2.48e-17	-18.37431	-16.66058	-17.68100
3	2002.893	58.67073	2.91e-17	-18.21570	-15.70223	-17.19885
4	2033.018	51.64234	3.54e-17	-18.02973	-14.71653	-16.68934
5	2058.531	41.97740	4.51e-17	-17.79834	-13.68539	-16.13440

* 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

Table4 represents the lag order selection criteria and here it is seen that the most of the criteria is suggesting Lag 2 so we will head on with lag 2. The purpose of choosing optimal lag is to reduce residual correlation.The key point is the reduction of serial correlation.



Graph 1: The Impulse Graph

Graph1 shows the Impulse Graph and coefficients for determining the relevance of one variable in explaining the other variable.The Granger causality or Block exogeneity test Wald Test as p value is less than 0.05explains the variation in crude oil has been explained by the US dollars, Natural Gas and Silver. However, the Gold is affected by the silver metal only. There is also effect of gold being visible in Natural Gas prices. IIP has not been affected by any of these factors. The impact of crude is seen on Nifty. Silver depends on Gold for the variation and the variations in USD is caused a little bit because of silver.

VAR Granger Causality/Block Exogeneity Wald Tests

Dependent variable: DLOG(SILVER)

Excluded	Chi-sq	df	Prob.
DLOG(NG)	2.928888	2	0.2312
DLOG(CRU	3.339778	2	0.1883
DLOG(NIF	3.348134	2	0.1875
DLOG(USD	0.281954	2	0.8685
DLOG(IIP)	0.017637	2	0.9912
DLOG(GOL	0.473052	2	0.7894
All	11.69689	12	0.4703

Dependent variable: DLOG(NG)

Excluded	Chi-sq	df	Prob.
DLOG(SILV	0.36281	2	0.8341
DLOG(CRU	1.791047	2	0.4084
DLOG(NIF	0.157958	2	0.9241
DLOG(USD	4.096239	2	0.129
DLOG(IIP)	0.381514	2	0.8263
DLOG(GOL	0.222207	2	0.8948
All	11.05795	12	0.524

Dependent variable: DLOG(CRUDE_OIL)

Excluded	Chi-sq	df	Prob.
DLOG(SILV	6.08763	2	0.0477
DLOG(NG)	0.268434	2	0.8744
DLOG(NIF	0.14163	2	0.9316
DLOG(USD	3.646221	2	0.1615
DLOG(IIP)	0.05844	2	0.9712
DLOG(GOL	4.425748	2	0.1094
All	13.0819	12	0.3631

Dependent variable: DLOG(GOLD)

Excluded	Chi-sq	df	Prob.
DLOG(SILV	74.34378	2	0
DLOG(NG)	5.57822	2	0.0615
DLOG(CRU	8.240937	2	0.0162
DLOG(NIF	1.143983	2	0.5644
DLOG(USD	0.148629	2	0.9284
DLOG(IIP)	4.14189	2	0.1261
All	94.97315	12	0

Dependent variable: DLOG(NIFTY)

Excluded	Chi-sq	df	Prob.
DLOG(SILV	0.653687	2	0.7212
DLOG(NG)	2.759909	2	0.2516
DLOG(CRU	10.46058	2	0.0054
DLOG(USD	2.187082	2	0.0335
DLOG(IIP)	2.189917	2	0.3346
DLOG(GOL	6.62572	2	0.0364
All	22.33109	12	0.034

Dependent variable: DLOG(USD)

Excluded	Chi-sq	df	Prob.
DLOG(SILV	11.25532	2	0.0036
DLOG(NG)	1.072755	2	0.5849
DLOG(CRU	1.44764	2	0.4849
DLOG(NIF	1.706142	2	0.4261
DLOG(IIP)	2.688643	2	0.2607
DLOG(GOL	3.250687	2	0.1968
All	22.59034	12	0.0314

Dependent variable: DLOG(IIP)

Excluded	Chi-sq	df	Prob.
DLOG(SILV	1.236744	2	0.5388
DLOG(NG)	0.337452	2	0.8447
DLOG(CRU	0.203618	2	0.9032
DLOG(NIF	0.024664	2	0.9877
DLOG(USD	0.613055	2	0.736
DLOG(GOL	0.826197	2	0.6616
All	3.778389	12	0.9871

Fig 2: The Wald test

The Wald testshows which variables are contributing something significant.It can be interpreted that explanatory variables in a model are significant.The Granger causality or Block exogeneity test Wald Test with a p-value less than 0.05 explains the variation in silver has not been affected by any macroeconomic variable. However, with the variation in crude oil, gold, and USD. There are no variations that are caused by any of the variables of Natural Gas or vice versa. The crude oil affects the gold and nifty and gets

affected by silver itself. The gold is affected by the crude oil and silver causing an impact on the Nifty. USD gets affected by the silver and does cause an impact on Nifty. IIP also does not hold any relationship directly with these variables.

Variance Decomposition:The Granger Causality or Block Exogeneity Wald Tests imply zero parameter restrictions only the endogenous lagged terms i.e., on lag 1 to 10 only.

Variance Decomposition

Variance Decomposition of DLOG(SILVER):

Period	S.E.	DLOG(SILV	DLOG(NG)	DLOG(CRU	DLOG(NIF	DLOG(USD	DLOG(IIP)	DLOG(GOL
1	0.077478	100	0	0	0	0	0	0
2	0.078197	98.17411	0.15786	0.504115	0.891665	0.198714	0.000444	0.073095
3	0.079964	94.60236	1.915396	1.75814	1.272354	0.214209	0.009509	0.228028
4	0.080072	94.44598	1.97076	1.783958	1.304316	0.215332	0.048941	0.230709
5	0.080101	94.39225	1.970842	1.783148	1.326492	0.245642	0.049617	0.232006
6	0.080109	94.37967	1.970437	1.782795	1.326493	0.247417	0.058617	0.234575
7	0.08011	94.37916	1.970599	1.782801	1.326634	0.247414	0.058752	0.234637
8	0.080111	94.37869	1.970875	1.782885	1.326626	0.247416	0.058784	0.234724
9	0.080111	94.37865	1.970883	1.782883	1.326636	0.247415	0.058786	0.234742
10	0.080111	94.37863	1.970891	1.782882	1.326638	0.247424	0.058792	0.234743

Variance Decomposition of DLOG(NG):

Period	S.E.	DLOG(SILV	DLOG(NG)	DLOG(CRU	DLOG(NIF	DLOG(USD	DLOG(IIP)	DLOG(GOL
1	0.144863	0.02123	99.97877	0	0	0	0	0
2	0.146621	0.049324	99.14336	0.426051	0.012879	0.259	0.100144	0.009241
3	0.14939	0.977443	95.5156	1.081224	0.149082	2.112833	0.125965	0.037851
4	0.149878	1.253897	94.96282	1.074639	0.168213	2.161236	0.208563	0.170633
5	0.149918	1.276052	94.92274	1.075178	0.179589	2.167302	0.208594	0.170548
6	0.149932	1.284651	94.90557	1.075085	0.186981	2.167167	0.209764	0.170787
7	0.149936	1.285343	94.90222	1.075286	0.186972	2.167189	0.211087	0.171904
8	0.149937	1.285334	94.90142	1.075477	0.187225	2.167189	0.21124	0.172116
9	0.149937	1.285405	94.90132	1.075479	0.18723	2.16721	0.21124	0.172116
10	0.149937	1.285416	94.90129	1.075479	0.187232	2.16721	0.21124	0.172131

Variance Decomposition of DLOG(CRUDE_OIL):

Period	S.E.	DLOG(SILV	DLOG(NG)	DLOG(CRU	DLOG(NIF	DLOG(USD	DLOG(IIP)	DLOG(GOL
1	0.119682	4.450435	1.172847	94.37672	0	0	0	0
2	0.123316	6.880375	1.145636	89.02357	0.025631	0.922959	0.045951	1.955877
3	0.124013	6.921038	1.360204	88.67372	0.075317	0.915616	0.080148	1.973962
4	0.12413	6.949745	1.361704	88.52094	0.087845	0.922696	0.144552	2.012516
5	0.124172	6.950481	1.362232	88.46167	0.096145	0.924207	0.193646	2.011619
6	0.124194	6.949607	1.36976	88.43567	0.096643	0.923871	0.213474	2.010973
7	0.124197	6.949351	1.370515	88.43251	0.096895	0.923837	0.215804	2.011084
8	0.124197	6.949355	1.370535	88.43208	0.097078	0.923986	0.215824	2.01114
9	0.124197	6.949344	1.370541	88.43194	0.097086	0.924005	0.215893	2.011196
10	0.124197	6.949342	1.370546	88.4319	0.097086	0.924008	0.215917	2.011199

Variance Decomposition of DLOG(NIFTY):

Period	S.E.	DLOG(SILV	DLOG(NG)	DLOG(CRU	DLOG(NIF	DLOG(USD	DLOG(IIP)	DLOG(GOL
1	0.063255	5.01026	3.95E-05	1.661706	93.32799	0	0	0
2	0.06599	4.73046	0.610912	6.771841	85.75276	0.149345	0.702974	1.281707
3	0.066667	4.834609	1.404438	6.635561	84.34853	0.178215	0.743036	1.855612
4	0.066835	5.136734	1.543807	6.607455	83.94238	0.177717	0.740926	1.850978
5	0.066875	5.137701	1.561886	6.654231	83.84493	0.183407	0.756937	1.860907
6	0.066892	5.162229	1.563591	6.652167	83.80895	0.185001	0.765415	1.862643
7	0.066893	5.162266	1.563736	6.652122	83.80715	0.186298	0.765565	1.862859
8	0.066893	5.162806	1.563875	6.652085	83.8063	0.186296	0.765621	1.863014
9	0.066893	5.162815	1.563875	6.652084	83.80629	0.186299	0.765621	1.863019
10	0.066893	5.162812	1.563888	6.652095	83.80625	0.186301	0.765628	1.86303

Variance Decomposition of DLOG(USD):

Period	S.E.	DLOG(SILV	DLOG(NG)	DLOG(CRU	DLOG(NIF	DLOG(USD	DLOG(IIP)	DLOG(GOL
1	0.026399	6.284313	0.112436	1.282508	6.612093	85.70865	0	0
2	0.02752	10.36589	0.661246	1.817211	6.084707	79.63378	0.18887	1.248299
3	0.027835	10.1411	0.671249	1.918171	6.838496	78.11817	1.020571	1.292243
4	0.027909	10.18918	0.681766	1.910117	6.864259	77.7039	1.354645	1.296137
5	0.027933	10.1772	0.717092	1.916834	6.857471	77.56952	1.444304	1.317581
6	0.027935	10.17756	0.717325	1.918428	6.859393	77.55998	1.449367	1.317947
7	0.027935	10.17852	0.717444	1.919306	6.8592	77.55804	1.449375	1.318109
8	0.027936	10.17898	0.71752	1.919291	6.859138	77.55728	1.44936	1.31843
9	0.027936	10.179	0.717544	1.919299	6.859132	77.55723	1.449359	1.318434
10	0.027936	10.17901	0.717544	1.919299	6.859134	77.55722	1.449364	1.318434

Variance Decomposition of DLOG(IIP):

Period	S.E.	DLOG(SILV	DLOG(NG)	DLOG(CRU	DLOG(NIF	DLOG(USD	DLOG(IIP)	DLOG(GOL
1	0.052851	1.63729	0.418423	0.144871	0.009577	0.260102	97.52974	0
2	0.060972	1.233097	0.489392	0.158893	0.025782	0.197321	97.60564	0.289875
3	0.06198	1.329698	0.499697	0.257057	0.065882	0.212881	97.24262	0.392166
4	0.062022	1.329645	0.49904	0.257773	0.126106	0.213127	97.1462	0.428113
5	0.062041	1.33529	0.502341	0.258454	0.134922	0.216677	97.12179	0.43053
6	0.062052	1.335033	0.505308	0.260242	0.134906	0.216689	97.11708	0.430743
7	0.062054	1.33523	0.506206	0.260685	0.134993	0.216693	97.11531	0.430886
8	0.062054	1.335255	0.506316	0.260887	0.135071	0.216751	97.11464	0.431083
9	0.062054	1.335256	0.50632	0.260893	0.135097	0.216774	97.11452	0.431142
10	0.062054	1.335255	0.506327	0.260893	0.135098	0.21678	97.1145	0.431148

Variance Decomposition of DLOG(GOLD):

Period	S.E.	DLOG(SILV	DLOG(NG)	DLOG(CRU	DLOG(NIF	DLOG(USD	DLOG(IIP)	DLOG(GOL
1	0.042011	8.076715	0.150152	3.68E-05	2.802793	6.29691	0.475806	82.19759
2	0.050454	27.17768	0.492819	0.76965	2.876055	4.892284	1.791473	62.00004
3	0.051272	26.35912	2.373487	1.583241	2.786171	4.888008	1.779898	60.23007
4	0.051663	26.94526	2.367944	1.586554	2.819943	4.856943	2.100675	59.32268
5	0.051714	26.91997	2.364266	1.636464	2.814523	4.887169	2.154503	59.2231
6	0.051726	26.90731	2.37065	1.64379	2.815283	4.884972	2.15621	59.22179
7	0.051727	26.90795	2.370545	1.644711	2.815846	4.88487	2.156623	59.21946
8	0.051728	26.90808	2.370636	1.644833	2.816014	4.884962	2.157432	59.21804
9	0.051728	26.90806	2.370617	1.644822	2.815992	4.884929	2.158037	59.21754
10	0.051728	26.90805	2.370641	1.644847	2.815988	4.884927	2.158088	59.21746

Fig 2: Variance Decomposition of log of Macro variables

IV. CONCLUSION

An alternative term for the stock market is the barometer of a country's macroeconomy. Indian stock market indices, Gold, Silver, IIP, US Dollar, Natural Gas and Crude Oil are examined in this paper.

The Granger causality or Block exogeneity test Wald Test with a p-value less than 0.05 explains the variation in crude oil's price. There's no effect on gold from anything else. Natural Gas prices are also affected by the gold price. These factors have had no effect on IIP. The Nifty index is affected by crude oil. As a result, both silver and the USD fluctuate slightly due to their dependence on each other.It has also been found that there is a short-term effect of these variables on each other than the impact dies off.

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