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Impact of Macroeconomic Factors on Selected Sectors of BSE

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Abstract

The year 1991 will forever remain a landmark year in the history of stock markets in India. The stock markets have become a yardstick for measuring the performance of an economy and the macro economic variables have become important indicators of the health of the economy. Here, an attempt has been made to study the relationship between selected external macroeconomic variables and different sectoral indices at Bombay Stock Exchange (BSE). For the purpose of study seven macroeconomic variables such as Index of Industrial Production, Consumer price Index, Call Money Rate, Dollar Price, Foreign Institutional Investment, Crude Oil Prices and Gold Price are used to study the impact of macroeconomic variables on Sectoral Indices at Bombay Stock Exchange (BSE) viz. Auto, Bankex, FMCG, Consumer Durable and Metal. The monthly statistical data for above mentioned variables have been used for five years covering the period from April 2014 to March 2019. It was observed that all variables show high correlation amongst themselves and Call Money Rate is the only variable that affects all the Indices.

Keywords: Macro Economic, GDP, IIP, Sensex, Crude Oil

Introduction

The liberalization of the Indian Economy in 1991 ushered the Indian stock markets into hitherto untouched era. The stock markets gradually became an important barometer for measuring the economic health of the Indian economy. The relationship of the stock market with macro-economic variables has always intrigued the researchers. Many studies have been done to explore the relationship with varying results. This study would also explore the relationship between selected the macro economic variables and various BSE indices. The study would explore the correlation and do a regression analysis to understand the effect of macro-economic variables on Bombay Stock Exchange Indices.

Literature Review

(Dasgupta) studied the relationship between certain macro-economic variables and BSE sensex. The variables were WPI, IIP, call money rates and exchange rates. He concluded that there existed long run relationship

between BSE Sensex and the selected macro-economic variables. IIP and interest rate were positively related and WPI and exchange rate were negatively related. However, there could not be found any short run relationship between the variables and Sensex.

([Sharma and Mahendru](#)) considered exchange rate, forex reserves, gold price and inflation rate as the independent variables. They found exchange rate and gold prices significantly affecting the stock prices. Forex reserves and inflation rate could not significantly affect the stock prices.

([Chen et al.](#)) have studied the applicability of efficient market hypothesis and rational expectations theory on the variability in stock prices. They found industrial production, yield curve and risk premium changes significantly explaining the variability in stock prices. Stock market index was surprisingly an insignificant independent variable.

([Naka et al.](#)) employed vector error correction model (VECM) to examine the relationship between Indian stock markets and macro-economic variables. They found GDP growth significantly positively affecting the stock market performance whereas inflation significantly negatively affecting the same.

([Nieh and Lee](#)) studied the relationship between exchange rates and stock market performance of G-7 countries. They concluded that there was no significant relationship between the two.

([Garg and Kalra](#)) considered inflation, unemployment rate, exchange rate, forex reserves, gold price and GDP as the macro-economic variables having impact on Indian stock market. They found inflation and unemployment rate having negative relationship while other independent variables having positive relationship with stock prices.

([Cook](#)) studied the relationship between macro-economic variables and stock prices using threshold auto-regressive cointegration and found that this test exposed formerly unobserved unevenness in the relationship between the dependent and independent variables.

([Bose](#)) establishes bi-lateral causality between development of equity markets and economic growth. It is suggested that equity markets' development is a dynamic process which affects as well as is affected by growth in economy.

([Sangmi and Hassan](#)), Examined the effect of six macro-economic variables on the results of Sensex, Nifty and BSE 100. The study used monthly data, applied multiple regression and found significant relationship between dependent (Indices) and independent (macro-economic) variables

Research Methodology

The present study explores the relationship between selected macro-economic variables and BSE indices. The macro economic variables considered for this study are:

- Call money rate
- Crude oil prices
- Exchange rate
- Consumer Price index
- Foreign institutional investors
- Index of industrial production
- Gold Price

The BSE indices included in this study are:

- SENSEX
- Metals
- Auto
- Capital Goods
- Fast Moving Consumer Goods and
- Consumer Durables

Data : Monthly data from April, 2014 to March, 2019 has been considered in this study. The data for the Macro economic factors has been gathered from <http://dbie.rbi.org.in/>

Hypothesis

Null Hypothesis (Ho): No significant relationship between BSE indices and selected macro-economic variables

Alternative Hypothesis (Ha): Significant relationship between BSE indices and selected macro-economic variables

Descriptive statistics was used to measure the mean standard deviation, range, minimum and maximum to understand the data. Then Karl Pearson's coefficient of correlation has been used to measure the correlation between the macro economic factors and BSE.

Multiple Regression has been used to study the relationship using following equation-

$$Y = \alpha + \beta X + \beta X + \beta X + \beta X + \beta X + U \quad (\text{Dollar Price}) + \beta X4 (\text{Crude Oil}) + \beta X5 (\text{FIIs}) + \beta X6 (\text{CPI}) + \beta X7 (\text{CMR})$$

Table 1 Data Analysis and Interpretation: Descriptive Statics of Study Variables

	BSE					Macro Economic Factor						
	Metal	BANKEX	Consumer Durable	FMCG	Auto	IIP	Gold	INR US\$	Crude Oil	FIIs	CPI	CMR
Max	15427.36	34141.96	23856.65	12771.69	26751.2	144.1	33217	73.6323	6471.05	9046.75	8.48	8.36
Min	6759.24	14706.66	6517.26	6676.19	13372.23	106	25207	59.30502	2004	-6902.37	1.46	5.87
Mean	11029.17	23700.621	14603.77	9105.163	20576.86	120.2167	28822	65.61238	3914.502	1188.685	4.49	6.68
Median	11304.82	22340.125	12475.67	8485.77	19984.32	119.25	28821	65.35882	3629.03	509.5076	4.51	6.41
SD	2314.489	4826.402384	4840.504	1645.323	3137.736	8.719745	1922	3.222094	1107.173	2831.899	1.46	0.76
Sample variance	5356861	23294159.97	23430479	2707089	9845386	76.03395	3692889	10.38189	1225833	8019652	2.14	0.58
Skewness	-0.71	0.23	0.46	0.48	0.04	0.48	-0.01	0.22	0.78	0.27	0.41	0.82
Kurtosis	-0.74	-1.11	-1.24	-1.10	-0.65	-0.21	-0.77	-0.14	-0.09	1.05	0.53	-0.66
Range	8668.12	19435.28	17339.39	6095.5	13378.97	38.1	8009	14.32728	4467.05	15948.44	7.02	2.49
Sum	661750.4	1422037.26	876226.4	546309.8	1234611	7213	1729291	3936.743	234870.1	71321.07	269.13	400.90
Count	60	60	60	60	60	60	60	60	60	60	60	60

Table presents the descriptive statistics of the data, containing sample means, medians, maximums, minimums, standard deviations, skewness, kurtosis, range, sum, count. As it can be seen from the Table, all the variables are asymmetrical. More precisely, BSE Metal and Gold Price have a negative skewness, which indicates the flat tails on the left-hand side of the distribution. Kurtosis value of all variables also shows data is not normally distributed because values of kurtosis are deviated from 3.

Interpretation

1. From the following table of BSE Metal Monthly Average, we get the mean as 11029.17, with a median of 11304.82. Range for following data was 8668.12. During the period of 5 years, BSE Metal hit highest price at 15427.36 and lowest point at 6759.24. The Standard deviation was found to be 2314.489.
2. From the following table of BSE BANKEX Monthly Average, we get the mean as 23700.621, with a median of 22340.125. Range for following data was 19435.28. During the period of 5 years, BSE BANKEX hit highest price at 34141.94 and

- lowest point at 14706.66. The Standard deviation was found to be 4826.40
3. From the following table of BSE CONSUMER DURABLE Average, we get the mean as 14603.77, with a median of 12475.67. Range for following data was 17339.39. During the period of 5 years, BSE CONSUMER DURABLE hit highest price at 23856.65 and lowest point at 6517.26. The Standard deviation was found to be 4840.504.
4. From the following table of BSE FMCG Monthly Average, we get the mean as 9105.163, with a median of 8485.77. Range for following data was 6095.5. During the period of 5 years, BSE FMCG hit highest price at 12771.69 and lowest point at 6676.19. The Standard deviation was found to be 1645.323.
5. From the following table of BSE AUTO Monthly Average, we get the mean as 20576.86, with a median of 19984.32. Range for following data was 13378.97. During the period of 5 years, BSE AUTO hit highest price at 26751.2 and lowest point at 13372.23. The Standard deviation was found to be 3137.736.

Correlation Matrix

	BSE					Macroeconomic						
	BANK EX	AUTO	CD	FMCG	Metal	IIP	Gold	Dollar	Crude oil	FIIIs	CPI	CMR
BSE BANKEX	1.00											
BSE AUTO	0.76	1.00										
BSE CD	0.94	0.74	1.00									
BSE FMCG	0.97	0.72	0.95	1.00								
BSE Metal	0.64	0.62	0.61	0.60	1.00							
IIP	0.78	0.55	0.85	0.80	0.41	1.00						
Gold	0.65	0.41	0.67	0.70	0.47	0.67	1.00					
Dollar	0.52	0.25	0.57	0.62	-0.07	0.65	0.58	1.00				
Crude oil	0.08	-0.17	0.06	0.12	0.56	-0.05	0.20	-0.24	1.00			
FIIIs	-0.03	0.00	-0.11	-0.07	0.25	-0.10	-0.04	-0.42	0.22	1.00		
CPI	-0.65	-0.49	-0.54	-0.62	-0.17	-0.50	-0.30	-0.55	0.32	0.15	1.00	
CMR	-0.68	-0.78	-0.74	-0.68	-0.30	-0.70	-0.56	-0.62	0.39	0.23	0.58	1.00

Table 2

Low Correlation: Less than 0.40

Moderate Correlation: 0.40 – 0.60

High Correlation: More than 0.60

From the Correlation Matrix we can interpret that:

BSE BANKEX

From the correlation Matrix we can interpret that:

- Index of Industrial Production (IIP) shows a high correlation with the BSE Auto at 0.78.
- Gold Price shows a high correlation with the BSE Auto at 0.65.
- Dollar Price shows a moderate correlation with the BSE Auto at 0.52.
- Crude Oil Prices shows a low correlation with the BSE Auto at 0.08.
- Foreign Institutional Investment shows a low negative correlation with the BSE Auto at -0.03.
- Consumer Price Index shows a high negative correlation with the BSE Auto at -0.65.
- Call Money Rate shows a high negative correlation with the BSE Auto at - 0.68.

BSE AUTO

From the correlation Matrix we can interpret that:

- Index of Industrial Production (IIP) shows a moderate correlation with the BSE Auto at 0.55.

- Gold Price shows a moderate correlation with the BSE Auto at 0.41.
- Dollar Price shows a low correlation with the BSE Auto at 0.25.
- Crude Oil Prices shows a low negative correlation with the BSE Auto at -0.17.
- Foreign Institutional Investment shows a no relation with the BSE Auto at 0.
- Consumer Price Index shows a moderate negative correlation with the BSE Auto at -0.49.
- Call Money Rate shows a high negative correlation with the BSE Auto at - 0.78.

BSE Consumer Durable

From the correlation Matrix we can interpret that:

- Index of Industrial Production (IIP) shows a high correlation with the BSE CD at 0.85.
- Gold Price shows a high correlation with the BSE CD at 0.67.
- Dollar Price shows a moderate correlation with the BSE CD at 0.57.
- Crude Oil Prices shows a very low correlation with the BSE CD at 0.06.
- Foreign Institutional Investment shows low negative correlation with the BSE CD at -0.11.
- Consumer Price Index shows a moderate negative correlation with the BSE CD at -0.54.
- Call Money Rate shows a high negative correlation with the BSE CD at - 0.74.

BSE FMCG

From the correlation Matrix we can interpret that:

- Index of Industrial Production (IIP) shows a high correlation with the BSE FMCG at 0.80.
- Gold Price shows a high correlation with the BSE FMCG at 0.70.
- Dollar Price shows a high correlation with the BSE FMCG at 0.62.
- Crude Oil Prices shows a very low correlation with the BSE FMCG at 0.12.
- Foreign Institutional Investment shows low negative correlation with the BSE FMCG at -0.07.
- Consumer Price Index shows a high negative correlation with the BSE FMCG at -0.62.
- Call Money Rate shows a high negative correlation with the BSE FMCG at - 0.68.

- Crude Oil Prices shows a moderate correlation with the BSE Metal at 0.56.
- Foreign Institutional Investment shows low correlation with the BSE Metal at 0.25.
- Consumer Price Index shows a low negative correlation with the BSE Metal at -0.17.
- Call Money Rate shows a low negative correlation with the BSE Metal at - 0.30.

Regression Analysis

BSE AUTO

Regression Statistics	
Multiple R	0.86525
R Square	0.748663107
Adjusted R Square	0.714829295
Standard Error	1675.594093
Observations	60

The R value of 0.86 indicates the high correlation between BSE AUTO with seven macro-economic variables. R square value of 0.75 shows that 75% of BSE Auto fluctuations could be explained by macro-economic variables. But we will be considering the Adjusted R square as the number of independent variable is more than one. Adjusted R square of 0.71 shows that 71% of BSE Auto fluctuations could be explained by macro-economic variables.

BSE METAL

From the correlation Matrix we can interpret that:

- Index of Industrial Production (IIP) shows a moderate correlation with the BSE Metal at 0.41.
- Gold Price shows a moderate correlation with the BSE Metal at 0.47.
- Dollar Price shows a low negative correlation with the BSE Metal at -0.07.

ANOVA					alpha value =0.05	
	Df	SS	MS	F	Significance F	
Regression	7	434881743	62125963	22.12766	1.55662E-13	P-Value
Residual	52	145996009.4	2807616			
Total	59	580877752.5				

From the ANOVA (Analysis of variance) or F test, the value of F is 22.13 with significance of 1.55662E-13. Since, the level of significance of 1.55662E-13 is less than 0.05, it proves that Index

of Industrial production, Consumer price Index, Call Money Rate, Dollar Price, Foreign Institutional Investment, Crude Oil Prices and Gold Price are simultaneously affecting the BSE Auto indices.

Regression Table

	Coefficients	Standard Error	t Stat	P-value
Intercept	72036.13079	9052.258291	7.957808	1.48E-10
IIP	34.06733772	42.54658339	0.800707	0.426945
Gold	-0.032643344	0.193549744	-0.16866	0.866721
Dollar	-428.9789157	118.209485	-3.62897	0.000649
Crude oil	0.457917973	0.271730848	1.68519	0.097945

FII's	0.033780855	0.090878032	0.371716	0.711614
CPI	-415.1563104	198.6577287	-2.08981	0.041544
CMR	-3956.799268	529.9005174	-7.46706	8.92E-10

The entire study has been done at 5% significance level. For checking the significance of the coefficients, p-values are used and the null hypothesis is rejected if the p value is found to be less than 5%.

From the above regression table,

1. It is observed that the coefficient of Index of Industrial Production (IIP) is 34.06733772 with t value of 0.800707 & corresponding P value is significantly greater than 0.05. Thus, it can be inferred that IIP does not make a significant impact on BSE Auto.
2. It is observed that the coefficient of Gold Price is -0.032643344 with t value of -0.16866& corresponding P value is significantly greater than 0.05. Thus, it can be inferred that Gold Price does not make a significant impact on BSE Auto.
3. It is observed that the coefficient of Dollar Price is -428.9789157 with t value of -3.62897& corresponding P value is significantly less than 0.05. Thus, it can be inferred that Dollar Price does make a significant impact on BSE Auto.
4. It is observed that the coefficient of Crude Oil is 0.457917973 with t value of 1.68519& corresponding P value is significantly greater than 0.05. Thus, it can be inferred that Crude Oil Price does not make a significant impact on BSE Auto.
5. It is observed that the coefficient of Foreign Institutional Investment (FII's) is 0.033780855 with t value of 0.371716& corresponding P value is significantly greater than 0.05. Thus, it can

be inferred that FII's does not make a significant impact on BSE Auto.

6. It is observed that the coefficient of Consumer price Index (CPI) is -415.1563104 with t value of -2.08981& corresponding P value is significantly less than 0.05. Thus, it can be inferred that CPI does make a significant impact on BSE Auto.
7. It is observed that the coefficient of Call Money Rate (CMR) is -3956.799268 with t value of -7.46706& corresponding P value is significantly less than 0.05. Thus, it can be inferred that CMR does make a significant impact on BSE Auto.

BSE BANKEX

Regression Statistics	
Multiple R	0.897138948
R Square	0.804858292
Adjusted R Square	0.778589216
Standard Error	2271.030214
Observations	60

The R value of 0.90 indicate the very high correlation between BSE BANKEX with seven macroeconomic variables. R square value of 0.80 shows that 80% of BSE Auto fluctuations could be explained by macroeconomics variable. But we will be considering the Adjusted R square as the number of independent variable is more than one. Adjusted R square of 0.78 shows that 78% of BSE BANKEX fluctuations could be explained by macro-economic variables.

ANOVA					alpha value =0.05	
	df	SS	MS	F	Significance F	
Regression	7	1106161370	1.58E+08	30.639	2.56708E-16	P-Value
Residual	52	268194068.1	5157578			
Total	59	1374355438				

From the ANOVA (Analysis of variance) or F test, the value of F is 30.639 with significance of 2.56708E-16 and since the level of significance is

less than 0.05, it proves that all the seven macro-economic variables are simultaneously affecting the BSE Bankex index.

Regression Table

	Coefficients	Standard Error	t Stat	P-value	Result
Intercept	15269.13842	12269.05261	1.244525	0.218887	
IIP	220.7254924	57.66586117	3.827663	0.000349	Reject Ho
Gold	0.302918897	0.262329234	1.154728	0.253481	Fail to Reject Ho
Dollar	-201.2434236	160.2161962	-1.25607	0.214703	Fail to Reject Ho
Crude oil	1.224150246	0.368292637	3.323852	0.001632	Reject Ho
FIIIs	0.043323889	0.123172288	0.351734	0.726459	Fail to Reject Ho
CPI	-1354.470587	269.2523839	-5.03049	6.19E-06	Reject Ho
CMR	-1855.508864	718.2050176	-2.58354	0.01263	Reject Ho

From the regression table,

1. It is observed that the coefficient of Index of Industrial Production (IIP) is 220.7255 with t value of 3.827663 & corresponding P value is significantly less than 0.05. Thus, it can be inferred that IIP does make a significant impact on BSE BANKEX.
2. It is observed that the coefficient of Gold Price is 0.302918897 with t value of 1.154728 & corresponding P value is significantly greater than 0.05. Thus, it can be inferred that Gold Price does not make a significant impact on BSE BANKEX.
3. It is observed that the coefficient of Dollar Price is -201.2434236 with t value of -1.25607 & corresponding P value is significantly greater than 0.05. Thus, it can be inferred that Dollar Price does not make a significant impact on BSE BANKEX.
4. It is observed that the coefficient of Crude Oil is 1.224150246 with t value of 3.323852 & corresponding P value is significantly less than 0.05. Thus, it can be inferred that Crude Oil Price does make a significant impact on BSE BANKEX.
5. It is observed that the coefficient of Foreign Institutional Investment (FIIIs) is 0.043323889 with t value of 0.351734 & corresponding P value is significantly greater than 0.05. Thus, it can be inferred that FIIIs does not make a significant impact on BSE BANKEX.

6. It is observed that the coefficient of Consumer price Index (CPI) is -1354.470587 with t value of -5.03049 & corresponding P value is significantly less than 0.05. Thus, it can be inferred that CPI does make a significant impact on BSE BANKEX.
7. It is observed that the coefficient of Call Money Rate (CMR) is -1855.508864 with t value of -2.58354 & corresponding P value is significantly less than 0.05. Thus, it can be inferred that CMR does make a significant impact on BSE BANKEX.

BSE Consumer Durable

Regression Statistics	
Multiple R	0.914807114
R Square	0.836872056
Adjusted R Square	0.814912525
Standard Error	2082.47167
Observations	60

The R value of 0.91 indicate the very high correlation between BSE CD with seven macroeconomic variables. R square value of 0.84 shows that 84% of BSE Auto fluctuations could be explained by macro-economic variables. But we will be considering the Adjusted R square as the number of independent variable is more than one. Adjusted R square of 0.81 shows that 81% of BSE CD fluctuations could be explained by macro-economic variables.

ANOVA					alpha value =0.05
	df	SS	MS	F	Significance F
Regression	7	1156890491	1.65E+08	38.10974	2.66997E-18
Residual	52	225507789.3	4336688		
Total	59	1382398280			

From the ANOVA (Analysis of variance) or F test, the value of F is 38.10974 with significance of $2.66997E-18$. Because of the probability (level of significant) of $2.66997E-18$ is less than 0.05, it proves that Index of Industrial production, Consumer price

Index, Call Money Rate, Dollar Price, Foreign Institutional Investment, Crude Oil Prices and Gold Price are simultaneously affecting the BSE FMCG indices.

	Coefficients	Standard Error	t Stat	P-value	Result
Intercept	1327.714974	11250.38069	0.118015	0.90651	
IIP	289.3046494	52.87799408	5.471173	1.3E-06	Reject Ho
Gold	0.087677315	0.240548626	0.364489	0.716971	Fail to Reject Ho
Dollar	-126.2429688	146.9138049	-0.8593	0.394119	Fail to Reject Ho
Crude oil	1.215523263	0.337714125	3.599267	0.000712	Reject Ho
FII's	-0.056139074	0.112945569	-0.49705	0.621252	Fail to Reject Ho
CPI	-490.7138456	246.8969625	-1.98752	0.052142	Fail to Reject Ho
CMR	-2729.466	658.5740662	-4.14451	0.000126	Reject Ho

From the regression table,

Regression Statistics	
Multiple R	0.908740951
R Square	0.825810117
Adjusted R Square	0.802361478
Standard Error	731.4540491
Observations	60

1. It is observed that the coefficient of Index of Industrial Production (IIP) is 289.3046494 with t value of 5.471173 & corresponding P value is significantly less than 0.05. Thus, it can be inferred that IIP does make a significant impact on BSE CD.
2. It is observed that the coefficient of Gold Price is 0.087677315 with t value of 0.364489 & corresponding P value is significantly greater than 0.05. Thus, it can be inferred that Gold Price does not make a significant impact on BSE CD.
3. It is observed that the coefficient of Dollar Price is -126.2429688 with t value of -0.8593 & corresponding P value is significantly greater than 0.05. Thus, it can be inferred that Dollar Price does not make a significant impact on BSE CD.
4. It is observed that the coefficient of Crude Oil is 1.215523263 with t value of 3.599267 & corresponding P value is significantly less than 0.05. Thus, it can be inferred that Crude Oil Price does make a significant impact on BSE CD.
5. It is observed that the coefficient of Foreign

Institutional Investment (FII's) is -0.056139074 with t value of -0.49705 & corresponding P value is significantly greater than 0.05. Thus, it can be inferred that FII's does not make a significant impact on BSE CD.

6. It is observed that the coefficient of Consumer price Index (CPI) is -490.7138456 with t value of -1.98752 & corresponding P value is significantly greater than 0.05. Thus, it can be inferred that CPI does not make a significant impact on BSE CD.
7. It is observed that the coefficient of Call Money Rate (CMR) is -2729.466 with t value of -4.14451 & corresponding P value is significantly less than 0.05. Thus, it can be inferred that CMR does make a significant impact on BSE CD.

BSE FMCG

The R value of 0.91 indicate the very high correlation between BSE FMCG with seven macroeconomic variables. R square value of 0.82 shows that 82% of BSE FMCG fluctuations could be explained by macroeconomics variable. But we will be considering the Adjusted R square as the number of independent variable is more than one. Adjusted R square of 0.80 shows that 80% of BSE FMCG fluctuations could be explained by macroeconomics variable. The Adjusted R Squared value increases only when the new term improves the model fit more than expected by chance alone. The adjusted R-squared value actually decreases when the term doesn't improve the model fit by a sufficient amount.

ANOVA						alpha value =0.05
	df	SS	MS	F	Significance F	
Regression	7	131896937.2	18842420	35.21782848	1.42418E-17	P-value
Residual	52	27821301.35	535025			
Total	59	159718238.5				

From the ANOVA (Analysis of variance) or F test, the value of F is 35.21782848 with significance of 1.42418E-17. Because of the probability (level of significant) of 1.42418E-17 is less than 0.05, it proves

that Index of Industrial production , Consumer price Index , Call Money Rate , Dollar Price , Foreign Institutional Investment , Crude Oil Prices and Gold Price are simultaneously affecting the BSE FMCG indices.

	Coefficients	Standard Error	t Stat	P-value	Result
Intercept	395.8802147	3951.6199	0.100182	0.920585284	
IIP	60.02378923	18.57303676	3.23177	0.002136995	Reject Ho
Gold	0.075566315	0.084491073	0.89437	0.375244815	Fail to Reject Ho
Dollar	52.08816818	51.60247749	1.009412	0.317451092	Fail to Reject
Crude oil	0.525844092	0.118619796	4.433021	4.8278E-05	Reject Ho
FII's	0.030316624	0.039671365	0.764194	0.448205475	Fail to Reject
CPI	-347.7689711	86.72088344	-4.01021	0.000194739	Reject Ho
CMR	-693.9402944	231.3196738	-2.99992	0.004138577	Reject Ho

From the regression table,

1. It is observed that the coefficient of Index of Industrial Production (IIP) is 60.02378923 with t value of 3.23177 & corresponding P value is significantly less than 0.05. Thus, it can be inferred that IIP does make a significant impact on BSE FMCG.
2. It is observed that the coefficient of Gold Price is 0.075566315 with t value of 0.89437 & corresponding P value is significantly greater than 0.05. Thus, it can be inferred that Gold Price does not make a significant impact on BSE FMCG.
3. It is observed that the coefficient of Dollar Price is 52.08816818 with t value of 1.009412 & corresponding P value is significantly greater than 0.05. Thus, it can be inferred that Dollar Price does not make a significant impact on BSE FMCG.
4. It is observed that the coefficient of Crude Oil is 0.525844092 with t value of 4.433021 & corresponding P value is significantly less than 0.05. Thus, it can be inferred that Crude Oil Price does make a significant impact on BSE FMCG.
5. It is observed that the coefficient of Foreign Institutional Investment (FIIs) is 0.030316624

with t value of 0.764194 & corresponding P value is significantly greater than 0.05. Thus, it can be inferred that FIIs does not make a significant impact on BSE FMCG.

6. It is observed that the coefficient of Consumer price Index (CPI) is -347.7689711 with t value of -4.01021 & corresponding P value is significantly less than 0.05. Thus, it can be inferred that CPI does make a significant impact on BSE FMCG.
7. It is observed that the coefficient of Call Money Rate (CMR) is -693.9402944 with t value of -2.99992 & corresponding P value is significantly less than 0.05. Thus, it can be inferred that CMR does make a significant impact on BSE FMCG.

BSE METAL

Regression Statistics	
Multiple R	0.904254915
R Square	0.817676951
Adjusted R Square	0.793133463
Standard Error	1052.689569
Observations	60

The R value of 0.90 indicate the very high correlation between BSE Metal with seven

macroeconomic variables. R square value of 0.81 shows that 81% of BSE Metal fluctuations could be explained by macroeconomics variable. But we will be considering the Adjusted R square as the number

of independent variable is more than one. Adjusted R square of 0.79 shows that 79% of BSE Metal fluctuations could be explained by macro-economic variables.

ANOVA					alpha value = 0.05	
	df	SS	MS	F	Significance F	
Regression	7	258430734.9	36918676	33.31543463	4.55605E-17	P-value
Residual	52	57624077.1	1108155			
Total	59	316054812				

From the ANOVA (Analysis of variance) or F test, the value of F is 33.31543463 with significance of 4.55605E-17. Because the probability (level of significant) of 4.55605E-17 is less than 0.05, it proves that Index of Industrial Production , Consumer price

Index , Call Money Rate , Dollar Price , Foreign Institutional Investment , Crude Oil Prices and Gold Price are simultaneously affecting the BSE METAL indices.

	Coefficients	Standard Error	t Stat	P-value	Result
Intercept	35356.62215	5687.068197	6.217021	8.73118E-08	
IIP	61.00752853	26.72982956	2.282376	0.026587417	Reject Ho
Gold	0.157341635	0.121597347	1.293956	0.201398281	Fail to reject Ho
Dollar	-433.0957264	74.26493825	-5.83177	3.54527E-07	Reject Ho
Crude oil	1.469363374	0.170714513	8.607138	1.41538E-11	Reject Ho
FII's	0.028938135	0.057093993	0.506851	0.614402162	Fail to reject Ho
CPI	-373.5560668	124.8064312	-2.99308	0.004218274	Reject Ho
CMR	-1779.581702	332.9092347	-5.34555	2.03353E-06	Reject Ho

From the regression table,

1. It is observed that the coefficient of Index of Industrial Production (IIP) is 61.00752853 with t value of 6.217021 & corresponding P value is significantly less than 0.05. Thus it can be inferred that IIP does make a significant impact on BSE Metal.
2. It is observed that the coefficient of Gold Price is 0.157341635 with t value of 1.293956 & corresponding P value is significantly greater than 0.05. Thus it can be inferred that Gold Price does not make a significant impact on BSE Metal.
3. It is observed that the coefficient of Dollar Price is -433.0957264 with t value of -5.83177 & corresponding P value is significantly less than 0.05. Thus it can be inferred that Dollar Price does make a significant impact on BSE Metal.
4. It is observed that the coefficient of Crude Oil is 1.469363374 with t value of 8.607138 & corresponding P value is significantly less than 0.05. Thus it can be inferred that Crude Oil Price does make a significant impact on BSE Metal.
5. It is observed that the coefficient of Foreign Institutional Investment (FIIs) is 0.028938135 with t value of 0.506851 & corresponding P value is significantly greater than 0.05. Thus it can be inferred that FIIs does not make a significant impact on BSE Metal.
6. It is observed that the coefficient of Consumer price Index (CPI) is -373.5560668 with t value of -2.99308 & corresponding P value is significantly less than 0.05. Thus it can be inferred that CPI does make a significant impact on BSE Metal.
7. It is observed that the coefficient of Call Money Rate (CMR) is -1779.581702 with t value of -5.34555 & corresponding P value is significantly less than 0.05. Thus it can be inferred that CMR does make a significant impact on BSE Metal.

Conclusion

The study employed correlation and multiple regression analysis and checked the impact of seven macro-economic variables on five selected sectors of BSE. For the study monthly data from April 2014 to March 2019 was considered.

On the basis of sectorial analysis it can be concluded that BSE indices get relatively more influenced by three macro variables out of the seven taken into consideration.. The one factor that influence and have a negative relation with all the sector is Call Money Rate. The coefficient table shows that BSE Metal indices have positive relationship with IIP and CO whereas DP, CPI and CMR have negative relation. BSE FMCG index has positive relationship with IIP and CO whereas CPI and CMR have negative relation. BSE CONSUMER DURABLE indx has positive relationship with IIP and CO where as CMR has negative relation. BSE BANKEX index has positive relationship with IIP and CO whereas CPI and CMR has negative relation. BSE AUTO index has DP, CPI and CMR has negative relation. The study concludes that domestic macro-economic factors play a relatively bigger role in influencing the BSE indices

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