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Econometric Analysis of Relationship between Selected Economic Variables and BSE Stock Index in India Using Tests of Co-integration

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ABSTRACT- The focal point of writings in the field of budgetary financial matters for a long time has been on the interrelationship between movement of stock indices and the macroeconomic factors in the economies. It is unquestionable that stock market positions are basically irregular which are for the most part accepted to be influenced by national and international news. It is anyway obvious that the stock index positions are controlled by demand and supply of stocks recorded in it. By and large the demand for stocks and confidence of individuals on them is controlled by numerous elements including the macroeconomic factors of the nation. The present study aims to investigate the long term relationship of few selected macroeconomic indicators with a proxy of the stock market movement i.e BSE 500 for the period 1998-2018.Unit root test was applied to check the stationarity of the data series and all these were found stationary at lag 1. The Johansen's test results for cointegration suggest that GDP, urban population and BSE Sensex share a long term relationship or are cointegrated. Findings suggest that since Indian industries are still not technologically advanced and are labour intensive, rise in availability of workers in the country reduces the labour cost which is a major portion of the total cost of production. When cost goes down, revenue rises which paves way for rise in the stock price and overall stock market movement.

Key Words: Macroeconomic Indicators, Johansen's Cointegration, Stock Market, ADF Technique, India

I. INTRODUCTION

Activities in the stock market can be noteworthy in both directions, and regrettably there is no precise means by which one can be sure of the reason behind such kind of behaviour. Considering the aspects that participate in trading psychology and appreciating the repercussion of specific external factors can guide to more dependable trading decisions which will prove to be the Holy Grail of successful investment. The connection between stock market movements and the macroeconomic environment has been a matter of intense speculation from the very birth of Securities Markets in Europe in the fifteenth century. Intuitively a positive correlation between the health of the macro economy and performance of the stock market does make sense. After all the stock market should be a reflection of the economy given that corporate performance and earnings are hugely influenced by macro economic conditions. Major advances in our understanding of the aforementioned relationship have been made in recent decades via progresses in the fields of Financial Economics - Especially Efficient Market Theory, Fiscal and Monetary policy, and through our attempts at creating micro foundations for macroeconomics. Substantial work remains to be done given that stock market performance very often deviates from the fundamentals of the economy ricocheting between heights of irrational exuberance and abysses of bottomless despair. Very often all sense is driven out of stock prices as animal spirits take over the market. This is the period when widespread consensus builds about a stock market bubble waiting to burst and bring down along with the stock market index many other real barometers of economic activity.

There have been many famous episodes when excesses on the stock market have overtaken the real economy and dealt a body blow to it on the way down. The Great Depression of the 1930s was famously preceded by a stock market collapse of hitherto unforeseen dimensions. Scholars have been still disputing the actual transmission mechanism of the economic downturn of 1930s but there is a broad consensus that the stock market collapse might have played a vital part in it. The linkages between securities market, credit markets and real economic activity have been explored in order to investigate the possibility of such excesses leading to economic downturns and devising mechanisms for prevention of the same. Reality checks are a must when

at stake is the well being of the whole economy. Financial assets have become a major factor in any reality check concerning the health of the economy as of late the financial sector has assumed a too big to fail stature in many advanced economies. Stock markets have traditionally been one of the most dominant sectors of the financial assets market. Hence there are multiple linkages through which stock markets affect and are affected by the real economy.

Objectives of the study

- To test the normal probability distribution characteristics of time series data considered
- To test the stationarity of time series data considered
- To investigate the presence of long term relationship of selected macroeconomic indicators with BSE 500.

II. LITERATURE REVIEW

Whether progress in the stock market paves way for economic growth or vice versa is a debatable question. During the last 10 years it is believed to have become more pertinent for India given the incredible surge in actions in the stock market in the last decade. Looking at the scanty time-series econometric evidence documenting the causality between stock market expansion and the Indian economy Raman K. Agrawalla et al (2007) built a composite index of stock market advancement. He used cointegration to demonstrate the presence of an established long run equilibrium relationship between the two in India. The finding implied that the Indian stock market should be dominated by more of long term investors than attracting more of speculators and day traders. Saryal Fatma Sonmez (2007) attempted to measure volatility in the stock market with respect to inflation and used generalized autoregressive conditional heteroskedasticity model. Monthly observations from Turkey (Istanbul stock exchange, ISE) and Canada (Toronto stock Exchange, TSE) from 1986 to 2005 were considered. It was deduced that inflation rate had a high predictive ability for Turkey's stock market fluctuations and moved in the same direction. This relationship was comparative weaker for Canada though significant. Sahu Naresh Chandra et al (2011) attempted to study the causality between stock market characteristics and macroeconomic fundamentals in India. Correlation and Ganger Causality Regression techniques were employed on annual data for the years 1981 to 2006. They were of the view that Sensex of Bombay stock Exchange (BSE) was not driven or caused by real gross domestic product of India or vice versa although both variables moved in the same direction which could be because of other exogenous variable like market capitalization and foreign exchange reserves that affected GDP. Stock market, inflation rate, exchange rate, interest rate and GDP were studied for three countries namely Malaysia, US and China. In the study the authors distinguished inflation as expected and unexpected and Johansen test revealed a long term association between both with stock returns. VEC observed short run relationship in case of China's stock market and expected inflation rates but no linkage among expected and unexpected inflation rates, exchange rate, interest rate and GDP with for Malaysia and US stock markets. Geetha Caroline et al (2011).

A study by Khan Muhammad Nauman et al (2012) used Multiple regression analysis with fixed effects model and proved that exchange rate and gross domestic product positively affected stock prices and consumer price index negatively affected the same. Other variables considered in the study were foreign direct investment, export, money supply, and oil prices which were found to be insignificantly related with the stock prices. Link between interest rate and stock returns in India was studied by Muthukumaran T. et al (2014). Monthly data for the years from 1997 to 2014 was considered and Granger causality technique revealed that stock market had no relation with the interest rate in India or vice versa. Ali Hamdan (2014) in his work on interest rate and stock market in Pakistan claimed that interest rate had a negative impact on stock market. The reason cited behind such inverse relationship was the comparatively higher returns from fixed income securities associated with lesser risk. Thus it was suggested that any economy should keep its interest rate at lower levels so as to keep developing. Oloo Beatrice Awuor (2015) undertook an analogous study on the impact of interest rates on Nairobi Securities Exchange and came up with similar results. He opined that authorities need not take up interest as an important policy matter affecting the stock market as there was no such evidence found. During the study period of 10 years from 2007 to 2017 it was noticed that interest rate

individually was not a significant determinant of stock returns. Rather exchange rates and inflation had certain individual influence over the stock market. The result of another similar study using monthly data from 1995 to 2010 and the autoregressive distributed lags (ARDL) approach on Nigerian Stock Market showed negative but weak impact of inflation rate on stock return. Inflation appeared to significantly act in response to stock price adjustment though it did not advocate that stock prices decided inflation movement. (Uwubanmwen Ahmed et al, 2015). Similar results were arrived at by Bai Zhongqiang (2014) using 2000 to 2010 average annual inflation rate on Shanghai Composite index of stock prices in China. A similar study by Gurloveleen, K et al (2015) employed Granger causality test to confirm the causality relationship between s Foreign Institutional Investors and Exchange Rate and average closing prices of manufacturing firms of BSE 500. It was detected that these variables had no connection with BSE 500 manufacturing firms. The Indian Stock Market was also concluded to show weak form of market efficiency as no relationship was established among the variables throughout the period of study.

Upadhyay Archana (2016) used daily data from January 2015 to December 2015 and similarly observed that there was no underlying connection between interest rate and stock returns. The long run and the short run relationship between stock price and few macroeconomic parameters were examined by Giri A. K. et al (2017). ARDL bound testing approach to co-integration was employed to check the long run relationship and Vector Error Correction Model was put to use to analyze both the short and long run causality. Variance decomposition was employed to estimate long run impact of the independent variables. Findings confirmed that exchange rate, economic growth and inflation affected stock prices positively and crude oil price influenced the stock price negatively. Short run and long run unidirectional causality from economic growth and FDI to stock prices in India was observed. It was also concluded that developments in the Indian stock market was mostly because of its own shocks. Megaravalli Amith Vikram et al (2018) examined the long and the short-run relationship among Indian, Chinese and Japanese stock markets and major macroeconomic variables such as exchange rates and CPI used as a proxy for inflation. The pooled estimated results emphasized that exchange rate significantly and positively affected the stock market whereas there was negative and insignificant effect of inflation on the stock market in the long-run. There was no statistically significant relationship between macroeconomic variables and stock markets in the short run. The long-run relationship between the stock market and macroeconomic variables studied by R Gopinathan, et al (2019) proposed that the real functional connection between these variables found out sturdy confirmation of cointegration and nonlinearity in the long-run by employing the alternating conditional expectations algorithm. In addition the constant partial wavelet coherency model discovered strong coherency at a lesser frequency for the altered variables, ascertaining non-linearity and time-varying nature in the relationship between stock prices and macroeconomic variables in India in the long run. Kakoti Dikshita (2019) empirically tested the macro factors like broad money supply (M3) and inflation rate, real interest rate and real effective exchange rate having an impact on stock market volatility in India. Econometrics tests results suggested that inflation rate measured by CPI and money supply i.e. M3 had a positive impact on India's stock market. At the same time real effective exchange rate and real interest rate were negatively affecting the stock market indices.

Aithal Prakash K. et al (2019) identified the influence of 44 numbers of macroeconomic indicators on the National Stock Exchange (NSE) and the Bombay Stock Exchange (BSE) of India for the period ranging from 2011 to 2018. ANNs with ReLu and Sigmoid activation functions were used to forecast the movement in the stock market using the major macroeconomic indicators. 92% and 87% correctness were achieved in case of Nifty and SENSEX respectively. According to the results of ANN also macroeconomic indicators impinged on diverse stock markets differently within the same nation.

John Emmanuel Isaac (2019) examined the impact of macroeconomic variables like inflation rate, money supply, interest rate, exchange rate on market capitalisation used as a proxy for Nigerian stock market performance. The existence of a long-run relationship between the said independent variables and stock market performance was observed. Results of Granger Causality test established that there ran a unidirectional causality from exchange rate and money supply to market capitalisation. Again interest rate and money supply were the two most prominent factors found to be influencing stock market performance in Nigeria whereas, exchange rate and inflation rate showed a weak effect on the same. Yet another study exposes the major role played by monetary policy in bringing about changes in the Indian stock market. However, the VAR analysis supports the findings that other macroeconomic information also has an impact

on stock return. The study also brings to the fore the effect of industry and size, which is consistent with the prediction of the CAPM (Capital Asset Pricing Model) model. Santanu Pal et al (2019).Another study examines the impact of economic indicators such as foreign capital flows, GDP growth, exchange rate, interest rate, inflation and trade in Nigeria on the long run stock market performance. Using VECM analysis the long run linkage was established between the said variables and stock market performance. Variables like trade, interest rate and inflation were negative related with performance of the stock market whereas foreign capital flows, exchange rate and GDP growth rate were found to be positively. Results also indicated that the foreign capital flows, stock market and interest rate altered to guarantee the restoration of the long-run linkage. (Olokoyo Felicia O. et al, 2020). Damani Hridanshu et al (2020) analyzed the relationship between BSE S&P 500 Index and real economic variables like gold prices, money supply, exchange rate, Wholesale Price Index, Net Investments by Foreign Institutional Investments, Index of Industrial Production (IIP), Consumer Sentiments index and Fiscal Deficit with the help of Multi-Regression analysis in India. Meaningful association was seen between BSE S&P 500 Index and exchange rate, gold prices, money supply, Wholesale Price Index and Net foreign Institutional investments in the capital market.

In general of the various research works done in this connection a large selection of macroeconomic variables have always been seen. Apart from considering few common variables in this study other variables like Employment in Industry, Urban Population, Gross fixed capital formation (GFCF) whose association with the stock market movement is not that evident have been considered.

Formulated Hypotheses

1. H_1: Time series return of the selected indices and macroeconomic variables follow normal distribution with skewness and kurtosis as zero and three respectively.

2. H_2: The returns distributions of the selected indices and macroeconomic variables are not stationary i.e. mean, variance or both are not constant.

3. H_3: There is no co-integration between selected indices of India and macroeconomic variables.

III. Design and Methodology

A set of 7 (seven) macroeconomic variables have been chosen for the study alongwith BSE sensex as the dependent variable. Annual data were taken from www.worldbank.org. and www.bseindia.com for the years 1998 to 2018. The seven macroeconomic parameters are: Employment in Industry, Urban population, Lending interest rate, Wholesale price index (2010 = 100) WPI, Gross Domestic Product (GDP, current US$), Trade and Gross fixed capital formation (GFCF). JB test was employed to check the normality and ADF technique (unit root test) were used to check the stationarity of all the time series data. Lastly to check the existence of cointegration among the data sets, Johansen's cointegration test was applied. The above mentioned tests were done through E-views software.

IV. Results and Discussion

-Descriptive Analysis and Test for Normality

Table 1 exhibits the descriptive statistics taken from the time series data on BSE 500 and 7 selected macroeconomic variables (1. Employment, 2.Urban Population, 3.Lending Interest, 4.WPI, 5.GDP, 6.Trade, 7.GFCF). Descriptive statistics of the eight variables like mean median, standard deviation, skewness and kurtosis are included. Additionally, the table also demonstrates the calculated values of JarqueBera (JB) and the corresponding p-values for all the time series data sets at 5% level of significance. The standard deviation for each of the variables under consideration is mostly different from each other for the study period. The statistics showing skewness for each of the variables are either positive or negative, but are less than 1. Kurtosis is also less than three in all the cases and above all since the p-values of JB test are not significant, it can be concluded that each of the time series data sets under consideration follows normal distribution.

Table 1: Descriptive Statistics and JB Test Results of Variables							
Variables	Mean	Median	SD	Skew.	Kurt	JB	p
BSE500	6480.40	6310.47	4343.05	0.49	-0.68	1.21	0.54
1. Employment	21.03	21.29	3.20	-0.26	-1.59	2.07	0.35
2. Urban Population	369080209.50	367810247.00	54820395.71	0.08	-1.20	1.22	0.54
3. Lending Interest	11.00	10.83	1.33	-0.01	-0.67	0.53	0.76
4. WPI	94.20	90.22	27.37	0.09	-1.63	1.99	0.36
5. GDP	1387882388038.62	1279311063124.32	752926683378.07	0.28	-1.19	1.42	0.49
6. Trade	41.89	42.56	9.96	-0.38	-0.92	1.21	0.54
7. GFCF	30.33	30.39	3.54	-0.16	-1.29	1.42	0.49
Note: Null Hypothesis: The time series data set follows normal distribution Alternative Hypothesis The time series data set do not follow normal distribution Source: www.worldbank.org and www.bseindia.com, Compiled from E-Views Output							

-Test of Stationarity

Visual plots of the time series data is generally the first attempt to test the stationarity and following it, movement of the level data series over time has been shown in the figures below.Looking at the visual plot of level data series of BSE 500 and selected macroeconomic variables for the period of study, we get the 'feeling' that these time series data are not stationary. It is because visually at least, the mean, variance and autocovariances of the individual data sets do not seem to be time-invariant. This is a case of nonstationary time series data sets under consideration.

Figure 1: Visual Plot of BSE 500

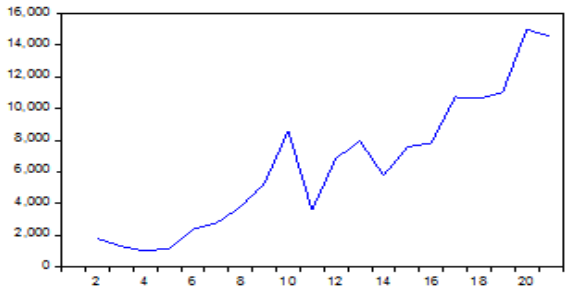


Figure 5: Visual Plot of Wholesale price index (2010 = 100)

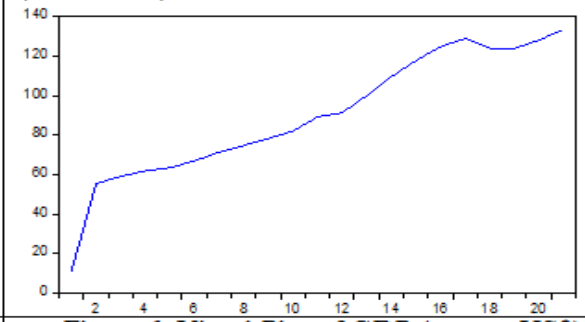


Figure 2: Visual Plot of Employment in industry (% of total employment) (modeled ILO estimate)

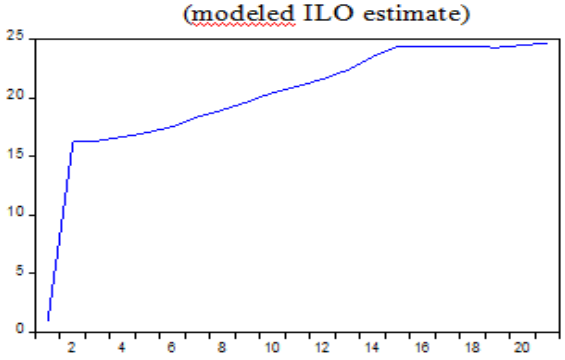


Figure 6: Visual Plot of GDP (current US$)

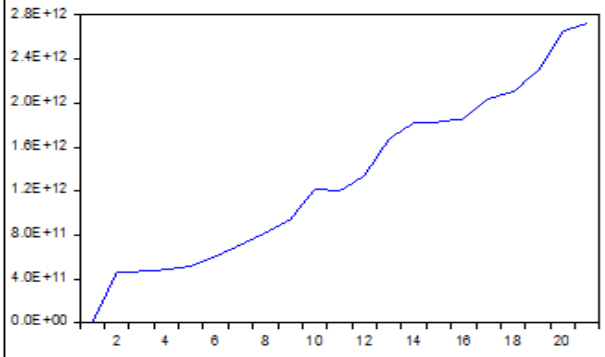


Figure 3: Visual Plot of Urban population

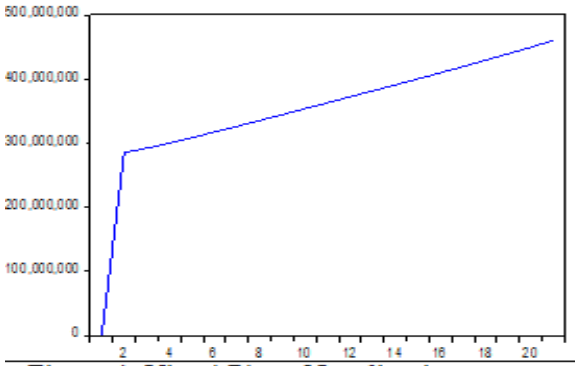


Figure 7: Visual Plot of Trade (% of GDP)

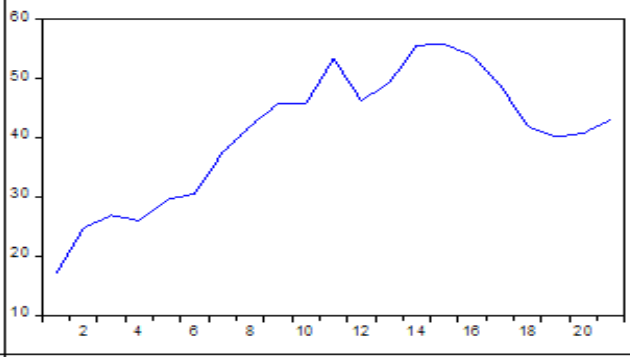


Figure 4: Visual Plot of Lending interest rate (%)

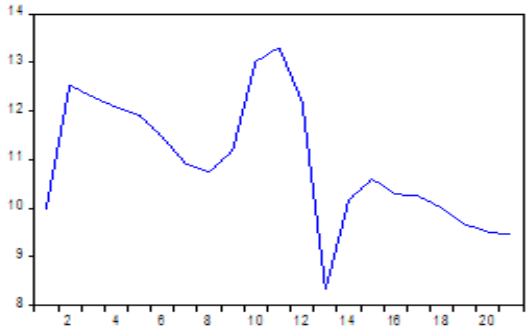
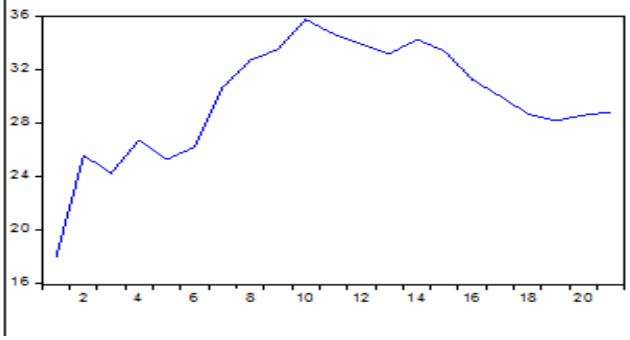


Figure 8: Visual Plot of Gross fixed capital formation (% of GDP)



However, decisions only on the basis of visual plots may encourage criticisms in the form of questions like: "How can we be so sure that the data sets under consideration represent nonstationary time series?" So, we may go for a more rigidly defined tool for analysis that will allow to make statistical treatments for verifying the results that includes ADF Test. The results of ADF Test are given in Table 2.

Table 2: ADF Test Results of BSE 500 and Selected Macroeconomic Variables

Variables	Level Data			First Difference		
	Computed Value	Critical Value@ 5% Level	Null Hyp.	Computed Value	Critical Value@ 5% Level	Null Hyp.
BSE500	-3.89	-3.67	Accepted	-5.34	-3.67	Rejected*
1. Employment	0.38	-3.67	Accepted	-41.07	-3.67	Rejected*
2. Urban Population	1.62	-3.67	Accepted	-4.01	-3.67	Rejected*
3. Lending Interest	-3.41	-3.67	Accepted	-4.64	-3.67	Rejected*
4. WPI	-1.80	-3.67	Accepted	-10.51	-3.67	Rejected*
5. GDP	-2.93	-3.67	Accepted	-4.37	-3.67	Rejected*
6. Trade	-1.18	-3.67	Accepted	-4.19	-3.67	Rejected*
7. GFCF	-0.99	-3.67	Accepted	-6.19	-3.67	Rejected*

Note: Null Hypothesis: There is unit root
Alternative Hypothesis: There is no unit root
'*' Integrated of Order 1
Source: www.worldbank.org and www.bseindia.com,
Compiled from E-Views Output

From the application of ADF Test, it was concluded that selected stock index's level data and macroeconomic variables are non-stationary (having a unit root) in all of the cases and when the ADF Test got applied to first differences of the selected index and macroeconomic variables, they became stationary. Thus, it entails that while all these variables are nonstationary in their level form they become stationary in their first difference and hence they may be called integrated of order '1' i.e. I (1). Since all these time series data sets under consideration are found to be integrated of same order i.e. I (1), we may proceed for the test of cointegration. It is because the prerequisite for test of cointegration is that; the data sets should be stationary and should also be integrated of same order. As our dependent variable BSE 500 is integrated of order '1', the cointegration can be established only with those variables which are also integrated of the same order i.e. I (1).

-Engle and Granger Test of Cointegration

In case of Engle and Granger test of cointegration, the test was done by including time series data sets on a one to one basis. At this point, the stock index under consideration i.e. BSE 500 was the dependent variable and the selected macroeconomic variables were independent variables but at a time one independent variable was taken into consideration.

Table 3: Regression Results with BSE 500 as Dependent Variable

	β Coefficient	p	r^2	DW	ADF Test Statistic for Residual	Engle Granger Critical Value@5%
1. Employment	1196.02	0.00	0.77	1.01	-2.18	-3.34
2. Urban Population	7.47	0.00	0.88	1.91	-4.07*	-3.34
3. Lending Interest	-2115.48	0.00	0.41	0.77	-2.87	-3.34
4. WPI	143.09	0.00	0.81	1.31	-2.78	-3.34
5. GDP	5.50	0.00	0.91	1.76	-3.55*	-3.34
6. Trade	212.24	0.02	0.23	0.47	-2.25	-3.34
7. GFCF	281.16	0.33	0.05	0.24	-2.62	-3.34

Note: Null Hypothesis: Cointegration does not exist
Alternative Hypothesis: Cointegration exists
'*' Cointegrated
Source: www.worldbank.org and www.bseindia.com,
Compiled from E-Views Output

In Table 3, it can be seen that the p-value of respective β coefficients in each of the cases are less than 0.05 which means that there is significant linear association between each of the selected macroeconomic variables and BSE 500. that is too significant.However, this significant association did not exist in case of gross fixed capital formation. It implies that gross fixed capital formation as a macroeconomic variable is neither linearly associated with the selected stock index nor it has any significant impact on it. The R-squared (r^2)value in all the cases were also in higher side except in case of gross fixed capital formation, trade and lending interest ($r^2 < 0.50$). It means that the selected macroeconomic variables except these three are capable enough to explain the movements of the selected stock index during the period. Additionally, since the DW statistics were also seen to be low in these three cases, these might be the symptoms of spurious regression. Then in order to detect cointegration, the residuals of the models were computed and the unit root of residuals has been tested. But, the ADF test statistic for residual computed in each of the cases got compared with Engle Granger critical value at 5% level of significance. The comparison revealed that urban population and GDP were the only two macroeconomic variables under consideration for which the residuals are stationary, which means that these two variables in the model are cointegrated with BSE 500 or they have long-run relationship or equilibrium relationship between them.

-Johansen's Test of Cointegration

From the Engle and Granger test of cointegration it was seen that there were two macroeconomic variables which are cointegrated with the stock index in consideration BSE 500. These two variables are: urban population and GDP. Now, so as to cross authenticate this result, Johansen's cointegration test was also conducted. It includes two statistics: (i) trace statistics and (ii) maximum eigen value statistics. While conducting these two tests, it is necessary that there should be sufficiency of number of observations and this sufficiency is created vis-à-vis the number of variables. First of all, one of the macroeconomic variables has been omitted i.e. gross fixed capital formation. It is because, the regression results as shown in Table 3 says that the impact of this variable on BSE 500 is insignificant. Secondly, the r^2 value is also extremely low in this case i.e. 0.05. Hence, now there are six macroeconomic variables which can be taken along with BSE 500. In order to maintain sufficiency of observations, the test of cointegration as suggested by Johansen was run in the present study twice.

Table 4: Trace Test and Maximum Eigen Value Test for BSE 500 with Employment, Lending interest, Trade and Urban Population

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigen Value	Trace Statistic	0.05 Critical Value	Prob.**
None*	0.957399	133.2844	69.81889	0.0000
At most 1	0.715134	46.47848	47.85613	0.0521
At most 2	0.658799	23.07829	29.79707	0.0682
At most 3	0.409544	12.72320	15.49471	0.1254
At most 4	0.164717	3.239720	3.841466	0.0719

Trace test indicates 1 cointegrating eqn(s) at the 0.05 level

*denotes rejection of the hypothesis at the 0.05 level

** MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegration Rank Test (Maximum Eigen value)

Hypothesized No. of CE(s)	Eigen Value	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None*	0.957399	56.80595	33.87687	0.0000
At most 1	0.815134	24.40019	27.58434	0.0502
At most 2	0.658799	19.35509	21.13162	0.0870
At most 3	0.409544	9.483480	14.26460	0.2481
At most 4	0.164717	3.239720	3.841466	0.0719

Max-Eigen value test indicates 1 cointegrating eqn(s) at the 0.05 level

*denotes rejection of the hypothesis at the 0.05 level

** MacKinnon-Haug-Michelis (1999) p-values

Source: www.worldbank.org and www.bseindia.com,
Compiled from E-Views Output

The variables taken into consideration in the first phase were: BSE 500, employment, lending interest, trade and urban population. Here the null hypothesis is there is no cointegrating equation. But the trace test and maximum eigen value test results in table 4 prove that the null hypothesis is getting rejected. However the null hypothesis that there is at most '1' cointegrating equations is getting accepted. It implies that there is one cointegrating equation as revealed by the Johansen's test of cointegration. The variables taken into consideration in second phase were: BSE 500, lending interest, WPI, GDP and trade. The trace test and maximum eigen value test results in table 5 says that the null hypothesis that there is no cointegrating equations is getting rejected, while the null hypothesis that there is at most '1' cointegrating equations is getting accepted. It also implied the presence of one cointegrating equation as revealed by the Johansen's test of cointegration.

Table 5: Trace Test and Maximum Eigen Value Test for BSE 500 with Lending Interest, WPI, GDP and Trade				
Unrestricted Cointegration Rank Test (Trace)				
Hypothesized No. of CE(s)	Eigen Value	Trace Statistic	0.05 Critical Value	Prob.**
None*	0.920496	117.4563	69.81889	0.0000
At most 1	0.755466	41.88123	47.85613	0.0510
At most 2	0.631268	37.06488	29.79707	0.0610
At most 3	0.593983	19.10654	15.49471	0.1360
At most 4	0.147953	2.882048	3.841466	0.0896
Trace test indicates 1 cointegrating eqn(s) at the 0.05 level				
*denotes rejection of the hypothesis at the 0.05 level				
** MacKinnon-Haug-Michelis (1999) p-values				
Unrestricted Cointegration Rank Test (Maximum Eigen value)				
Hypothesized No. of CE(s)	Eigen Value	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None*	0.920496	45.57511	33.87687	0.0013
At most 1	0.755466	24.81634	27.58434	0.5100
At most 2	0.631268	17.95834	21.13162	0.1314
At most 3	0.593983	16.22450	14.26460	0.0542
At most 4	0.147953	2.882048	3.841466	0.0896
Max-Eigen value test indicates 1 cointegrating eqn(s) at the 0.05 level				
*denotes rejection of the hypothesis at the 0.05 level				
** MacKinnon-Haug-Michelis (1999) p-values				
Source: www.worldbank.org and www.bseindia.com, Compiled from E-Views Output				

Therefore it may be concluded that, the Johansen's test results for cointegration and the results of Engle and Granger cointegration test are just in line with each.

Managerial Implication

The present study evidences that urbanization and GDP are cointegrated with BSE, which is not in agreement with various former studies. However empirical results suggest that GDP and urban population are moving hand in hand throughout the study period with BSE which is used as a proxy for stock market movement. It may be surmised that such an association is because of economic reasons. More productive resources have to be directed towards industries involved in manufacturing and any other such tertiary industries. Costly equipments and other items required for productions are more likely to be replaced with abundantly available labour force from the agricultural sector considering the comparative dearth of factors of production in most developing countries. As noted by several researchers (Todaro, 1995 & Hu, 2000), large numbers of developing countries have witnessed great and incessant immigration of rural peasants into big cities leading to urbanization.

For developing countries this unrestricted supply of rural workers can guarantee an enduring development of urban economy though not that effortlessly and rapidly. With the ever rising demand of the industries for labour force this supply of workers is a great relief. India is still a developing country and hence most of its industries are still labour intensive. This surge in the availability of workers reduces the labour cost which has a positive impact on the overall cost of production and hence the revenue of the companies. This is how the GDP, urban population and the BSE Sensex share a long term relationship. However some industries like the banking, information technology, engineering industries etc are more capital intensive or automated and hence no way can take in the rural workers at the same rate as the relocation. Additionally segments such as legal and accounting services require highly-educated workers. For that reason, most of the rural labour force leave their villages and run away to metropolitan cities in most of the developing countries. They join informal labor markets and get employed in jobs like tourist photography, hawking small jewelry, prostitutions and other very trivial occupations. This suggests that companies also have to devote substantial

time in exploring the most resourceful production methods. For example, the right person is to be matched with the right job, 'doing by learning' for workers are to be given importance. All of these are dependent on time. It might be an extended process of 'trial and error' at the national level for policy-makers. Like say for instance, imparting professional training to individuals through formal schooling is a time consuming process. Similarly repeated amendment of laws before they are really helpful and enforceable needs time. This study will help investors to strategize their investment decisions keeping in view the design of the labour force of industries which will have an impact on the production of goods and services in the country (GDP). All of this has a positive impact on the market indices. Similarly policymakers can take the findings of the study into consideration and formulate policies, laws and rules of the market accordingly.

V. Conclusion

Anxiety clouds the idea of investing money in the stock market. The depressing economic data is one of the main grounds that obstruct people's investment expedition. Despite the sluggish economy post Covid 19 restrictions, the stock markets are at record high. BSE's sensex stroked the 46,000 mark and NSE's nifty went beyond the 13,600 mark. This market and economy related inaptness builds perplexity in the mind of the investor. Fundamental to such daily fluctuations is a market movement, which can be noticed over a considerable period of time. As an investor, one should take stock of price pattern and devise a judgment about market drifts, before settling on their strategy. For a short period of time, stock prices can be unstable. They don't essentially budge in a straight line. nevertheless, if one takes account of long-term price patterns to some extent, one can perceive a better-defined trend. If one desires to comprehend the stock market trends, they also should be familiar with the language of market. A trend is the large ascending (uptrend) or descending (downtrend) stock price movement over time. The upward movement is called an uptrend. When stock price rises investors celebrate. But how long can this state of rejoice be sustained? During a fit market uptrend, it's sensible to gain 20 to 25%. Investors possess diverse risk appetites and expectations for return. With proper clarity on stock market trends, they can line up their portfolios to these necessities. Nonetheless, all of this can be understood only when one realizes what brings about a shift in the stock market. Further research can be carried out to find out the various other reasons of time lags or delay of the causation among the variables in the study. This is of importance as time lag demonstrates the basis of the failure of such analysis to reproduce the impact of urbanization on growth and stock market indices.

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