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ORIGINAL ARTICLE

IMPACT OF MACROECONOMIC FACTORS ON INDUSTRIAL VALUE ADDED IN INDIA 1992-2012

Renu Bansal
Department of Economics , Shri Ram College of Commerce ,
Delhi University, India.

ABSTRACT

The aim of this paper is to investigate empirically the impact of various macroeconomic factors such as exchange rate, repo-rate, imports of goods and services and infrastructure index on the industrial performance for the Indian Economy post 1992 macro-economic reforms. The OLS- (ordinary least squares) estimation technique is applied to annual data for the period 1992-2012. The results show that the appreciation of nominal exchange rate exerts a negative impact, while the rise in import of goods and services has a positive impact and the increase in repo rate negatively impacts the industrial production in India. The results are statically significant with very low p-values. Although an index for infrastructure is also statistically significant, it does not seem to explain much of the value added by industry, as a percentage of GDP.

KEY WORDS: Exchange Rate; Repo Rate; Infrastructure index; GDP
JEL Classification: O14, O19, O47, F31

INTRODUCTION

It has been a popular belief that economic growth and development go hand-in-hand with industrialization. Experience has shown that over the last five decades industrialization has played a crucial role in transforming many low-income countries to middle income countries, like South Korea, Malaysia, China, Thailand and Singapore. However, the case for India remains very different. Macroeconomic developments in India during last two decades has seen both sides of ups and downs. Gross domestic product grew by about 6 percent on a long-term basis in last two decades. Growth witnessed best phase during the period 2003-2008 with average annual growth rate at 8.5 percent. India has been among the fastest growing economies in the

world during the decade of 2001-2010. Savings and investment rates were close to the rates observed in East Asian tigers.

The GDP composition of India consists of three prime sectors namely agriculture, industry and the services sector. The sectoral composition of Indian economy changed considerable with falling share of agriculture and rising share of services sector. Agriculture is the predominant sector of livelihood in India, employing almost 50 percent of the workforce. Despite the falling share of agriculture in the national income, the role of agriculture in explaining the growth story of India is quite significant. In 1950-51, industry contributed 15.2 percent of GDP and employing 9.4 percent of the workforce. Almost six decades later, the share of industry stands 26 percent of GDP, employing 18.8 percent of the workforce. Average annual growth rate of industry has been 5.4 percent since 1950s, respectively manufacturing which accounts for roughly two fifths of industry grown roughly at the same rate. India was the world's ninth largest manufacturing nation, though the output per head was extremely modest according to United Nations Industrial Development Organization' International Yearbook of Industrial Statistics (2011).

The services sector has played an important role in explaining the economic performance of India post reform period. Service sector has been fastest growing sector and have helped accelerate the overall growth rate of the Indian economy. Services accounts for employing more than 25 percent However, the composition towards GDP stands at 17.9 percent by agriculture, 24.2% by industry and 57.9% by services by end of 2011-12. Since the post 1980s period, the growth of services sector has been considerably high going by the global standards. Whereas the capacity of services and industry sectors in India in creation of jobs is very disappointing as per international experience.

GDP means the total value of all the services and goods that are produced within the territory of the nation within the specified time period. The country had a GDP of around USD 2.34 trillion in 2012 and this makes the Indian economy the twelfth biggest in the whole world. The growth rate of India's GDP was 5.9% in 2012. The agricultural sector has always been an important contributor to the Indian GDP. This is due to the fact that the country is mainly based on the agriculture sector and employs around 49% of the total workforce in India. The agricultural sector contributed around 17.9% to India's GDP in 2012. The agricultural yield increased in India after independence but in the last few years it has decreased. In contrast, service sector growth rate in India's GDP has been very rapid in the last few years as it contributes the most to the GDP (57.9%). This growth in services has risen due to several reasons and it has also given a major boost to the Indian economy. India ranks fifteenth in the services output and it provides employment to around 23% of the total workforce in the country.

Although industry has never been the major driver of growth in GDP, not provided employment to a majority of the workforce, it still has a significant role to play. In the last two decades, its value addition as a percentage of GDP has ranged between 28%-35%. Although there has not been much variation over the years, the period where the contribution of industry has been highest was during the period 2003-08.

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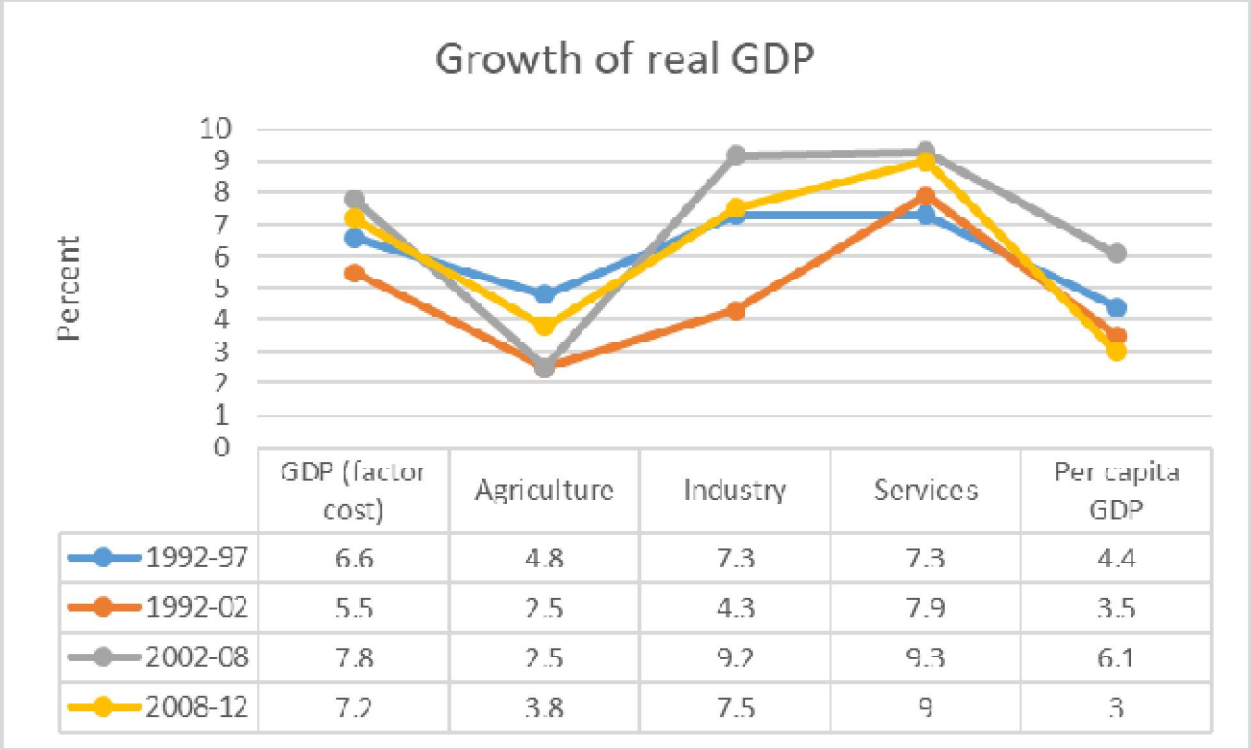
TABLE 1 : Sectoral Composition of Growth

	Share in Real GDP(%)			Contribution to GDP Growth (%)		
	Average of 1994 -97	Averge of 2004 -07	Average of 2007 -12	1991 - 07	1996 -02	2001-08
Agriculture	28.2	19.4	17.9	21.1	11.5	7.0
Industry	26.4	26.5	24.2	29.0	20.2	29.3
Services	45.4	54.1	59.7	49.8	68.3	63.6

** Source : CSO



	GDP (factor cost)	Agriculture	Industry	Services	Per capita GDP
1992-97	6.6	4.8	7.3	7.3	4.4
1992-02	5.5	2.5	4.3	7.9	3.5
2002-08	7.8	2.5	9.2	9.3	6.1
2008-12	7.2	3.8	7.5	9	3

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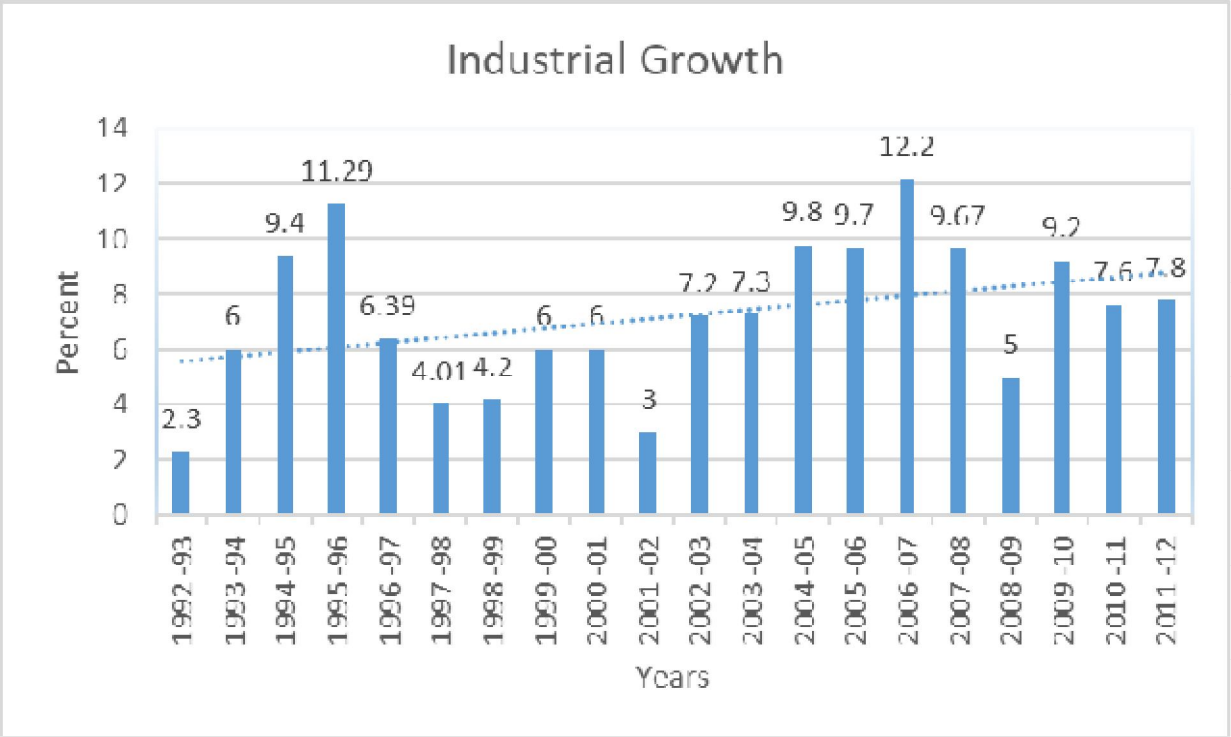

OBJECTIVE OF THE STUDY

The aim of this paper is to identify the macro economic factors that explain industrial performance. For the purpose of this study, industrial performance has been judged on the basis of value addition as a percentage of GDP. Industry corresponds to ISIC divisions 10-45 and includes manufacturing (ISIC divisions 15-37). It comprises value added in mining, manufacturing, construction, electricity, water, and gas. Value added is the net output of a sector after adding up all outputs and subtracting intermediate inputs. It is calculated without making deductions for depreciation of fabricated assets or depletion and degradation of natural resources. The origin of value added is determined by the International Standard Industrial Classification (ISIC). Gross domestic product (GDP) represents the sum of value added by all its producers. Value added is the value of the gross output of producers less the value of intermediate goods and services consumed in production, before accounting for consumption of fixed capital in production. The United Nations System of National Accounts calls for value added to be valued at either basic prices (excluding net taxes on products) or producer prices (including net taxes on products paid by producers but excluding sales or value added taxes). Both valuations exclude transport charges that are invoiced separately by producers. Total GDP is measured at purchaser prices while value added by industry is normally measured at basic prices.

Industrial performance is greatly influenced by the economic activities. When growth of the economy slows down, there will be a fall in demand for good or services. As a result, industry performance will suffer and will lead to fall in revenues and profit margins of various

sectors of industry. To curb this, firms will have to reduce their prices to increase the sales. This could further lead to increase in unemployment. On the other hand when there is an increase in GDP, the demand for products will automatically increase and hence the prices will go up. To cope with the increase in demand and rising inflation, firms will need to employ new people resulting in reduction in unemployment rates. Industrial performance is also in turn affected by macroeconomic factors like unemployment rate, inflation and interest rates. A macroeconomic factor is a factor that is pertinent to a broad economy at the regional or national level and affects a large population rather than a few select individuals. Macroeconomic factors such as economic output, unemployment, inflation, savings and investment are key indicators of economic performance and are closely monitored by governments, businesses and consumers. Some of these macroeconomic factors and their influence on growth have been explained below.

INFLATION

In economics, inflation is referred to as a persistent increase in the general price level of goods and services over a period of time. With the increase in Inflation there will be an increase in the level of prices of products and services over a specific period of time. As a result the firms will have to incur higher costs of operations. This will be also be due to the increase in wages of the employees. The inflation-growth linkage has been on the front burner of academic discourses. However, the relations between inflation and growth have mostly been studied at an aggregate level and the need to relate inflation to some specific activity sectors of an economy rather than from the perspective of total growth have been largely ignored.

INTEREST RATES

Interest rates are the charges levied by the banks for the lending activities they undertake. Increase in Interest rates will directly influence industry as businesses borrow money from the banks from time to time. Increase in interest rates will lead to higher interest expense as a result businesses will have to incur higher costs to repay the loan.

Repo rate is the interest rate at which the RBI lends short term money to banks. When the repo rate increases, borrowing from RBI becomes more expensive. This pushes up the cost of borrowing, and with firms depending heavily on debt to run production, their costs go up significantly. This in turn, generally leads to decline in investment expenditure, which in turn reduces the industrial growth along with the GDP.

GOVERNMENT EXPENDITURE

Government expenditure, which is majorly financed through government revenue, public borrowing, grants and aids, refers to the expenses which the government incurs for its own maintenance, for the society and the economy as a whole. It is an important instrument which the government can influence to achieve its macroeconomic objectives. Components of the government expenditure include; capital expenditure and recurrent expenditure. Capital expenditure refers to government spending on building, road construction, land, and housing

among others. The benefits of expenditures on capital projects are more durable and impactful as compared to those of recurrent expenditure which basically refers to expenses on the day to day activities of the government, wages and salaries, maintenance of social services, rent and rates, etc. Some studies have suggested that increase in government expenditure on socio-economic and physical infrastructures impact on long run growth rate. For instance, government expenditure on health and education raises the productivity of labor and increase the growth of national output. Similarly, expenditure on infrastructure such as road, power etc. reduces production costs, increase private sector investment and profitability of firms.

EXCHANGE RATE

Theoretically, exchange rate movements can affect economic performance through a number of channels, such as cost of imported inputs, competitiveness of exports, and changes in the value of firms' foreign assets and liabilities. For example, when the value of the Rupee falls vis-à-vis other currencies, the cost of imported inputs such as energy increases, causing a reduction in the profit margins and prompting firms to cut down on production. On the other hand, decline in the value of Rupee makes Indian exports cheaper and hence more competitive in the global market, which makes higher production more attractive for exporting firms

Most empirics also are in line with the theoretical predictions, firms with a higher share of imported inputs tend to benefit significantly from a real exchange rate appreciation on account of lower input costs. However, the impact of real appreciation operating through decreased export competitiveness is not significant in the short-run.

LITERATURE REVIEW

Internationally, there is a large body of literature on empirical studies and evaluation of the impact of macro-economic variables on stock market indices. Impact of exchange rate volatility on various indicators of real economy. However, most of these studies are focused more on the appropriateness of exchange rate regime namely, fixed, flexible and pegged though the motivation behind most studies remains the same – that increase in exchange rate volatility leads to uncertainty having different impacts for different countries on both domestic and foreign investment decisions, trade, and other sources of economic growth.

Most academic studies on India have focused on studying the impact of exchange rate volatility on exports while little attention has been devoted to study its impact on industrial growth and output. The country has experienced increased volatility of its exchange rate ever since it has shifted to a more market oriented exchange rate system after the launch of the economic reforms in 1991. Increased real exchange rate volatility poses risk/uncertainty for both exporters and importers unless managed efficiently.

Macroeconomic variables such as GDP, employment and inflation play a vital role in the economic performance of any country.

Gagan Deep Sharma, Sanjeet Singh and Gurvinder Singh (2011) in their work, studies the pattern of CPI, WPI, GDP, GNI and Rate of interest in India and Sri Lanka for the year 2002-2009 while also analyzing the impact of macro-economic variable on GDP growth in India vis-à-vis Sri

Lanka. The econometrics methodology used in their paper is Unit root test, Granger Causality Test, Cointegration test, Vector Auto Regression, Variance Decomposition, and Variance Decomposition Analysis have been used for the analysis purpose.

Singh, J. (2012) studied imports from China in great detail and found that Indian import trend reported a surge in recent years, because of cheap import of Chinese manufacturing goods. The share of the imports of 268 items studied (that are included in IIP) from China in total imports from China to India has jumped to 41.3% in 2010-11 from 26.3% in 2005-06. As per use based classification, the import share of Capital goods is largest (8.8%) followed by Consumer Goods (6.5%) Intermediate Goods (4.7%) and Basic Goods (2.9%). He postulates that the 2006-09 period of high growth in Indian industry was increasingly fueled by larger import of basic goods like aluminum, copper, carbon black, and cement from China.

Macroeconomic policy has a major impact on all sectors, including industry. One such policy instrument is the repo rate. Ghosh, S. (2009) studied the interlinkage between monetary policy shocks and the industry value added. In a situation of money tightening by increasing interest rates, there is an increase in cost of capital that is likely to result in lower investment, and consequently, lower output. The data also showed that investment expenditures tend to be more interest sensitive, so much so that purchases of capital goods are likely to exhibit a sharper decline in response to a monetary tightening.

Infrastructure and financial development are crucial in industrial production. According to Zegeye (2000); Hulten et al. (2006); Sharma and Sehgal (2010) study, infrastructure development has a positive impact on industrial output. The research on the impact of infrastructure on output of some south Asian countries was done by Saho and Dash (2011). To find this relationship they used variables like gross domestic capital formation, labor force, international trade and human capital; and found that development in infrastructure has positive and significant impact on output of South Asian countries. They concluded that along with physical infrastructure, social infrastructure also contributes to growth.

However, the study by Soneta K. et al. (2009) used time series regression model for data from 1981-2009 in Pakistan. Their results revealed that in Pakistan investment in public infrastructure has insignificant effect on manufacturing sector.

Although there is a lot of empirical work done on industrial output and productivity, it's growth, and response to shocks, it has usually been done considering a single macroeconomic factor. There is no research yet for India that attempts to combine these factors and determine their impact on the industry as a percentage of value added to the GDP. Thus, the focus of this study is to look at data from India to ascertain whether results from 1992-2013 match the a priori economic expectations.

METHODOLOGY

Data Sources and Measurement of Variables

The paper used times series data covering the period of 22 years from 1992–2013, obtained from World Bank's Indian Development Indicators, Reserve Bank of India (RBI) and Central Government statistics. Five variables were used in the study, namely industrial value

added as a percentage of GDP, imports as a percentage of GDP, exchange rate, repo rate and an infrastructure index.

Industry performance has been determined by its value added as a percentage of GDP. As per the World Bank calculation, Industry corresponds to ISIC divisions 10-45 [Appendix] comprising of value added in mining, manufacturing, construction, electricity, water, and gas. Value added is the net output of a sector after adding up all outputs and subtracting intermediate inputs. It is calculated without making deductions for depreciation of fabricated assets or depletion and degradation of natural resources.

Imports have been included as imports of goods and services as a percent of GDP, as per World Bank data. Imports of goods and services represent the value of all goods and other market services received from the rest of the world. They include the value of merchandise, freight, insurance, transport, travel, royalties, license fees, and other services, such as communication, construction, financial, information, business, personal, and government services. They exclude compensation of employees and investment income (formerly called factor services) and transfer payments.

Exchange rate has been taken as per Reserve Bank of India records of yearly average with US dollars. It is often used to measure the level of economic competitiveness.

Repo rate has been taken as a yearly average of the rates announced by the Reserve Bank of India. It is the rate at which the central bank lends money to commercial banks in the event of any shortfall of funds. Repo rate is usually used by monetary authorities to control inflation.

The infrastructure index used in this study is based on an index calculated using Principal Component Analysis on infrastructure parameters – per capita electricity consumption, road length, rail length, number of banking offices, credit deposit ratio, educational institutions per kilometer, tax to GDP ratio, infant mortality rate, and GIA/GCA.

MODEL SPECIFICATION

The multiple linear regression function through the application of the Ordinary Least Squares method is employed to examine the impact of macroeconomic indicators on India's industrial production.

$$IO_t = \beta + \alpha_1 IMT_t + \alpha_2 E_t + \alpha_3 RR_t + \alpha_4 IFT_t + \varepsilon_t$$

Where;

IO_t = Industrial Output measured as value added by industry as a percent of GDP at time t.

IMT_t= import of goods and services measured as a percent of GDP at time t.

E_t = yearly average of exchange rate at time t.

RR_t = yearly average of repo rate

IFT_t = Infrastructure index

ε_t = the stochastic error term

α_0 is intercept while $\alpha_1, \alpha_2, \alpha_3 \; and \; \alpha_4$ are the coefficients with respect to the explanatory variables respectively.

The 'a priori' expectations of the sign of the coefficients are determined by the principles of economic theory and refer to the expected relationship between the explained variable and the explanatory variable(s). It is expected that

$$\alpha_1 > 0, \alpha_2 < 0, \alpha_3 < 0, \alpha_4 > 0$$

METHOD OF ESTIMATION

This study utilized the ordinary least squares estimation technique. The reason is that it is one of the simplest methods of linear regression. Its goal is to closely fit a function with data and it does so by minimizing the sum of square errors from the data.
The econometric package used for analysis is STATA.

Table 2: Regression results

IO	Coefficient	Std. Error.	t -Statistic	P- value	95%Confidence Interval	
IMP	.183173	.0194494	9.42	0.000	.1426022	.2237438
EX	-.1178387	.0144671	-8.15	0.000	-.1480166	-.0876607
RR	-.1706838	.0577166	-2.96	0.008	-.2910785	-.0502891
INF	-.0131959	.0036453	-3.62	0.002	-.0207998	-.005592
Constant	37.29235	.9724404	38.35	0.000	35.26387	39.32082

Source	SS	Df	MS
Model	50.7023701	4	12.6755925
Residual	6.15699155	20	.307849577
Total	56.8593617	24	2.36914007

Number of obs = 25
F(4, 20) = 41.17
Prob > F = 0.0000
R-squared = 0.8917
Adj R-squared = 0.8701
Durbin-Watson statistic=1.617864

Table 3: Multi collinearity results

variable	VIF	1/VIF
IMP	1.59	0.628603
EX	1.82	0.549823
INF	1.34	0.747572
RR	1.20	0.834353
Mean VIF	1.49	

DIAGNOSTIC TESTS

- *Goodness of Fit [R^2 – coefficient of determination]*

*I*t shows the percentage of variation in the dependent variable that is accounted for by variations in the explanatory variables. Hence it measures the explanatory powers of the model. It is usually between zero and one, and determines whether the model has a good fit or not. (Atoyebi et al., 2012).

The model chosen has a very good fit. The value of the R^2 is 0.8917 which implies that about 89.17 percent of the variation in industrial output is explained by the regression. This remaining explanation might be due to the other factors not considered in this model and possible errors of measurement in industrial output.

- *Statistical significance of the individual parameters [t-test/p-test]*

The t –statistic shows the significance of each explanatory variable in predicting the dependent variable. Also, the p-value was employed to further ascertain the significance of the individual parameters. For a 1% level of significance, at a p-value greater than 0.01, we fail to reject the null hypothesis (Ho) and conclude that the parameter is not individually significant. However, if the p-value is less than 0.01, we reject Ho and conclude that the parameter is significant.

As shown in the results table, all the parameters are individually significant in explaining the industrial output measured as the value added as a percent of India's GDP.

- *Overall Significance of the Model [F-test]*

The F-statistic is used to test for the overall significance of the estimated regression. It is computed as

$$\text{F-statistic}=\frac{explained\ variation.(n-k-1)}{unexplained\ variation.(k)}$$

The F-calculated is compared with F-tabulated. If F-calculated is greater than F-tabulated then we reject the null hypothesis and conclude that the chosen explanatory variables are statistically significant in explaining the dependent variable. The higher the value of the F-statistic, the greater the overall significance of the estimated regression.

Our model reveals that at 1% level of significance, the variables collectively influence the variation of industrial sector growth as shown by the F-statistic (41.17), and F-Prob (0.00) in the OLS framework.

- *Multicollinearity – Variance Inflation Factor*

Linear relationships among the explanatory variables is troublesome. The primary concern is that as the degree of multicollinearity increases, the regression model estimates of the coefficients become unstable and the standard errors for the coefficients can get wildly inflated. The variance inflation factor is used to determine whether the independent variables are linearly related. The variance inflation factor is calculated as VIF (α_i) = $^{1}/_{(1-R_i^2)}$ where R_i^2 is determined by running a regression of the explanatory variable X_i (ith independent variable) on all remaining explanatory variables in the equation. As a rule of thumb, a variable whose VIF values are greater than 10 may merit further investigation.

In the reported VIF table, all variables have a level less than 3, and so there is no problem of multicollinearity.

- *Autocorrelation – Durbin Watson Statistic*

The Durbin-Watson statistic is a test for first-order serial correlation. More formally, the DW statistic measures the linear association between adjacent residuals from a regression model. Serial correlation occurs in time-series studies when the errors associated with a given time period carry over into future time periods. Serial correlation will not affect the unbiasedness or consistency of OLS estimators, but it does affect their efficiency. With positive serial correlation, the OLS estimates of the standard errors will be smaller than the true standard errors. Thus, the model loses its predictive power. Although exact determination is difficult, if the DW statistic lies between 1.5 and 2.5, it indicates no autocorrelation. If it lies below 1.5, it indicates positive autocorrelation and if it is above 2.5, it indicates negative autocorrelation (Shim et al., 1995).

In our model, the value of the DW statistic is 1.61 which suggests that autocorrelation is unlikely to be a problem.

- *Heteroskedasticity – White test*

Heteroskedasticity refers to the circumstance in which the variability of a variable is unequal across the range of values of a second variable that predicts it. Heteroskedasticity has serious consequences for the OLS estimator. Although the OLS estimator remains unbiased, the estimated SE is wrong. Because of this, confidence intervals and hypotheses tests cannot be relied on. In addition, the OLS estimator is no longer BLUE. Different tests are used to determine the presence of heteroscedasticity like Park's test, White's test and Bruesh-Pagan test.

According to the White test performed on the above model, we do not reject the null of homoscedasticity.

ANALYSIS OF REGRESSION RESULTS

The regression results show that the coefficient of exchange rate is negatively significant showing that an increase in the exchange rate is associated with the decrease of 0.1178 in the industrial value addition as a percentage of GDP, all things being equal. This is statistically significant at 1%. This implies that if the value of the foreign currencies exceeds that of the local currency due to demand and supply of foreign currency as against local currency prices on imported raw materials will be very expensive which will adversely affect industrial production. Given that India is heavily dependent on imports of raw material and intermediate goods for industrial production, and increase in the exchange rate will add to the import bill and thus raise costs.

The coefficient of import of goods and services as percentage of GDP is 0.183 the fact that a 1% increase in the import of goods and services as a proportion of Indian GDP leads to a 0.183% increase in industrial output, again as a percent of GDP, given other things constant. This coupled with the negative relation with exchange rate only emphasis the dependence of Indian industrial output on imports of raw materials, machinery and technology.

It is seen that the coefficient of repo rate is negatively significant at 1% level of significance. It implies that for a 1 unit increase in the repo rate, industrial value added as a percentage of GDP will fall by 0.1706. This is in line with the economic expectation of an increase in repo rate increasing the cost of borrowing, and thus pushing up cost of production across the industry. Indian industries depend a lot on debt, along with equity, to finance their operations, and thus will be negatively impacted by increasing repo rates.

The infrastructure index used is also negatively related to industrial output, though in a very small magnitude. A unit increase in the infrastructure index, which incorporates physical, social and financial infrastructure across the nation, results in a 0.013 decrease in the percentage of value added by industry to GDP. This seems contrary to a priori expectations that improvement in infrastructure should boost industrial production. The possible reason for this negligible effect may be the economic conditions prevailing, and that the increased government expenditure in infrastructure may be directed more towards improving social infrastructure which may not directly be impacting industrial production. The infrastructure index used for this study does assign significant weight to factors like infant mortality rate, number of banking offices etc. Thus, it is imperative to study this linkage in more detail in future research.

CONCLUSION

The study was undertaken to assess the impact of macroeconomic indicators on industrial production in India. The model was regressed using multiple macroeconomic indicators such as, inflation, real effective exchange rate, unemployment rates, along with exogenous factors like world petroleum prices, the model estimated was not statistically significant. So some of the macroeconomic indicators were dropped and final estimated model

results are reported in the paper. Finally, the ordinary least squares estimation technique was utilized given the sample size for the period 1992-2013, using annual date. The study identified real exchange rate, import of goods and services and repo rate as the key macroeconomic factors that significantly influence the industrial production, with infrastructure being statistically significant yet not individually explaining much of the variation in industrial production.

APPENDIX

ISIC 10-45 sections that have been included in the Industry, value added as percentage of GDP variable.

- Mining and quarrying
- 10 - Mining of coal and lignite; extraction of peat
- 11 - Extraction of crude petroleum and natural gas; service activities incidental to oil and gas extraction excluding surveying
- 12 - Mining of uranium and thorium ores
- 13 - Mining of metal ores
- 14 - Other mining and quarrying
- D - Manufacturing
- 15 - Manufacture of food products and beverages
- 16 - Manufacture of tobacco products
- 17 - Manufacture of textiles
- 18 - Manufacture of wearing apparel; dressing and dyeing of fur
- 19 - Tanning and dressing of leather; manufacture of luggage, handbags, saddlery, harness and footwear
- 20 - Manufacture of wood and of products of wood and cork, except furniture; manufacture of articles of straw and plaiting materials
- 21 - Manufacture of paper and paper products
- 22 - Publishing, printing and reproduction of recorded media
- 23 - Manufacture of coke, refined petroleum products and nuclear fuel
- 24 - Manufacture of chemicals and chemical products
- 25 - Manufacture of rubber and plastics products
- 26 - Manufacture of other non-metallic mineral products
- 27 - Manufacture of basic metals
- 28 - Manufacture of fabricated metal products, except machinery and equipment
- 29 - Manufacture of machinery and equipment.
- 30 - Manufacture of office, accounting and computing machinery
- 31 - Manufacture of electrical machinery and apparatus.
- 32 - Manufacture of radio, television and communication equipment and apparatus
- 33 - Manufacture of medical, precision and optical instruments, watches and clocks
- 34 - Manufacture of motor vehicles, trailers and semi-trailers
- 35 - Manufacture of other transport equipment

- 36 - Manufacture of furniture; manufacturing
- 37 - Recycling
- E - Electricity, gas and water supply
- 40 - Electricity, gas, steam and hot water supply
- 41 - Collection, purification and distribution of water
- F - Construction
- 45 - Construction

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