

Decomposition of Growth Differentials into Scale and Efficiency Effects: Pre & Post Economic Reforms Periods in India

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Abstract

The study aims to examine the impact of labour and capital inputs on the growth of India with the help of the estimation of growth equations both in pre-reforms and post-reforms periods. Based on the secondary time-series data for the periods 1980-81 to 2019-20 the growth equations in Cobb-Douglas form have been estimated separately for pre and post economic reforms periods. This study analyzes the growth differentials between pre and post economic reforms periods by decomposing them into scale and efficiency effects. The main conclusion of the study is that the growth of India in pre reforms and post reforms periods has been found to be significantly different. Also, both labour and capital have the significant impact on growth both in pre and post reform periods.

Keywords- GDP differential, Gross capital formation, Gross Domestic Product, Pre and post- economic reform periods, Scale and efficiency effects.

Introduction

The condition of Indian Economy was not at all satisfactory during 1980s. This was primarily due to the immense falling down of foreign currency reserves. Due to that, the fiscal deficit was sky-high. There was an outflow of country's capital which further worsened the situation. Various foreign investors became pessimistic about the Indian Economy. Not only this, there were various unanticipated changes which adversely affected the other economies of the world as well. It was indeed of the hour for a historic step for India to overcome all the struggles faced by the economy. This led to the integration of Indian economy with the world economy in order to make India competitive at a world level. The main objective of the economic reforms was to enhance the Indian economy and make it efficient.

Under the strategy of economic reforms, India took seven major steps to achieve the prescribed goals regarding the economic growth. First, roles of public and private sectors were clearly stated under the New Industrial

Policy. Foreign investment was encouraged by abolishing the Foreign Exchange Regulation Act and thus Foreign Exchange Management Act was introduced. Under the new industrial policy licensing system was abolished, there was freedom of importing the technology, public sector was contracted, foreign investment was free to enter, MRTP and FERA restrictions were removed and importance of small industries was increased.

Second, new trade policy was formulated for controlling and regulating imports and exports. Under this trade policy export-import restrictions were reduced, export-import tax was reduced, procedure of exports and imports was made easier, foreign capital market was established, full convertibility on current account was made applicable and incentives for exports were provided.

Third, fiscal reforms were introduced to correct the fiscal deficit problem. For this individual and corporate taxes were reduced and tax procedure was simplified. Also, import duties were heavily reduced. Fourth, under monetary reforms statutory liquidity ratio was lowered, banks were given the freedom to decide interest rate on deposits, nationalized banks were granted permission for collecting money by issuing shares and the permission was given to the private sector for opening the banks. Fifth, under capital market reforms the limit for investment was raised under the portfolio investment scheme, the Securities and Exchange Board of India was established, private sector was given permission for establishing mutual funds and the registration of the sub-broker was made mandatory. Sixth, under the program of phasing out subsidies, Cash Compensatory Support was stopped. Seventh, price control was dismantled in case of fertilizers, steel and iron and petro-products. In brief, the economic reforms program of India was oriented towards globalization, privatization and liberalization.

India witnessed a positive impact on the overall growth rate of the country as a result of the economic reforms of 1991. The foreign investment in India witnessed an increasing trend in the period after the inception of economic reforms. Process of economic reforms resulted into the increase in foreign direct investment (FDI) in India. In 1980-81, FDI inflow in India was \$91.9 million which became \$73.54 million in 1990-91 and further increased to \$58.38 billion. In 1980-81, total labour employed in India was 162 lakh which became 346 lakhs in 1990-91 and further increased to 437.17 lakh in 2019-20. Similarly, gross capital formation was \$49.18 billion in 1980-81 in India which increased to \$86.54 billion and further became \$783 billion in 2019-20. As the result of increase in FDI, employment and gross capital formation, the gross domestic product of India increased to \$470.16 billion in 1990-91 which was \$287.22 billion in 1980-81. It became \$2500.13

billion in 2019-20.

Clearly, the strategy under economic reforms has resulted into economic growth of India in terms of continuously increasing levels of gross domestic product. On comparison of growth of India under economic reforms era with pre-reforms era, there has been the significant achievements in the Indian economy. So, it becomes essential to compare empirically pre-reforms economic growth with post-reforms economic growth in India. Levels of GDP change as a result of change in the labour and capital in the growth process. Economic reforms affected the use of labour and capital in India and thereby their productivity. Changes in labour and capital use affect the growth of gross domestic product quantitatively as well as qualitatively. This quantitative aspect is known as the scale effect while the qualitative aspect is termed as the efficiency effect.

The difference in gross domestic product between pre-reforms and post-reforms period is the growth differential which is due to the scale and efficiency effects of the use of labour and capital. Thus, it is required to decompose these growth differentials into the scale and efficiency effects.

Review of Literature

There are many studies that were successful in analyzing the effect of Economic reforms on the Indian Economy.

Kolte et al. (2019) examined the effect of economic reforms on the Indian economy. They used data from 1991-2011 for comparing different countries. It was concluded that the impact of the economic reforms were not great enough but had contributed positively to the socio economic status of the people in India. Variables like growth rate of GDP, literacy rate, healthcare facilities, and productivity of labor were all positively affected as a result of Economic reforms in India. But it was further said that much better initiatives could have worked wonders.

Ahluwalia (2018) concluded that there is a significant increase in the growth of Indian economy as a result of economic reforms. It was also found out that the economic reforms were successful in poverty reduction. Moreover, there was also an improvement in the variables like education, health services, and clean drinking water and sanitation. But, their progress as a result of economic reforms was less than what was hoped.

Jamal et al. (2018) analyzed the growth of Indian economy in pre and post reform period. Using time series data from 1978 to 2013, they tried to show the difference in the growth of Indian economy during these years. A simple regression analysis was used by including GDP, FDI inflows & imports before, during and after the economic reforms. It was found that as a result of economic reforms in India, there was an increment in the growth rate

of India.

Goel and Satapathy (2012) analyzed the effect of reforms on the GDP of India. They used secondary data to know the effect of changes in FDI, exports and gross fixed capital formation on Indian GDP. Multiple linear regression technique was used for the same. They used time series data from 1991-92 to 2010-11. It was concluded that all these three variables had a great impact on the GDP growth rate of India.

Chakraborty and Nunnenkamp (2006) examined the impact of FDI on the output in context of the Indian Economy. They used the time series data from 1987-2000 to depict the relationship between FDI and Output. It was found that there was a positive strong association between FDI and the output, using simple panel regression. They tested the model using panel co-integration technique and error correction model for uncovering Granger causality. It was concluded that FDI in India was not inappreciable the pre-reform period. It was also discovered that both the quality as well as the volume of FDI is important for Indian economy's growth.

From the above review of studies, it can be concluded that there was a significant impact of the economic reforms of 1991 on the economic growth of India. But none of the reviewed studies compared economic growth in India between pre-reforms and post-reforms period by the estimation of growth differentials and their decomposition into scale and efficiency effects. This is the main issue to be diagnosed in this study.

Objectives, Data and Variables

This paper aims to examine the role of labor and capital on gross domestic product of India both in pre-economic reforms and post-economic reforms period with the estimation of GDP differentials followed by their decomposition into scale and efficiency effects.

This study is based on the secondary time-series data collected from the World Bank (data.worldbank.org), Directorate General of Employment and Training, Ministry of Labour and Employment, Govt. of India, Indian Labour Statistics and Indian Labour Yearbook. The period considered in the study is 1980-81 to 2019-2020 because of the availability of data in both pre and post economic reforms periods. It compares the GDP of India in pre and post economic reforms period. There is a further division of the time period into two sub periods i.e. from 1980-1991 (pre-reform period) and 1992-2020 (post-reform period). The present study includes the data for GDP, employment and gross capital formation. Gross domestic product has been considered as the dependent variable and gross capital formation and employment of labour as the independent variables. Gross domestic product at constant prices (1915=0) in US \$ has been considered as

the proxy variable for economic growth. Employment of labour has been measured as lakh units. The expected algebraic sign of both labour and capital is positive.

Hypothesis and Econometric Modelling

The null hypothesis to be tested in the study can be described as below:

H_0 : Labour and capital do not have significant impact on growth of India both in pre & post economic reforms periods.

H_1 : Labour and capital have a significant impact on growth of India both in pre & post economic reforms periods.

The neo-classical approach has been used to study the relationship between GDP of India and its determinants of labour and capital. Thus the function to be estimated is as:

$$Q = f(L, K)$$

Cobb-Douglas functional form has been used to estimate the growth functions separately for pre & post economic reforms periods. The growth equation has also been estimated for India as a whole where pre and post reforms periods have not been considered. These are;

$$\text{Ln}Q^{\text{PO}} = \text{Ln} \beta_0^{\text{PO}} + \beta_1^{\text{PO}} \text{Ln}L^{\text{PO}} + \beta_2^{\text{PO}} \text{Ln}K^{\text{PO}} \quad \text{----- (1)}$$

and,

$$\text{Ln}Q^{\text{PR}} = \text{Ln} \beta_0^{\text{PR}} + \beta_1^{\text{PR}} \text{Ln}L^{\text{PR}} + \beta_2^{\text{PR}} \text{Ln}K^{\text{PR}} \quad \text{----- (2)}$$

Where, Q- GDP of India, L- Level of employment, K - Gross capital formation, Ln- Natural logarithm and β_0 , β_1 and β_2 are the constants to be estimated. PO and PR are related with post and pre- economic reforms periods. All the slope coefficients in both equations (1) and (2) show the output elasticity of the concerned factor of production. Equation (1) is related with the case of post-economic reform period while equation (2) is related with pre-economic reform period. Both equations have to be estimated with the help of Ordinary Least Squares method.

Growth Differentials and their decomposition into Scale and Efficiency effects:

For getting growth differentials equation (1) has to be subtracted from equation (2) as shown below.

$$\text{Ln}Q^{\text{PO}} - \text{Ln}Q^{\text{PR}} = \text{Ln} \beta_0^{\text{PO}} + \beta_1^{\text{PO}} \text{Ln}L^{\text{PO}} + \beta_2^{\text{PO}} \text{Ln}K^{\text{PO}} - \text{Ln} \beta_0^{\text{PR}} - \beta_1^{\text{PR}} \text{Ln}L^{\text{PR}} - \beta_2^{\text{PR}} \text{Ln}K^{\text{PR}} \quad \text{--(3)}$$

After making necessary adjustments, equation (3) can be written as below:

$$\text{Ln}Q^{\text{PO}} - \text{Ln}Q^{\text{PR}} = [\text{Ln} \beta_0^{\text{PO}} - \text{Ln} \beta_0^{\text{PR}}] + [(\text{Ln}L^{\text{PO}} - \text{Ln}L^{\text{PR}}) \beta_1^{\text{PO}} + (\text{Ln}K^{\text{PO}} - \text{Ln}K^{\text{PR}}) \beta_2^{\text{PO}}]$$

$$+ [(\beta_1^{PO} - \beta_1^{PR}) \text{Ln } L^{PR} + (\beta_2^{PO} - \beta_2^{PR}) \text{Ln } K^{PR}] \text{-----} \quad (4)$$

In equation (4), the first term on right hand side is the intercept component in growth differentials. Right – handed second term measures the growth differential due to scale effects with respect to labour and capital. The third term analyses the efficiency effects on growth differentials due to labour and capital respectively. Both scale components of labour and capital have been calculated both at pre and post-economic reforms β_1 and β_2 . Similarly, the efficiency effects have been calculated both at pre and post-economic reforms average values of labour and capital. These various components have been described as below:

- $\text{Ln}\beta_0^{PO} - \text{Ln}\beta_0^{PR}$ ----- The autonomous component
- $(\beta_1^{PO} - \beta_1^{PR}) \beta_1^{PO}$ -----Scale effect due to labour at post-reform β_1
- $(\beta_1^{PO} - \beta_1^{PR}) \beta_1^{PR}$ ----- Scale effect due to labour at pre-reform β_1
- $(\beta_2^{PO} - \beta_2^{PR}) \beta_2^{PO}$ -----Scale effect due to capital at post-reform β_2
- $(\beta_2^{PO} - \beta_2^{PR}) \beta_2^{PR}$ -----Scale effect due to capital at pre-reform β_2
- $(\beta_1^{PO} - \beta_1^{PR}) \beta_1^{PO}$ -----Efficiency effect due to labour at post-reform average of labour.
- $(\beta_1^{PO} - \beta_1^{PR}) \beta_1^{PR}$ -----Efficiency effect due to labour at pre-reform average of labour.
- $(\beta_2^{PO} - \beta_2^{PR}) \beta_2^{PO}$ ----- Efficiency effect due to capital at post-reform average of capital.
- $(\beta_2^{PO} - \beta_2^{PR}) \beta_2^{PR}$ -----Efficiency effect due to capital at pre-reform average of capital

Analysis of Results

Table 1 – 6 represents the results of the study. Table 1 shows descriptive statistics of GDP, employment and gross capital formation for India. Table-1 (A) depicts that GDP and Gross capital formation are having the positively skewed distribution and labour is negatively skewed in pre-reforms period. These variables are not distributed normally. There is 17.49%, 24.41% and 35.37% variation in GDP, employment and gross capital formation respectively. In post-economic reforms period in Table 1 (B), all the three variables are positively skewed and thus, are not having the normal distribution. Table 1 (C) shows that all the variables of GDP, labour and Gross Capital Formation are skewed for overall period. The distribution of employment is significantly normal at 1.7 % level. In the same way, GDP and gross capital formation also have the normal distribution but at 7.6% and 8.4% respectively.

Table 1 (A): Descriptive Statistics: Pre-Reform Period (1981-1991)

Value	Q	L	K
Mean	3.75E+11	257.64	6.96E+10
Median	3.65E+11	262.70	6.36E+10
Maximum	4.70E+11	346.30	1.04E+11
Minimum	2.87E+11	162.00	4.92E+10
Std. Deviation	6.55E+10	62.89	1.78E+10
Skewness	0.22	-0.15	0.54
Jarque-Bera	0.88	0.87	0.90
Probability	0.64	0.65	0.64
C.V.	17.49	24.41	35.37

Source: Author's Compilation

Table 1 (B): Descriptive Statistics: Post-Reform Period (1992-2020)

	GDP	EMP	GCF
Mean	1.34E+12	2.90E+11	4.11E+11
Median	1.18E+12	2.40E+11	3.83E+11
Maximum	2.70E+12	8.30E+11	8.71E+11
Minimum	4.96E+11	4.07E+10	9.77E+10
Std. Deviation	6.97E+11	2.21E+11	2.59E+11
Skewness	0.57	0.55	0.30
Jarque-Bera	2.69	2.10	2.65
Probability	0.261	0.35	0.27
C.V.	51.92	76.25	62.97

Source: Author's Compilation

Table 2 (C): Descriptive Statistics: Aggregate (1981-2020)

	GDP	EMP	GCF
Mean	1.08 E+12	366.61	3.17E+11
Median	8.20E+11	391.25	1.81E+11
Maximum	2.70E+12	482.60	8.71E+11
Minimum	2.87E+11	162.00	4.92E+10
Std. Deviation	7.35E+11	79.94	2.68E+11

Skewness	0.835	-1.08	0.708
Jarque-Bera	5.15	8.11	4.95
Probability	0.076	0.017	0.084
C.V.	68.36	21.81	84.61

Source: Author's own work

Tables 2 (A) - 2(C) analyse the simple correlation coefficients between the considered variables in pre-reforms, post-reforms and for India as a whole. It is clear that the correlation coefficient between GDP and labour & GDP and gross capital formation are statistically significant.

Table 2 (A): Correlation Matrix: Aggregate (1981-2020)

	LNGDP	LNEMP	LNGCF
LNGDP	1.000	0.813	0.987

Source: Author's Compilation

Table 2 (B): Correlation: Post-Reform Period (1992-2020)

	LNGDP	LNEMP	LNGCF
LNGDP	1.000	0.966	0.983
LNEMP	0.966	1.000	0.947
LNGCF	0.983	0.947	1.000

Source: Author's Compilation

Table 2 (C): Correlation: Pre-Reform Period (1981-1991)

	LNGDP	LNEMP	LNGCF
LNGDP	1.000	0.786	0.978
LNEMP	0.786	1.000	0.753
LNGCF	0.978	0.753	1.000

Source: Author's Compilation

Table 3 reports the results related with the explanatory power of the independent variables considered in the study. In case of pre-reforms period, labour significantly explains the GDP by 93.3% which is statistically found to be significant as shown by the very high value of F-statistic. In this period gross capital formation explains 96.7% variation in GDP which is also statistically significant.

In post-reform period, labour explains 61.7% variation in GDP while gross capital formation explains 95.7% variation in GDP significantly. In case of

whole of the period labour explains 66.1% variation in GDP while gross capital formation is responsible for 97.4% explanation of variation in GDP in India.

Table 3: Explanatory Power of Variables (R²): Pre, Post and Aggregate

	LNEMP	LNGCF
Pre Reforms	R ² = 0.933 F= 125.78 (p=0.00)	R ² = 0.967 F=264.37 (p=0.00)
Post Reforms	R ² = 0.617 F=43.56 (p=0.00)	R ² = 0.957 F=602.96 (p=0.00)
Aggregate	R ² = 0.661 F= 73.98 (p=0.00)	R ² = 0.974 F= 1434.93 (p=0.00)

Source: Author's Compilation

Note: Values in parenthesis are p-values.

Table 4 presents the estimates of growth equations. In case of pre-reform period, all the regression coefficients have been found to be statistically significant. In case of pre-reform period, the output elasticity of labour is 0.23 which is significant at 7% level. The output elasticity with respect to capital has been estimated as 0.34. The value of μ (function coefficient= $\beta_1 + \beta_2$) is 0.57 which shows that there is presence of decreasing returns to scale.

The pre-reforms period related estimated model explains 98% variation jointly in GDP of India. This explanatory power has been found to be highly statistically significant as being shown by the value of F-statistic. The estimated growth model regarding post reforms period explains 96% variation in GDP significantly. The model shows that if labour increases by 1%, GDP will increase by 0.77%. Output elasticity of capital is also having significant impact on GDP.

It is also clear that the contribution of capital in GDP of India is less than that of labour. It can also be seen that in pre-reforms period the contribution of labour in GDP has been estimated to be lower in comparison to

capital. As per the value of μ (function coefficient), it can be said that there are increasing returns to scale in the post-reforms period.

In the period 1981-2020, labour significantly and negatively affected the GDP in India but capital had the more significant impact on GDP. Also, the contribution of capital on GDP has been estimated more in comparison to the labour. 98% variation is being explained jointly by labour and capital in India. This explanatory power of the fitted model is highly statistically significant. On the basis of the comparison of the value of adjusted coefficient of determination (Adj. R^2), it is clear that the fitted model is better in case of the aggregate scene.

Structural Break Point Analysis

Chow test has been used to study whether there is any structure-based difference in GDP growth in pre and post-economic reform periods. In this case, the estimated F-statistic has been found as 3.86 with 2% level of significance. This F-statistic is statistically significant showing that there are significant structural differences between the pre and post-economic reforms periods. This conclusion enables to proceed further in the analysis of the estimation of GDP differentials and their decomposition into scale and efficiency effects.

Table 4: Estimates of Growth Equations

Variables	Pre - Reform	Post Reform	Aggregate
$\text{Ln } \beta_0$	17.17 (0.00)	5.09 (0.00)	9.98 (0.00)
β_1	0.23 (0.07)	0.77 (0.06)	-0.28 (0.03)
β_2	0.34 (0.00)	0.69 (0.00)	0.74 (0.00)
R^2	0.978	0.963	0.977
Adjusted R^2	0.973	0.960	0.976
F	181.86 (0.00)	335.21 (0.00)	797.53 (0.00)
D-W	2.04	0.48	0.52
μ	0.57	1.46	0.46

Note: The values in parenthesis are the p-values: μ - function coefficient

Source: Author's Compilation

Table 5 reports the results of the study related with GDP differentials and their decomposition into scale and efficiency components. The components of scale and efficiency have been calculated with the help of the pre-reform and post-reform mean values. The value of difference of autonomous GDP ($\text{Ln } \beta_0^{\text{PO}} - \text{Ln } \beta_0^{\text{PR}}$) is -12.08, which shows that as a result of economic reforms the autonomous component of GDP differentials has decreased.

In case of scale effect, based on β_1^{PR} , the GDP differential has been found to be higher in post reform period by 11%. Similarly, at β_1^{PO} , the GDP differential due to labour have been found to be 38% higher in post reforms period. In case of capital GDP differentials have been found to be higher by 60% at the β_0^{PR} but at β_2^{PO} this differential has been estimated more by 122% at β_2^{PO} in post-reforms period. In case of scale effect, it is clear that both labour and capital have become more productive in post-reforms period. Regarding efficiency effects, in pre-reform case the productivity of labour has been found to be higher by 298% at PR . At PO , the efficiency component has been found to be higher by 325% more in post-economic reform period than the pre-economic reform period. On the basis of efficiency, the role of capital has also been assessed. At PR , the efficiency component of capital has been found more by 857% in post-reforms period in comparison to pre-reforms period, but at PO this component has been found to be more by 919% in post-economic reforms period. It is clear that in post-economic reform period, the growth of GDP has been found to be more in comparison to pre-economic reform period.

On the basis of total scale effect, both labour and capital are responsible for more GDP differential by 71% at the values of β_1 and β_2 of pre-reforms period while it was 160% more at the values of β_1 and β_2 of post-reforms period. Also, according to the total efficiency component, both labour and capital are responsible for more GDP differential by 1155% at PR and PR while it was 1244% more at the values of PO and PO .

Table 5: Decomposition of GDP Differentials into Scale and Efficiency Components

Components	At Pre-Reform Mean	At Post-Reform Mean
	$\text{Ln } L^{\text{PR}}, \text{Ln } K^{\text{PR}}, \beta_1^{\text{PR}}, \beta_2^{\text{PR}}$	$\text{Ln } L^{\text{PO}}, \text{Ln } K^{\text{PO}}, \beta_1^{\text{PO}}, \beta_2^{\text{PO}}$
Intercept $\text{Ln } \beta_0^{\text{PO}} - \text{Ln } \beta_0^{\text{PR}}$	5.09-17.17=(-12.08)	5.09-17.17= (-12.08)

Scale Effect Labour ($L^{PO} - L^{PR}$) β_1	($L^{PO} - L^{PR}$) β_1^{PR} =(6.01-5.52)(0.23)=0.11	($L^{PO} - L^{PR}$) β_1^{PO} =(6.01-5.52)(0.77)=0.38
Capital ($K^{PO} - K^{PR}$) β_2	($K^{PO} - K^{PR}$) β_2^{PR} =(26.25-24.48)(0.34)=0.60	($K^{PO} - K^{PR}$) β_2^{PO} =(26.25-24.48) (0.69)=1.22
Total	0.71	1.6
Efficiency Effect Labour ($\beta_1^{PO} - \beta_1^{PR}$) L	($\beta_1^{PO} - \beta_1^{PR}$) L^{PR} =(0.77-0.23) (5.52)=2.98	($\beta_1^{PO} - \beta_1^{PR}$) L^{PO} =(0.77-0.23) (6.01)=3.25
Capital ($\beta_2^{PO} - \beta_2^{PR}$) K	($\beta_2^{PO} - \beta_2^{PR}$) K^{PR} =(0.69-0.34)(24.48)=8.57	($\beta_2^{PO} - \beta_2^{PR}$) K^{PO} =(0.69-0.34) (26.25)=9.19
Total	11.55	12.44

Source: Author's Compilation

Various diagnostic statistics have been calculated to assess whether any assumption regarding Ordinary Least Squares method is violated. D-W Test has been applied to detect the presence of autocorrelation and it has been found that there is no evidence of autocorrelation in case of pre-economic reforms but in the period of post-economic reforms, there has been noticed the presence of positive autocorrelation. Regarding heteroscedasticity, the Breusch-Pagan- Godfrey Test has been used and it has been found that in case of pre and post-economic reform periods there was no evidence of heteroscedasticity but in case of the aggregate period, there is evidence of the heteroscedasticity. Variance Inflation Factor shows that there is no issue related with multi-collinearity in all the cases.

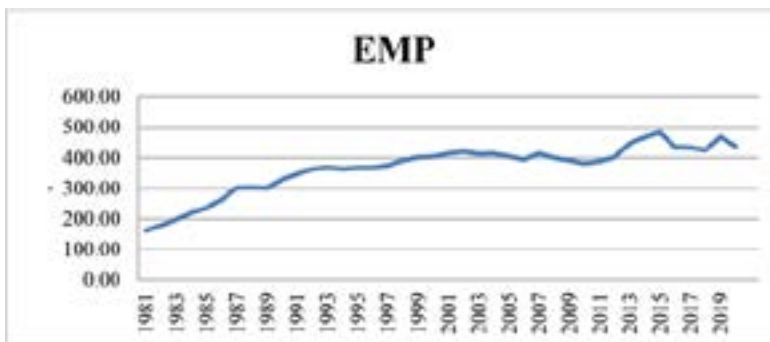
Table 6: Diagnostic Statistics

Test	Pre Reforms	Post Reforms	Aggregate
Auto Correlation (D-W Test)	2.04	0.48	0.52
Heteroscedasticity (Breusch-Pagan-Godfrey)	F= 0.66 (0.54) N * R ² = 1.56 (0.46)	F= 0.37 (0.70) N * R ² = 0.80 (0.67)	F= 10.78 (0.00) N * R ² = 14.73 (0.00)
Multicollinearity (VIF)	Emp= 9.81 GCF=9.81	Emp= 2.31 GCF=2.31	Emp= 3.67 GCF=3.67

Source: Author's Compilation

Conclusion

This study focus on analyzing GDP of India for the period 1981-2020, classified as pre-economic reforms period and post-economic reforms period. Data was collected for GDP of India, labour employment and Gross Capital Formation. Growth equations have been estimated considering GDP of India as their dependent variable and labour employed and gross capital formation as the independent variables. It has been found that both labour and capital have the significant impact on GDP in pre-economic reforms as well as in post-economic reforms periods with the help of the estimated Cobb-Douglas function. So, null hypothesis has been rejected. The GDP elasticity with respect to labour in pre-reforms period has been estimated 23% and that with respect to capital has been found to be 34%. Similarly, in-case of post-reforms periods, GDP elasticities with respect to labour and capital have been estimated as 77% and 69% respectively which are statistically significant. It has been also found that there is structural difference between the two types of periods and thus GDP differentials have been estimated and then these differentials have been decomposed into efficiency and scale effects. The results show that both scale and efficiency components of GDP differentials have been found more in post-economic reforms period showing that economic reforms process has played a significant positive role in affecting the levels of gross domestic product. It can be suggested to the planners and policy makers of India to take some healthy steps so that the productivity of labour and capital can further be strengthened.



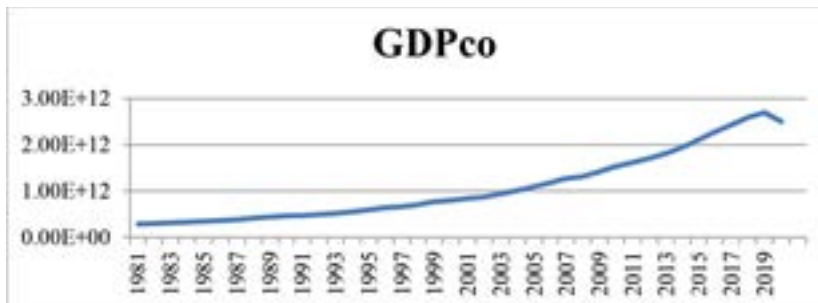
Source: Author's Compilation

Figure 1: Trend in Employment (EMP)



Source: Author's Compilation

Figure 2: Trend in Gross Capital Formation (GCF)



Source: Author's Compilation

Figure 3: Trend in Gross Domestic Product at Constant Prices (GDPco)

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