ROLE OF CONSTRUCTION SECTOR IN ECONOMIC GROWTH IN INDIA

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Abstract

This paper attempts to estimate trend of construction of public, private corporate and household sector in India for the period of 2004-05 to 2012-13. The analysis is base on the data for the nine years. The index number statistical tools applied to estimate the fluctuation. It was resulted that the slightly fluctuated. On the basis of fitted trend, future value has been predicted. The economic growth was analysed the direction of causality between GDP and construction in public, private corporate and house hold sector. The findings indicate a strong relationship between the dependent and independent variables.

Key words: *GDP, public Construction, private corporate, household Sector, Causal Relationship, Co-integration, linear regression method*

Introduction

Construction is playing a vital role in establishment sector as well as the major sources of economic growth, human resource development and economic activities. It is impulse to the uplift of unorganized sector employees and economic development of the country. It can be regarded as a mechanism of generating the employment and offering job opportunities to millions of unskilled, semi-skilled and skilled work force. It also plays key role in generating income in both formal and informal sector. It supplements the foreign exchange earnings derived from trade in construction material and engineering services. India is the second fastest growing economy of the world at present. India's economy has returned to high rates of growth, according to the latest figures. In 2015-16 the GDP growth rate reached 7.6 per cent, up from 5.6 per cent in 2012-13. The vast majority of workers in India are in informal jobs. Although there has been a shift out of agriculture, construction has absorbed more workers than other sectors in recent years. More than 90 per cent of the workforce in India is part of the unorganised sector.

With the rapid development of Indian economy, constructions have been serving as the pillar of the economy. It has played a great role in promoting the economic growth. The rapid development of the construction industry has important significance in strengthening the urban and rural infrastructure construction, advancing the process of urbanization, building a harmonious society and improving the whole social production efficiency. Around 16 per cent of the nation's working population depends on construction for its livelihood. The Indian construction industry employs over 30 million people and creates assets worth over $200 billion. It contributes more than 5 per cent to the nation's GDP and 78 per cent to the gross capital formation.

The construction industry is a major contributor towards India's GDP, both directly and indirectly. It employs 33 million people, and any improvements in the construction sector affect a number of associated industries such as cement, steel, technology, skill-enhancement, etc

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Construction Industry in India

The Construction industry in India is an important indicator of the development as it creates investment opportunities across various related sectors. The construction industry has contributed an estimated US$ 308 billion to the national GDP in 2011-12 (a share of around 19per cent) in 2011, there were slightly over 500 construction equipment manufacturing companies in all of India. The sector is labor-intensive and, including indirect jobs, provides employment to more than 35 million people. To achieve, the Optimum rate of economic growth, the rate of capital formation should be above 40 per cent in India, the gross capital formation for the year of 2009-10 was 36.5 per cent of the GDP. It was composed of 9.2 per cent in public sector and 24.9 per cent in private sector. The investment from the household sector was 11.7 per cent. In this paper has to attempt the role of construction industry in economic growth in India.

Research Methodology

The secondary data regarding public, private corporate and household sector of the construction industry were collected from data-book Compiled for use of Planning Commission, CSO, MoSPI, Economic Survey 2013-14 and the various journals. The temporal analysis is based on the 9 years starting from 2004-05 to 2013-14. The entire analysis was done by the use of SPSS and Excel. Statistical tools were used for identifying the performance of construction. The index number was estimated with the formula:

$$I = \frac{x_i}{x_o} \times 100$$

where,

x_i = public sector / private sector and household sector of construction in the current years

x_o = Public sector / private sector and household sector of construction in the base year i.e. triennium ending [TE] 2004-05.

The index number is calculated on the chain based method to account for the change in coverage in construction industry estimation. The base year for the index numbers has been taken as the first year of the sampling years.

The co-efficient of variation was estimated by using the following formula:

$$\text{Coefficient of variation} = \frac{\text{Standard Deviation}}{\text{Mean}} \times 100$$

To calculate compound annual growth rate, divide the value of an investment at the end of the period in question by its value at the beginning of that period, raise the result to the power of one divided by the period length, and subtract one from the subsequent result.

This can be written as follows: $\left(\frac{1}{\#\text{ of years}}\right.$

$$CAGR = \left(\frac{\text{Ending Value}}{\text{Beginning Value}} \right) - 1$$

The trend analysis was worked out using linear model and secular trend models. The secular trend function was finally selected to explain the trend due to its superiority over others in terms of coefficient of multiple determinations (R^2).

The secular Trend model is log Y = a+bt

Where

Y = Index number of public, private and household sector.

a = Constant

t = Time in years

b = Regression coefficient

In this model, the growth rate will be (bx100) in terms percentages (Suseendra Babu, 1997, Guledgudda, et all. 2001).

The general form of the equation of multiple linear regression is:

$Y_i = \beta_o + \beta_1 . X_i + \beta_i \times + \beta_2 . X_{i,2} + \ldots . + \beta_k . X_{i,k} + \varepsilon$

and

i = 1,2,.....,n are the observations from the sample;

Y_i = observation *i* of the dependent variable;

$X_1, X_2, \ldots, X_k$ = independent variables;

B_0 = constant(free term of equation);

$B_1, \ldots . \beta_k$ = coefficients of independent variables;

ε = error term of equation.

As research method, it was applied the backward method of linear regression (which consists of frequentative elimination of independent variables which have the most insignificant influence to dependent variable) into SPSS (Statistical Package for the Social Sciences) program (method tested on Table 2). The variables are: – economic growth rate (GDP in construction) for what was verified the correlation as dependent variable; – public, private corporate and household sector construction, as independent variables.

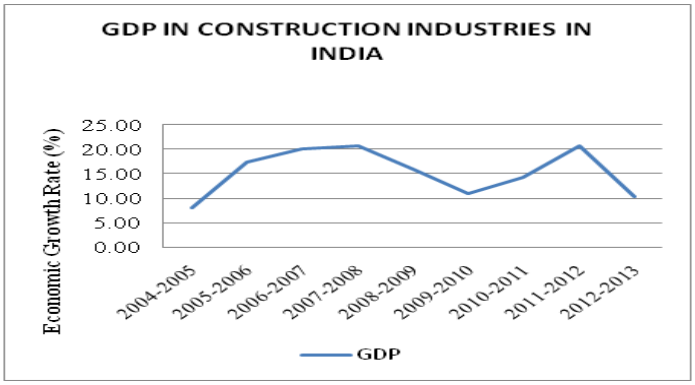

Fig – 1

Index number of public, private and household sector of construction in India is presented in Table 1. The index number of public, private corporate and household showed that the zigzag position in all years. Due to the unstable political situation it was vary time to time.

Table – 1 Index Number of Capital Formation of the Public Sector, Private Corporate Sector and Household Construction in India

[Base TE: 2004-05 = 100]

Year Period	Capital formation of Construction		
	Public	Private Corporate	Household Sector
2004-2005	100.00	100.00	100.00
2005-2006	125.83	180.31	100.44
2006-2007	124.79	119.84	118.44
2007-2008	118.66	133.17	120.47
2008-2009	117.85	57.31	137.75
2009-2010	112.61	129.28	109.34
2010-2011	111.84	142.02	111.79
2011-2012	105.78	106.57	131.29
2012-2013	130.45	101.30	104.51

Trend and Descriptive Statistics in Public, Private Corporate and Household Sector Construction in India

In order to find out the variation in public, private corporate and household sector of construction in all the years, coefficient of variation analysis was used (Table.2). It was observed that the variation in house hold sector construction is high compared to the other construction sectors. Public sector is higher that the private corporate construction industry.

Table – 2 Descriptive Statistics and growth of the Public, Private corporate and Household of Construction in India

	Capital formation of Construction		
Year Period	**Public**	**Private Corporate**	**Household sector**
Mean	318123.33	175397.33	578594.22
SD	128581.46	59289.72	260432.36
CV	40.41	33.80	45.01
ACGR	-99.71	-84.49	-88.57

The result shows that trend in public, private household sector construction in India. It is observed from the table that all the period, the growth is negative value. Public sector construction has first position among the others.

Trends in Public, Private Corporate and Household Sector Construction in India from 2004-05 to 2012-13

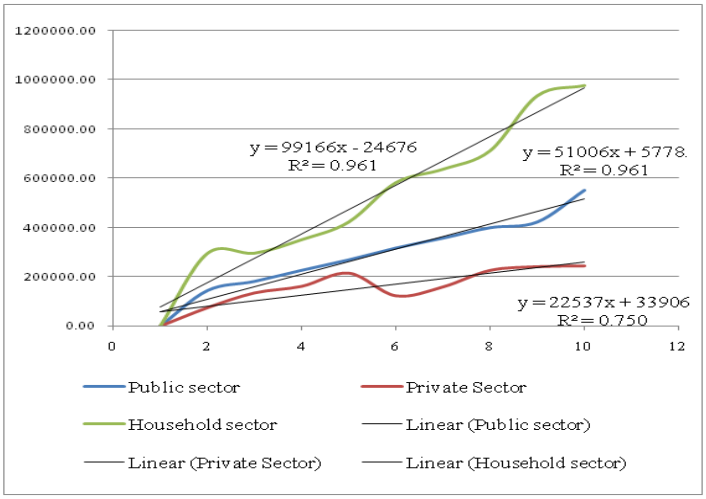

Fig.2 Trends in Public, Private Corporate and Household sector Construction in India from 2004-05 to 2012-13

Projected Value of the Public Sector, Private Corporate Sector and Household of Construction Sector in India

The results reveals that the future trend of public sector, private sector and house hold of the construction, the trend is likely to continue upto 2006-07 A.D. The projected public, private corporate and household will be Rs.9,23,886 crores, Rs.4,17,035 crores and Rs.16,61,146 crores respectively.

Table – 3 Projected Trend of the Public, Private Corporate and Household Sector of in India

(Rs. Crore)

Year Period	Capital formation of Construction		
	Public	Private Corporate	Household
2013-14	515838	259276	966984
2014-15	566844	281813	1066150
2015-16	617850	304350	1165316
2016-17	668856	326887	1264482
2017-18	719862	349424	1363648
2018-19	770868	349424	1363648
2019-20	821874	371961	1462814
2020-21	872880	394498	1561980
2021-22	923886	417035	1661146

Source: Calculated value

The Pearson's correlation coefficients are between –1 and 1, the positive values indicates a direct correlation, while a negative value indicates an inverse correlation. The correlation coefficient (Pearson) indicates a stronger correlation as its value is approaching the 1 value. Furthermore, the significance has to be lower than 0.05 to express a good accuracy. Analysing the results from the Table.4, for all the 9 observations, the correlation coefficients have negative values, thus there are opposite correlations between the dependent and independent variables (when one variable grows, the others decrease).

The Linear Regression: a Relationship between the Economic Growth Rate and the Others Indicators

The linear regression is based on the calculation of the correlation coefficient for the all the variables group, the correlation between a dependent variable and the others independent variables being analysed. If the correlation coeffient has a value approaching 1, this means that the correlation is strong. The aim of using the linear regression is to determine what impact on the economic growth has the independent variables such as:

a) Public construction b) Private corporate c) Household sector

The optimal method used for the linear regression model is the backward method, which is based on the elimination, at every step of iteration, of the independent variable which has the weakest influence on the dependent variable. None of the independent variables were removed, as it is shown in Table 5. From the Table 6, there can be observed that among the variables, it is a good correlation, but not very strong, because the correlation coefficient is 0.752. In addition to this value, none of the independent variables have been removed, so all these variables have a significant on economic growth. The significance is below 0.05, which means that there are small errors determined by chance. As a remark, the total credit influence on the economic growth is very good and strong (sig =0.000), and the tolerance is 0.067, greater than 1-Adjusted R square (1–0.305=0.695), which eliminates the uncollinearity risk. VIF (Variance Inflation Factor = 1/Tolerance) also helps for the collinearity analysis, being able to warn about an uncollinearity situation if its value has a greater value than 6.

Table 4 The Correlation Co-Efficient and the Significance for the Dependent and Independent Variables

		GDP	Public	Private corporate	Household
Pearson Correlation	GDP	1.000	-.121	.341	-.094
	Public	-.121	1.000	.798	.966
	Private corporate	.341	.798	1.000	.756
	Household	-.094	.966	.756	1.000
Sig. (1-tailed)	GDP	.	.379	.185	.405
	Public	.379	.	.005	.000
	Private corporate	.185	.005	.	.009
	Household	.405	.000	.009	.
N	GDP	9	9	9	9
	Public	9	9	9	9
	Private corporate	9	9	9	9
	Household	9	9	9	9

Table – 5 Variables Entered/Removed [a]

Model	Variables Entered	Variables Removed	Method
1.	Public, Private, Household [b]	.	Enter

[a] All requested variables entered.

[b] Dependent Variable: Economic growth.

Table – 6 The correlation Coefficient Model Summary [b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics	
					R Square Change	F Change
1	.752[a]	.565	.305	4.00140	.565	2.168

[a] Predictors: (Constant), Public, Private Corporate and Household.

[b] Dependent Variable: Economic growth.

Table – 7. The linear Regression coefficient model parameters

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
	B	Std. Error	Beta			Tolerance	VIF
(Constant)	11.452	4.455		2.570	.050		
Public	-6.273E-005	.000	-1.681	-1.361	.232	.057	17.559
Private Corporate	9.938E-005	.000	1.228	2.499	.055	.360	2.777
Household	1.107E-005	.000	.601	.528	.620	.067	14.882

a. Dependent Variable: GDP in construction industry

In our case, VIF is 14.882, which also eliminates the uncollinearity risk. Thus, using the coefficients calculated (column B – Table 7), the linear regression equation obtained is: public -6.273×10^{-5} , private corporate 9.938×10^{-5} , Household 1.107×10^{-5} and GDP + 11.452. The interpretation of coefficients from regression equation points out that, considering data for the period 2004–2005 to 2012-13, on a short period of time, it is expressed the following correlations: if public sector increases with one point, then economic growth rate decreases with -6.27 percent; if private corporate sector increases with one percent, then economic growth rate decreases with 9.93 percent; if household sector increases with one point, then economic growth rate increases with 1.10 percent.

Histogram

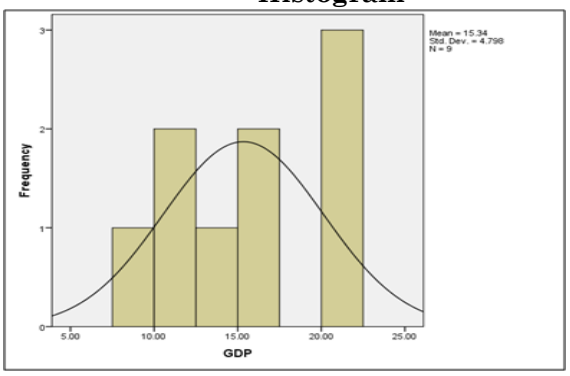

Fig – 3

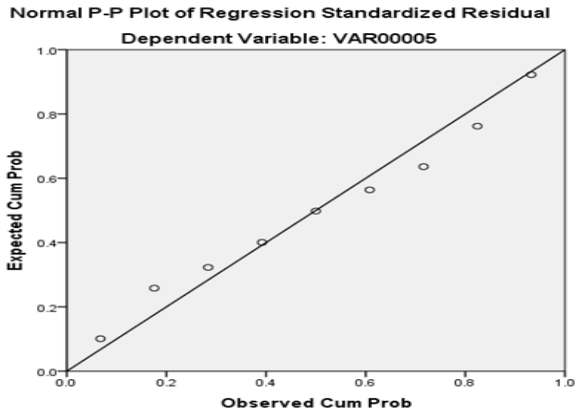

Fig – 4

In Figure 3 and Figure 4 were represented the residuals by comparing them with the normal distribution law. A residual is an observable estimate of the unobservable statistical error. The residuals generally comply with the normal distribution law (an empirical analysis based on the comparison of the curve – Figure 3 and of the points near the line – Figure 4), thus the linear regression model can be applied for the data analysed. As an observation, for the 0.6-0.9 interval the residuals don't comply with the normal distribution law, so on this interval the errors can be higher.

Table – 8 Diagnosis Of Collinearly

Model	Dimension	Eigen value	Condition Index	Variance Proportions			
				(Constant)	Public	Private Corporate	Household
1.	1	3.873	1.000	.01	.00	.00	.00
	2	.095	6.373	.61	.01	.00	.02
	3	.027	11.962	.36	.01	.90	.05
	4	.004	29.820	.02	.98	.10	.93

a. Dependent Variable: GDP

The most important information transmitted by this table is represented by the values of the condition indexes. Theoretically, an index higher than 15 shows that there is a collinearity problem, while a value higher than 30 indicates serious collinearity problems. In the study come across values of the condition index, above 15, for models represents the linear combination of independent variables which explain best the evolution of economic efficiency.

Conclusion

The trend analysis for capital formation of construction industry shows that India has made a significant to construction industry. The India position in the international scenario of construction industry has gone significant place in the world construction industry; even though the growth has not significant decreased. The result reveals that the future trend of construction industry is continued to 2021-22 A.D. Indian is that the growth of public doesn't encourage the economic growth, leading to a relative decline in the economic growth rates

likewise private corporate and household sector, leading to a relative expand in the economic growth. Consequently, on the short time, public, private corporate and household sector in India have to be under control in order do not influence in the negative way economic growth in India.

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