INVESTMENT ON INDIAN RAILWAYS AND ITS CONTRIBUTION TO GDP-AN EMPIRICAL STUDY

Shruthi B.R.*

Prof. H.R. Uma**

Abstract: *The service sector covers a wide array of activities ranging from services provided by the most sophisticated sector like telecommunications to simple services, highly capital intensive activities like civil aviation and shipping to employment-oriented activities like tourism and housing, infrastructure related activities like railways, roadways, and ports to social sector related activities like health and education. Indian Railways is one of the largest systems in the world under single management. It is also one of the very few railway systems in the world generating operating surpluses. With a modest beginning in India from 1853, the Indian Railways has emerged today as the main vehicle for socio-economic development of the country. Investment is very important factor for the development of any economy. The present study makes an attempt to explore the relationship between Railways share in India's G.D.P and investment in Indian railways. This study is an attempt to examine how investment in Indian railways has influenced its contribution to GDP.*

*Research scholar, University of Mysore

**Professor of Economics, University of Mysore

I.   INTRODUCTION

The service sector covers a wide array of activities ranging from services provided by the most sophisticated sector like telecommunications to simple services, highly capital intensive activities like civil aviation and shipping to employment-oriented activities like tourism and housing, infrastructure related activities like railways, roadways, and ports to social sector related activities like health and education.[1]

Indian railways is one of the major infrastructures under service sector. It is one of the largest railway systems in the world under a single management. Capital is one of the important factors of production. Investment in a particular industry contributes to the gross domestic product of the nation.

Investment in Indian railways is of two types one is capital at charge and another one is investment from capital fund. Capital at charge is the book value of the capital assets of railways. In pursuance of the recommendations of railway convention committee (1991) railway capital fund has come into operation from 1992-93. Appropriation to the fund is from revenue surplus and is intended to finance expenditure on assets of capital nature.

Rail GDP means Indian railways share in India's GDP. There are some factors on which rail GDP depends on like investment, capital output ratio, growth of those sectors that generate demand for the transport sector and so on.

There is a relationship between investment and GDP in every economy. This is an attempt to check whether there is a relationship between investment and contribution to GDP in a particular public sector organisation like railways.

II.   REVIEW OF LITERATURE

Wolassa L kumo (2012) conducted pairwise granger causality tests between economic growth, economic infrastructure investment and employment in South Africa for the period 1920-2009 using bivariate vector autoregression model (VAR) with and without structural break. The result indicates that there is a strong causality between economic infrastructure investment and GDP growth and also study found that there is a strong two way causal relationship between economic infrastructure investment and public sector employment.

Arjun Singh Sirari and Narendra Singh Bohra (2011) studied about foreign direct investment in Indian service sector. This study throw light on the significance of the FDI inflow in Indian

---

[1]Economic survey 2012-13

service sector since 1991 and how growth in service sector FDI leads to both formal and informal employment generation.

Harish Mani et all (2011) analyzed the relationship between public investment in agriculture sector and GDP growth. This study has examined the effects of higher public investment for agriculture on the stable growth of this sector as well as entire economy. This study employed ADF test and OLS model.

III. OBJECTIVE AND HYPOTHESES

The major objective of this study is to examine the relationship between investment in Indian railways and its contribution to nation's GDP.

Hypothesis

- **Ho:** There is no significant relationship between investment and GDP share of Indian railways. $Ho: \beta_1 = 0$

- **Ha:** There is significant relationship between investment and GDP share of Indian railways.

IV. METHODOLOGY

Data source: This study is based on secondary data collected from Ministry of Railway's railway year books, annual reports and planning commission for the period of 15 years from 1997-98 to 2011-12

Techniques of data analysis:

- Classical method of unit root testing: graph, ACF, PACF using Givewin software

- Modern method of unit root - Augmented Dickey Fuller Test using e-views software.

- OLS regression is used to find out the magnitude of relationship between the variables using Givewin software.

V. INVESTMENT AND SHARE OF INDIAN RAILWAYS IN GDP AN EMPIRICAL ANALYSIS

Investment and GDP are such variable which have close relationship and impact each other. In every sector investment influences GDP contribution of that sector. Indian railways being one of the important parts of service sector investment in this sector influences its GDP contribution.

Table 1: **Investment in railways and share of railways in GDP**

Year	Investment (in crore)	Rail GDP (in crore)
1997-98	49057.8	19712
1998-99	53657.6	19953
1999-00	58353.4	21798
2000-01	63341.01	22700
2001-02	70117.47	24289
2002-03	77915.78	25660
2003-04	87474.50	27179
2004-05	98490.02	29162
2005-06	112180.41	31339
2006-07	130168.71	34832
2007-08	151434.35	38235
2008-09	176726.41	41161
2009-10	203315.37	44763
2010-11	231615.25	47404
2011-12	257958.35	50945

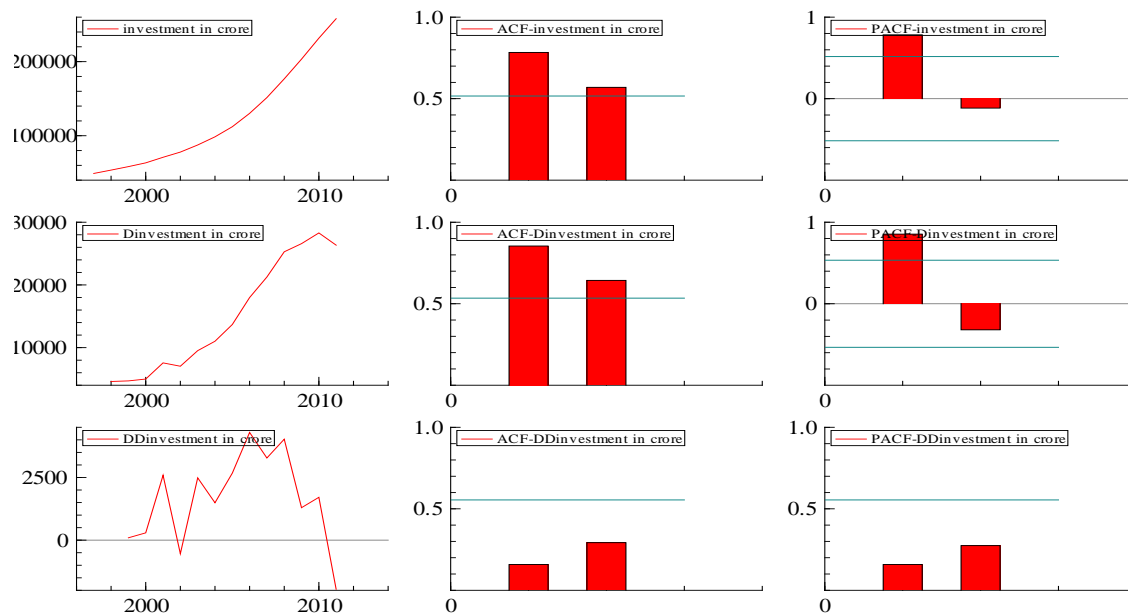Source: Indian railway year books various issues

Table 1 shows investment in Indian railways and railways share in GDPfrom 1997-98 to 2011-12 for the period of 15 years.

VI.   RESULTS AND DISCUSSION

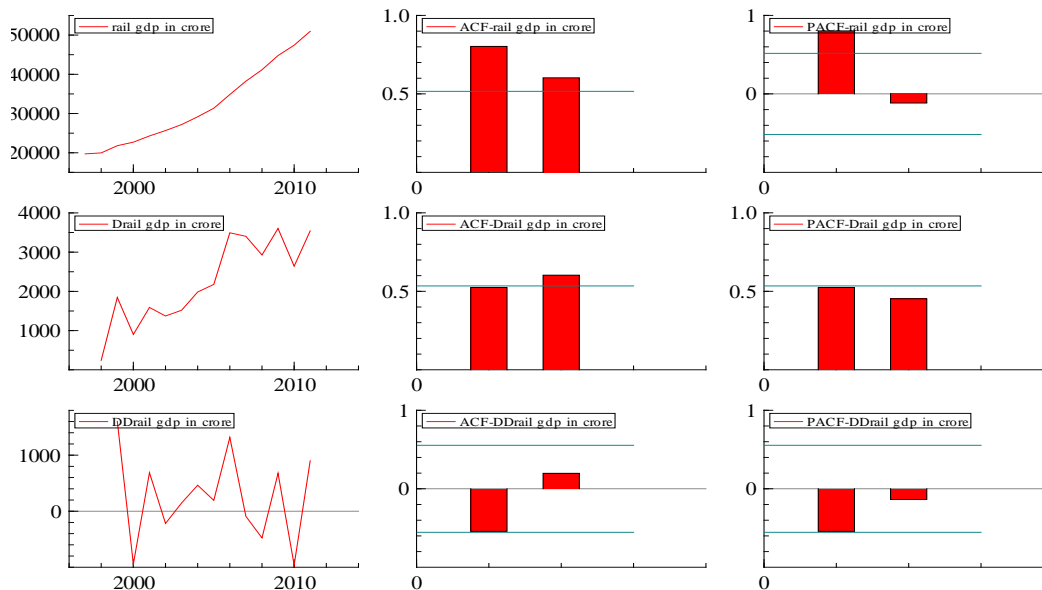**Classical methods to find out stationarity: ACF and PACF**

Investment:

Graph 1:

Rail GDP

Graph 2:

Analysis of unit root using Modern method: Augmented Dickey-Fuller test.

Investment

- Level with intercept and trend:

Null Hypothesis: INVESTMENT_IN_CRORE has a unit root

Exogenous: Constant, Linear Trend

Lag Length: 2 (Automatic - based on SIC, maxlag=3)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-3.724332	0.0623
Test critical values:	1% level	-4.992279	
	5% level	-3.875302	
	10% level	-3.388330	

Data at Level is non-stationary.

First difference with intercept and trend:

Null Hypothesis: D(INVESTMENT_IN_CRORE) has a unit root

Exogenous: Constant, Linear Trend

Lag Length: 3 (Automatic - based on SIC, maxlag=3)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-6.298737	0.0033
Test critical values:	1% level	-5.295384	
	5% level	-4.008157	
	10% level	-3.460791	

Difference series is stationary.

Rail GDP

- Level with intercept and trend:

Null Hypothesis: RAIL_GDP_IN_CRORE has a unit root

Exogenous: Constant, Linear Trend

Lag Length: 0 (Automatic - based on SIC, maxlag=3)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-1.170572	0.8760
Test critical values:	1% level	-4.800080	
	5% level	-3.791172	
	10% level	-3.342253	

Data at Level is non-stationary.

- First difference with intercept and trend:

Null Hypothesis: D(RAIL_GDP_IN_CRORE) has a unit root

Exogenous: Constant, Linear Trend

Lag Length: 0 (Automatic - based on SIC, maxlag=0)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-3.834353	0.0496
Test critical values:	1% level	-4.886426	
	5% level	-3.828975	
	10% level	-3.362984	

Difference series is stationary.

Table 2: ADF: INVESTMENT AND RAILWAY GDP

Variable	T value		p value	
	Level	1st difference	Level	1st difference
Investment	-3.724332	-1.170572	0.0623	0.0033
Rail GDP	-1.170572	-3.834353	0.8760	0.0496

Table 2 shows that variables investment and rail GDP arenon-stationary at level and stationary at first difference as p values are less than 0.05.

Regression:

As first difference series of two variables are stationary now we can conduct Regression of first different series.

EQ(1) ModellingDrailgdp in crore by OLS (using Data1)

The estimation sample is: 1998 to 2011

	Coefficient	Std.error	t-value	t-prob	Part.R^2
constant	717.109	295.1	2.43	0.032	0.3298
Drailgdp	0.101452	0.01705	5.95	0.000	0.7468

sigma 559.082	RSS 3750867.71
R^2 0.746761	F(1,12) = 35.39 [0.000]**
log-likelihood -107.354	DW 2.22
no. of observations 14	no. of parameters 2
mean(Drailgdp in crore) 2230.93	var(Drailgdp in crore) 1.05797e+006

The above result indicates that the null hypothesis $Ho : \beta_1 = 0$ is rejected as p- value is 0.000. r^2 value shows that 74% of variation in rail GDP is explained by investment. 1% change in investment leads to 10% change in rail GDP.

VII.   CONCLUSION

The present study is an attempt to explore the nature of relationship between investment in Indian railways and its GDP contribution. Thisstudy used classical method and augmented dickey fuller test to find out the stationarity of the series. And regression analysis to determine the relationship between investment in Indian railways and railways share in GDP. It is evident from the regression results that there is a significant relationship between investment in Indian railways and railway share in GDP.

REFERENCES

1. Alivelu G (2010) "salient aspects of the growth story of Indian railways 1981-82 through 2007-08", center for economic and social studies, working paper no.86.

2. Anderson, Dennies(1990): "Investment and economic growth", world development, vol 18 :pp 1057-1079

3. Anwermuhammed S. and R.K. Sampath (1999): Investment and Economic growth. "paper presented at western agricultural economics association annual meeting, Fargo, 11 14 July.

4. Harish mani et al. (2011): "Public investment in agricultural and GDP growth: Another look at the inter sectoral linkage and policy implications", working paper no.201 centre for development economics.

5. KumoWolassa L. (2012): "Infrastructure investment and economic growth in south Africa: A granger causality analysis", working paper series no.160 African development bank, Tunis, Tunisia.

6. SirariArjun Singh and Narendra Singh Bohra (2011): "Foreign direct investment in India service sector",Int. J. Eco. Res., 2011,2(2), 10-18 ISSN:2229-6158 IJER, MAR-APR 2011

7. Soumya A and K.N Murthy (2007): Effects if public investment in infrastructure on growth and poverty in India, viewed on 5 April 2014 (www.hss.iitb.ac.in/ties07/paper/ts4/psC/6.do)

8. www.indianrailways.gov.in

9. http://planningcommission.gov.in