RELATIONSHIP BETWEEN FISCAL DEFICIT AND ECONOMIC GROWTH IN INDIA: AN EMPIRICAL ANALYSIS

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Abstract: The growing and persistent fiscal deficit in recent years has brought the issue of fiscal deficit and growth into sharp focus. In the context of macroeconomic management of India, it has often been argued that high fiscal deficit is affecting capital formation in the economy both by reducing private investment and also through reduction in public sector's own investment arising out of ever-increasing consumption expenditure. The study seeks to investigate the relationship between fiscal deficit and economic growth in a multivariate framework with gross savings and capital formation for the period 1970-71 to 2012-13.The Cointegration test results indicate absence of relationship among the variables. Causality results show that the Indian economy's growth has been driven by gross savings and capital formation but fiscal deficits and economic growth are not causally related either directly or via the channels of savings and capital formation.

Keywords: Fiscal Deficit, Economic Growth, VAR, Cointegration, Causality.

Introduction: The impact of fiscal deficit on economic activity has been one of the subjects of longstanding debates in economic literature. The growing and persistent fiscal deficit in recent years has brought the issue of fiscal deficit and growth into sharp focus. In India too, recurring and rising budget deficits have been a dominant feature of fiscal operations since 1980's. In the context of macroeconomic management of India, it has often been argued that high fiscal deficit is affecting capital formation in the economy both by reducing private investment and also through reduction in public sector's own investment arising out of ever-increasing consumption expenditure. Therefore it becomes important to see if these high deficits have some implications for growth.

Theoretical Framework: The economic literature is divided into three broad strands regarding the issue of fiscal deficit and economic growth. The neo classicals following a tradition of balanced budget believed that deficits imply a fall in savings or an increase in dissavings of the government. The fall in savings in turn puts pressure on interest rate thereby crowding out private investment and lowering economic growth. Also the debt servicing associated with government borrowings forces government to cut back spending on relevant sectors like health, education and infrastructure which are the long term determinants of economic growth.

On the contrary the Ricardo-Barro Equivalence Theorem holds that any tax-induced change in government budget deficit/surplus will be exactly offset by a change in private savings and level of national savings will be unchanged. It states that government borrowings only postpone taxes for future. Consumers who are simultaneously taxpayers too, fully anticipate the increase in future taxes and hence do not consider the current tax cuts and consequent disposable income increase as permanent. The increase in the disposable income resulting from the tax cut is therefore entirely saved. Hence ,under the Ricardian equivalence ,government deficits by increasing the probability of future taxes will result in equivalent reduction of consumption of forward looking economic agents and the decline of public savings is matched by increase in private savings thereby leaving national savings unchanged. The substitution of current taxes by budget deficit has no impact on private consumption decisions, interest rate, national savings and aggregate demand.[Barro, 1989]. Hence the Ricardian strand purports no relationship between deficits and other macro variables.

These opposite predictions of the above two strands stem mainly from the fact, that both theories have different views on whether the government debt will be perceived by households as an increase in their wealth or not. The Ricardian approach assumes that government debt is not treated as net wealth, while the Neo-classical approach holds the opposite that government debt will be viewed as increasing the households' net wealth.

Lastly, Keynesians provide an argument in favor of crowding-in effect by making reference to the expansionary effects of budget deficits. Keynesians believe that budget deficits result in an increase in domestic production, which makes private investors more optimistic about the future course of the economy resulting in more investment (i.e. "crowding-in" effect). [Buscemi et al 2012]**.** In Keynesian macroeconomics fiscal deficits constitute an important policy prescription. Keynes identified underspending or underconsumption as the root cause of the widespread unemployment of 1930's.This demand side thinking argues that unemployment is a consequence of inadequate demand for goods and

services and if spending level increases employers will hire more labour. Keynes therefore advocated for running of deficits by increased spending and/or reducing taxes. In context of unemployed resources government expenditure either on consumption or investment causes output to increase through a multiplier process and this multiplier process sets into motion irrespective of the composition of deficit(monetization or borrowings).

Empirical literature: Since theoretically the issue of relationship between fiscal deficits and growth is unsettled a number of researchers have investigated the issue empirically.

Guess and Koford (1984) used Granger Causality test and found no causal relation between GDP and fiscal deficits for 17 OECD countries for the period 1949-81. Ghali (1997) found no consistent evidence of government spending affecting per capita output growth for Saudi Arabia in a VAR framework. Rahman (2012) found no long run relationship between fiscal deficits and growth for Malaysia for the period 2000 to2011 in an ARDL framework.

Huynh (2007) found a negative impact of budget deficit on the GDP growth in Vietnam for the period of 1990 to 2006. Keho (2010) examined the causal relationship between budget deficit and growth for seven West African countries over the period 1980-2005.In the sample of seven he found deficits to be adversely impacting growth in four countries while for the remaining three no causality was observed. Fatima (2011) found a significant negative impact of fiscal deficit on economic growth in Pakistan for period 1980-2009 in a simultaneous equation framework. Buscemi et al (2012) analyzed the effects of fiscal deficit on saving and economic growth in an endogenous growth framework using reduced form GMM for dynamic panel covering the period 1999-2009 for three emerging economies –India, South Africa and China. The regression results obtained indicate a significant and positive correlation between fiscal deficit and savings and fiscal deficit and economic growth. The impact of fiscal deficit on growth also depends crucially on mode of financing as rate of interest and taxes exhibit a negative and significant relationship with growth.

Ogbelo et al (2011) found evidence for the existence of causal relationship between government expenditure and GDP with causality running from expenditure to GDP in Nigeria from period 1970-2006.

Lucas, Alia and Odhiambo (2013) with a simple OLS estimation concluded that budget deficits have an unexpected positive influence on economic growth of Kenya for the period 1970-2007.

Data and Methodology: The study seeks to assess the impact of fiscal deficits on India's economic growth during period 1970-71 to 2012-13. We first assess the causal nexus between fiscal deficit and economic growth in a simple bivariate framework using Johansen –Juselius Cointegration and Granger Causality tests. The results indicate absence of any long run and causal relationship between fiscal deficit and economic growth which motivates us to conduct the study in a multivariate framework so as to avoid possible distortion of causality inference due to the omission of relevant variables. We therefore construct a multivariate model for detecting causal relationship between fiscal deficits and growth using saving and investment as additional variables.

The saving rate is one of the most important variables in economy. Saving rates and economic growth are strongly and positively correlated. Although what induces what still causes hot debate. Most economists agree, that there exists a virtuous cycle, in which higher saving causes faster growth and that causes even higher saving.

Savings are undoubtedly a necessary condition for capital accumulation and to the extent that domestic saving and investment rates are correlated, higher domestic saving rates will imply higher investment. However, in an open economy, where capital is highly mobile, domestic saving and investment may be uncorrelated. If that is the case, the increase in the former may not be transmitted into higher investment. If however, the degree of capital mobility is limited, domestic saving will be an important factor generating higher domestic investment which in turn leads to higher growth. The role of domestic saving and domestic investment in promoting economic growth has received considerable attention in India. Since the inception of economic planning in India, the emphasis has been on saving and investment as the primary instruments of economic growth and increase in national income. One of the objectives of economic plan (for *e.g.*, Eleventh five year plan) is to increase the production in the economy and thus economic growth. (Jangili 2011).In fact the saving-investment upsurge experienced in late 1970' has been regarded as one of the important factors behind the economic growth achieved since 1980's.

Theoretically fiscal deficits are considered among the factors that exert influence on the level of domestic savings and investment. Understanding the mechanisms of this impact and being able to predict the reaction of private and hence the national saving and investment rate to changes in fiscal deficits would give a powerful insight into deficit's probable effects on growth.

The relevant variables for this analysis are Gross Fiscal Deficit (centre and state combined) , Gross Domestic Product at factor cost, Gross Capital Formation and Gross Savings. All the nominal variables have been first deflated by Consumer Price

Index (for industrial workers) and then converted into natural logarithms so that their first difference measures growth rates. The source of data for variables is Hand Book of Statistics on Indian Economy (2008-09, 2012-13) published by Reserve Bank of India.

We propose to investigate the relationship among the variables by Johansen –Juselius Cointegration and Granger Causality under VAR/VECM framework.

Estimation Results:

Unit Root Test: Behind the cointegration technique lies the idea that some non-stationary variables may drift apart in the short run but they converge towards equilibrium in the long run. Despite being individually non stationary, a linear combination of them can be stationary.

Since the cointegration analysis is interesting only for non-stationary time series, the first step is to verify that all variables in question are stationary and integrated of the same order.

In order to uncover the underlying data generating process of the series (whether it is stationary or not) the study employs Augmented Dickey Fuller Test. The test consists of estimating the following regression equation

: $\Delta y_t = a_o + a_1 t + a_2 y_{t-1} + \sum b_1 \Delta y_{t-1} + e_t$ --------(i)

The null hypothesis of unit root is accepted if a_2=o. If the null hypothesis a_2 = o is rejected, the series is trend stationary.

However, the unit root test in the presence of structural break is different from simple ADF test. Based on ADF equation, Perron (1989) developed a method to test unit roots incorporating structural change. Perron's procedure for unit roots based on modified ADF is as follows:

H_0: $y_t = a_0 + y_{t-1} + \mu_1 Dp + \mu_2 D_l + e_t$

Where Dp =1 for t=τ +1, and 0 otherwise and D_l =1 for t > τ , and 0 otherwise. The structural break is assumed to have occurred at τ. The appropriate alternative hypothesis in this case is,

A_0: $y_t = a_0 + a_1 t + \mu_2 D_l + \mu_3 D_t * t + e_t$ -------(ii)

Where D_t = t - τ for t > τ, and 0 otherwise. In other words, the alternative hypothesis is that series is stationary around the trend, and the slope and intercept of the trend line change at t= τ +1.

Perron (1989) suggested a two-step procedure for testing unit roots in the presence of structural break:

Step 1: Detrend the data by estimate the alternative hypothesis and calling the residuals y_t^r.

Step 2: Estimate the regression

$y_t^r = a_2 y_{t-1}^r + e_t$

If the errors from this regression do not appear to be white noise estimate equation in form of Augmented Dickey-Fuller test. The t-statistic for the null hypothesis can be compared to the Mc Kinnon critical values.

We assume a break in the variables in 1991 which marks the introduction of economic reforms. The significance of break in trend is ascertained in terms of Chow test. The results of Chow test in terms of F-Statistic and Log Likelihood statistic revealed that all variables except Gross Savings exhibited a break in trend in 1991 .

Table 1 : Chow's Structural Break Test

Variable	Estimated Chow test - F statistics	Probability	Estimated Chow test- Log Likelihood statistics	Probability
LFD	3.0492	0.0417	9.5308	0.0230
LSAV	1.7108	0.183	5.6237	0.13142
LGCF	4.4132	0.0100	13.1549	0.0043
LGDP	3.255	0.033	10.1012	0.0177

Notes :
LFD = Log of real fiscal deficit
LSAV = Log of real gross savings
LGCF = Log of real gross capital formation
LGDP = Log of real fiscal deficit

The next step is to test for unit roots incorporating the structural break in 1991 for the relevant variables using Perron's methodology .All the variables were found to be non stationary at levels but as table 2 indicates the unit root hypothesis was strongly rejected for their first differences. Hence the variables turn out to be integrated of order one.

Table 2 : Unit Root Test Results

Variable	ADF statistics (First ifference)	Probabilities
LFD	-6.6996 (1)	0.00
LSAV	-6.9618 (1)	0.00
LGCF	-8.9663 (0)	0.00
LGDP	-12.715 (0)	0.00

Testing Cointegration: If two or more series are found to be I(1) then the next step is to find out whether they are cointegrated. There are three popular methods for establishing cointegration among variables of interest- (i) Engle Granger (EG)/Augmented Engle Granger (AEG) Test (ii) Cointegrating Regression Durbin –Watson (CRDW)

Test and (iii) Johansen and Juselius Test.

The Johansen - Juselius Test which the present study utilizes is based on two likelihood ratio tests - the trace statistic test and the maximum eigen value test. The test is believed to have several advantages over the other two tests. First, it tests for all the number of cointegrating vectors between variables and secondly, it provides a unified framework for estimating and testing cointegrating relations within a framework of a vector error correction model. The application of the test first requires determination of the order of VAR .Since the order of VAR can not be known a prioi , Schwarz Criterion (SC) is used to determine the optimum lag length .

The optimum lag length for our four variable VAR turned out to be one. The results of Johansen-Juselius Test are reported in the following table:

Table 3: Results of Johansen-Juselius Test

Hypothesised No. of C.Es	Trace Statistics	0.05 C.V.	Probability*	Max-Eigen Statistics	0.05 C.V.	Probability*
None	31.2646	47.8561	0.65	18.106	27.58	0.48
At most 1	13.1584	29.797	0.88	8.998	21.131	0.83
At most 2	4.1602	15.494	0.89	3.0394	14.264	0.87
At most 3	0.32084	3.841	0.57	0.3208	3.8414	0.57

*indicates Mackinnon- Haug – Michelis (1999) p values

As shown in the table both trace and Max-Eigen value statistics indicate no cointegration among variables at 0.05 level.

Causality Detection: Since the variables under consideration are not found to be cointegrated we detect the causality among the variables in the standard Granger framework (i.e. without the error correction term).

The results for VAR causality are reported below:

Table 4 a. Dependent Variable: LFD

Excluded	Chi square	Probability
LSAV	0.085	0.9584
LGCF	3.108	0.2114
LGDP	1.1563	0.5609

Table 4 b. Dependent Variable : LSAV

Excluded	Chi square	Probability
LFD	1.81915	0.4020
LGCF	6.2421	0.0441
LGDP	0.0630	0.9690

Table 4 c. Dependent Variable: LGCF

Excluded	Chi square	Probability
LFD	0.7076	0.702
LSAV	9.676	0.007
LGDP	0.9147	0.633

Table 4 d. Dependent Variable: LGDP

Excluded	Chi square	Probability
LFD	1.8566	0.395
LSAV	8.6570	0.013
LGCF	5.7535	0.056

As shown in table 4a and 4d there is no causal relationship between fiscal deficit and GDP in either direction. Fiscal deficit also does not cause either gross savings or capital formation (table 4b and 4c) which is indicated by the high probabilities 0.40 and 0.702 respectively. However there is a bi directional

causality between gross savings and capital formation and both of them cause GDP without being affected by the latter. To conclude, our results indicate that the Indian economy's growth has been driven by gross savings and capital formation but fiscal deficits and economic growth are not causally related either directly or via the channels of savings and capital formation.

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