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TAX SPEND DEBATE: TIME SERIES EVIDENCE FROM INDIA

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ABSTRACT

Governments cannot roll over the mounting debt for long. In order to satisfy inter-temporal budget, constrain, so as to avoid economic ills associated with higher deficits in the long run, some economists have advocated spending cuts while others support either tax increase or tax cuts. Which of the policy prescriptions could be successfully followed in a particular economy will largely depend upon causal nexus between revenues and expenditures. This study using cointegration tests, Error Correction Model (ECM) and Granger causality studies the dynamics of relationship between two variables for Indian economy using annual data. Both Engel Granger and Cointegration Regression Durbin Watson (CRDW) tests support existence of long run relationship between two variables. Furthermore, ECM and Granger causality tests support existence of unidirectional causality from revenues to expenditures in accordance with Spend and Tax as postulated by Buchanan and Wagner. Thus from the perspective of policy making and deficit solution debate, raising taxes in India is the better solution for current budget deficit Predicament.

KEYWORDS
budget deficit, revenues, public expenditures, cointegration, public finance, tax revenue.

JEL CLASSIFICATION
H2, C2.

1. INTRODUCTION

A ponzi game cannot be played for a long time. The inter temporal budget balance puts constrain on the behavior of governments. As such a high debt at present must be settled through high future surpluses in terms of present value, which can be made possible through adjustment in revenues, government expenditures or through seigniorage. Many of the contemporary economies like India are plagued with huge and escalating government budget deficits. Consequent to this these economies are expected to face economic monsters of high real interest rates, low capital formation and high unemployment rates. Moreover, to the extent that deficit is financed through the issuance of government bonds, the recurrent large deficits will further accentuate the problem of public debt and its adverse effects on the financial credibility of economy. In order to mitigate and avoid all these economic ills researchers and policy makers have expended numerous efforts to have a thread bear analysis of the problem of deficits and suggest ways to resolve it. But they are often confronted with the dilemma of either changing expenditures or taxes. Dalton (1923) argued, while an individual adjusts his expenditure according to his income, a public authority adjusts its income according to its expenditures. In this context we have the analogy that government cuts the cloth according to coat, while an individual cuts the coat according to cloth. This view would certainly recommend cuts in government expenditures rather than tax cuts as an optimal solution to deficit problem. The reason being that governments spend all they receive in the form of taxes (and often much more than that) leaving the deficit unchanged (or even higher). Thus increasing taxes can lead to increasing spending rather than bringing down the deficits. However, there is another group of economists that suggest the things other way around and opine that it is the taxes that adjust to spending. As such tax increase would not lead to higher spending and thus could be used as an effective tool to curb deficit along with spending cuts. Still there are some economists who posit that changes in spending and taxes occur simultaneously. Therefore, need arises to consider both the components simultaneously so as to avoid any ambiguous overall effect on deficits. Hence there is a need to analyse empirically the direction of causality in case of two variables–expenditures and revenues. With this background present study has taken this issue in Indian context and tries to examine empirically the direction of causality in case of two variables that could provide an optimal policy prescription to counter the problem of deficits. The remainder of this paper is organized as follows. Section A gives theoretical description of Tax Spend debate while literature review is presented in section B. This is followed by discussion on methodology used along with empirical analysis in section C. Paper ends with conclusion and policy implications presented in section D.

2. THEORETICAL UNDERPINNINGS OF TAX–SPEND DEBATE

In the domain of public finance, the debate over nexus between government expenditures and government revenues has resulted into four alternative hypotheses. A brief account of all these is presented under separate headings as under.

2.1 TAX AND SPEND HYPOTHESIS

This hypothesis maintains that changes in government revenues (Taxation) lead to changes in government expenditures. Friedman (1978), Ram (1988) as well as Buchanan and Wagner (1977, 1978) advocate such a view. According to Friedman level of spending adjusts to the level of tax available, as such causality runs from tax to expenditure. However, he did not advocate raising taxes to bring down deficits as he opined that former will invite more spending. Because of this positive relationship Friedman had long proposed tax cuts as a means of reducing budget deficits. He reasoned that tax cuts will lead to larger deficits which in turn will exert a mounting pressure on the governments to curtail its expenditures. Buchanan and Wagner supported same causal direction, but unlike Friedman they hypothesise a negative relationship wherein a decrease in government revenues will lead to an increase in government expenditures and vice versa. They argue that tax payers suffer from fiscal illusion as any reduction in taxes is perceived by them as a reduction in cost of public programmes (low price for public goods and services) and they start demanding increasing quantities. However public incurs even higher costs primarily because of indirect inflation taxation which is a consequence of excessive money creation. Also government debt financing will lead to high interest rates that may crowd out private investment. Thus tax cut in conjunction with resultant government spending would actually lead to higher spending and higher deficits. Following this reasoning Buchanan and Wagner advocate a tax increase that will be perceived as higher costs for government goods and services by tax payers, as a policy prescription for bringing down the budget deficit. Although these two views differ with regard to their policy prescription for bringing down the deficit both support causality from tax revenues to spending. For this reason, it is also known as "Revenue Dominance hypothesis" (Hansan and Lincolon, 1997). To determine empirically the validity of this hypothesis unidirectional causality should stem from government revenues to government expenditures.

2.2 SPEND AND TAX HYPOTHESIS

According to this hypothesis government first fixes its expenditure programme and then adjusts its tax and revenue policy to accommodate the desired spending. This view which is more pro Keynesian is supported by Wiseman, Peacock (1979) and Barro (1979). Wiseman and Peacock argue that a temporary increase in government spending (due to emergency purposes) leads to increase in government taxes and other types of revenues that tend to become enduring in due course of time and finally assume permanent nature. As such causality runs from expenditures to taxes. Barro, supporting the same causal direction uses Ricardian view to justify this view. He argues that an increased expenditure arranged through higher borrowings now results in increase in expected future taxes. With this perception of higher future tax liability tax payers decrease present spending to pay future taxes. Both these arguments establish that expenditure changes precede changes in taxation level. Under this causality pattern the optimal solution for controlling the budget deficit obviously is the expenditure cuts. Validity of this hypothesis is established if unidirectional causality stems from government expenditures to government revenues.

2.3 FISCAL SYNCHRONISATION HYPOTHESIS

This hypothesis postulates that decisions regarding tax and expenditures are taken simultaneously as such causality runs in both the directions. Musgrave (1966), and Meltzer and Richard (1981) advocate this view. According to Metzler and Richard quantity and quality of public goods reflect the preferences of a community and size of government is determined by welfare maximizing choice of decisive individuals. Public simultaneously determines the levels of government spending and taxation by contrasting the benefits of public goods with their costs. According to Musgrave the expenditure and tax sides of government must be decided jointly so as to maximize society's inter temporal social welfare function. Joint determination as such implies that one has influence on other.For empirical verification of this hypothesis bi-directional causality should be proved.

2.4 INSTITUTIONAL SEPARATION HYPOTHESIS

This hypothesis states that management and legislative branches of government have different taxation and spending functions. As they are different institutions they take independent decisions regarding expenditures and revenues. So taxation and expenditure levels are independent of each other. Wildavsky (1988) a major advocate of this hypothesis maintains that budgeting can be incremental and adjustments can be made on the margin if these separate institutions reach a consensus on fundamentals. Owing to this institutional separation in united states between spending allocation and taxation, Hoover and Sheffrin (1992) attributed this independence to many important actors with divergent interests and agendas. They also reported empirical results that are consistent with independent determination of two sides of budget –expenditure and revenues. Drazon (2001) reported that not any causal link but disagreement between parties or groups in decision making process is the cause for growing public debt.

3. BRIEF EMPIRICAL LITERATURE REVIEW

Although many studies have been conducted in this field but uncertainty about the direction of nexus between public expenditure and Revenue persists (Anderson et al.,1986; Naidu et al. 1994). The mixed results regarding the inter temporal relationship have been established using data from different countries, for different time periods, with different lag length specifications and different methodologies adapted. Further, most of studies in this regard have focused on developed countries, especially on US economy. One of the extensive studies by joulfaian and Mookerjee (1991) was conducted using data of 22 countries which showed that for most of the countries (except Japan, Canada and Iceland) causality runs from revenue to expenditure) thus supporting tax –spend hypothesis. Manage and Marlow (1986) using Granger causality test on US data (1929-1982) found a bi-directional causality between tax receipts and out lays in 58 per cent of states of US and unidirectional causality between them in the rest of states. Same authors (1987) using data for the period 1952 to 1982 came to the conclusion that tax causes expenditure at state level and no causality was found at local level. Studies of Blackley (1986) and Ram (1988) also support tax-Spend hypothesis. Furstenberg (1986) using vector auto regressive Method for data period 1946-1983 came to conclusion that expenditure causes revenue thus supporting Spend-Tax hypothesis.Other studies that support this hypothesis include Anderson, Wallace,and Warner (1986), Jeong and Furstenberg (1986). Das and Das (1998) using data from 1950-97 and making use of granger causality test and error correction model (ECM) found bidirectional causality between taxes and expenditures thus supporting the concept of fiscal synchronisation. Milpoler and Russek (1989) also support the same hypothesis. In another study by Li (2001) bidirectional causality was found between government expenditure and Revenue in China during the period from 1950 to 1997. Ali (2002) explored the causal relationship between government spending (expenditure) and taxation (tax revenue) in two countries, Lebanon and Tunisia and Empirical results of this study suggest that the decisions to spend and tax are significantly interdependent in both the countries. Chang et al. (2002) used cointegration and vector autoregression models to test the relationship between the government revenue and government expenditure for 10 countries using the data from 1951 to 1996. Three of them are from Asia—South Korea, Taiwan, and Thailand—and the remaining seven countries are Australia, Canada, Japan, New Zealand, South Africa, the UK, and the USA. The results from Granger causality tests suggest unidirectional causality running from revenue to spending, supporting the 'Tax-and-Spend' hypothesis, for Japan, South Korea, Taiwan, UK, and the USA. Opposite relationship, supporting the 'Spend-and Tax' hypothesis holds only for Australia and South Africa. In the case of Canada, the study finds a feedback existing between revenue and spending (expenditure), supporting the 'Fiscal Synchronization' hypothesis. However, in case of New Zealand and Thailand, the results support none of the hypotheses. Mariam et al. (1996) also found bidirectional causality in case of Malaysia thus supporting the fiscal synchronization Hypothesis.

4. DATA, METHODOLOGY AND EMPIRICAL RESULTS

4.1 DATA

This study investigates the dynamics of relationship between revenues and government expenditures in case of India using the annual data for the period 1970-71 to 2011-12. The two variables considered for this are Tax Revenues of central Government (TR) and its Total Expenditures (TE). All necessary Data for this period has been collected from Handbook of Statistics on Indian Economy published by Reserve Bank of India, union budgets and economic survey (various issues). Both the variables have been taken in natural logarithmic forms to avoid problem of heteroscedasticity.

4.2 UNIT ROOT TEST

The very first step involved in this empirical analysis of time series data is to ascertain the nature of data (Stationary or non stationary). For this, as a preliminary we take the graphic view of two series. From the graphs [fig. 1 and fig. 3] it is clear that two series, at levels, are not maintaining a constant mean and seem to follow an upward trend. However, first differences of both fluctuate around non- zero mean.

FIGURE: 1.1 [LEVEL]

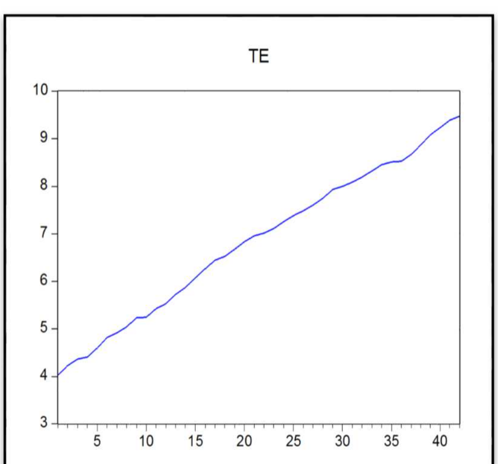


FIGURE 1.2 [FIRST DIFFERENCE]

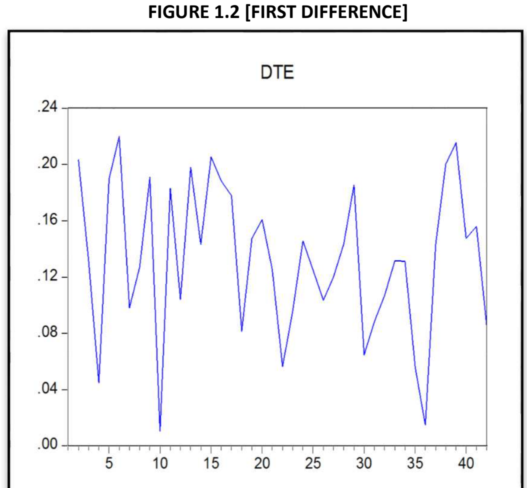


FIGURE :1.3 [LEVEL]

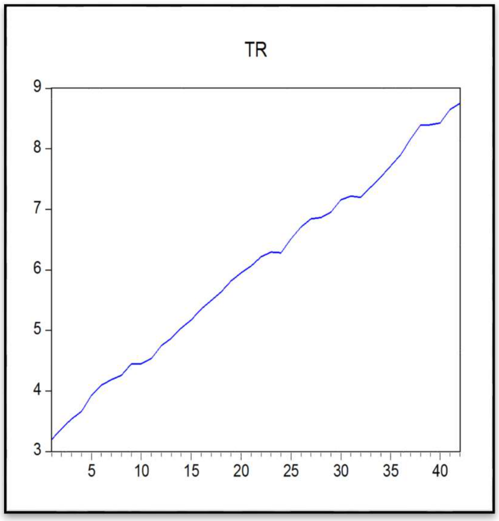
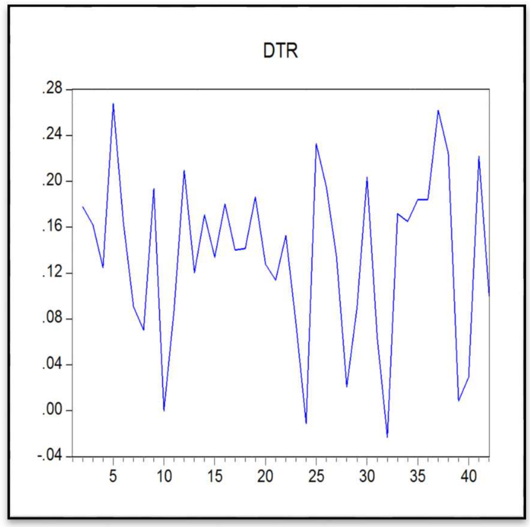


FIGURE :1.4 [FIRST DIFFERENCE]



To further verify this we make use of Augmented Dicky Fuller test (ADF). This test is based upon analysis of following three different forms of regression for two variables under consideration. The three forms are as under:

With Drift:

$\Delta TE = \beta_1 + \beta_3 TE_{t-1} + \sum_{i=1}^{i=m} \alpha_i \, \Delta TE_{t-i} + \varepsilon_t$ .... (C.1)

$\Delta TR = \beta_1 + \beta_3 TR_{t-1} + \sum_{i=1}^{i=m} \alpha_i \, \Delta TR_{t-i} + \varepsilon_t$ .... (C.2)

With constant and trend:

$\Delta TE = \beta_1 + \beta_2 t + \beta_3 TE_{t-1} + \sum_{i=1}^{i=m} \alpha_i \, \Delta TE_{t-i} + \varepsilon_t$ .... (C.3)

$\Delta TR = \beta_1 + \beta_2 t + \beta_3 TR_{t-1} + \sum_{i=1}^{i=m} \alpha_i \, \Delta TR_{t-i} + \varepsilon_t$ .... (C.4)

Without drift and trend:

$\Delta TE = \beta_3 TE_{t-1} + \sum_{i=1}^{i=m} \alpha_i \, \Delta TE_{t-i} + \varepsilon_t$ ....(C.5)

$\Delta TR = \beta_3 TR_{t-1} + \sum_{i=1}^{i=m} \alpha_i \, \Delta TR_{t-i} + \varepsilon_t$ .... (C.6)

In all three cases hypothesis is

Null; Ho: $\beta_3 = 0$ (Unit root is present or series is non stationary)

Alternate: H1: $\beta_3 < 0$ (no unit root)

Decision Rule:

1) If computed τ statistic is more negative than ADF critical values reject Ho implying series is stationary.
2) If computed τ statistic is not more negative than ADF critical values accept Ho implying that series is non stationary.

Having obtained these results same test is applied on first differences of two variables labeled as ΔTE and ΔTR.To check their stationarity the regressions equations to be estimated will be as

$\Delta^2 TE = \beta_1 + \beta_2 t + \beta_3 \Delta TE_{t-1} + \sum_{i=1}^{i=m} \alpha_i \, \Delta^2 TE_{t-i} + \varepsilon_t$ .... (C.7)

$\Delta^2 TR = \beta_1 + \beta_2 t + \beta_3 \Delta TR_{t-1} + \sum_{i=1}^{i=m} \alpha_i \, \Delta^2 TR_{t-i} + \varepsilon_t$ ...... (C.8)

Results of ADF test for all four variables are summarized in summarized in table (01)

TABLE 1: ADF TEST RESULTSA

Name of the variable	Computed τ statistic	ADF critical value (1% level)	ADF critical value (5% level)	Result
TE	-2.008195	-4.198503	-3.523623	**Non Stationary**
TR	-3.254068	-4.226815	-3.536601	**Non Stationary**
DTE (ΔTE)	-3.892043	-3.615588	-2.941145	**Stationary**
DTR (ΔTR)	-5.936740	-3.610453	-2.936740	**Stationary**

From result table (01) it is clear that both the variables are non stationary at levels but stationary at their first difference. Further for ADF test in case of levels we have used equation with constant and trend because their graphs seem to be stationary around trend. While in case of first differences graphs seem to fluctuate around non zero mean so we have used case of equation with trend only (Carter, Griffiths and Guay,2008). Lag length was chosen as per AIC criteria.

4.3 TESTS FOR COINTEGRATION

To examine the presence of long run equilibrium relationship between two variables we make use of Engel-Granger (EG) cointegration test and Cointegration Regression Durbin –Watson (CRDW) Test. For EG test we perform Unit root test on the residuals obtained from regression

$TE = \alpha + \beta(TR) + u$ .... (C.9)

Results for which are presented in Table (02).

TABLE 2: EG TEST RESULTS

Dependent Variable: TE				
Method: Least Squares				
Included observations: 42				
Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**
TR	0.987722	0.010758	91.81392	0.0000
C	0.889479	0.067146	13.24699	0.0000
Adjusted R-squared	0.995159	S.D. dependent var		1.604168
S.E. of regression	0.111611	Akaike info criterion		-1.501155
F-statistic	8429.797	Durbin-Watson stat		0.590823

Representing the residuals from above regression as û we conduct unit root test on û by running the regression

$\Delta \hat{u}_t = \rho \hat{u}_{t-1}$

Since we are working on residuals intercept and trend are ignored. The resulting estimated equation comes out to be as;

$\Delta \hat{u}_t = -0.29457 \hat{u}_{t-1}$

$t = -2.6154, R^2 = 0.1459\ d = 1.5767$

Computed value of t is -2.6154 which is more negative than Engel Granger 1 per cent critical value of -2.5899 hence, we reject the null hypothesis of non stationarity. Since residual is stationary it implies there is long run equilibrium relationship between TE and TR or simply two variables are cointegrated.

4.4 COINTEGRATION REGRESSION DURBIN WATSON (CRDW) TEST

We also use an alternative and Quicker method i.e., CRDW to find out whether TE and TR are cointegrated. The critical values for this test were first provided by Sargan and Bhargava (1983) and null hypothesis in this test is Durbin Watson statistic (d) obtained from cointegration is zero. The decision rule is if computed d statistic is more than critical value then cointegration exists. The results of test are summarized in Table (03).

TABLE 3: CRDW TEST RESULTS

Computed d statistic	Critical value (5% level)	Result
0.5908	0.386	**TE and TR are cointegrated**

Thus results of table reinforce the results of EG test conducted already and we conclude that two variables are cointegrated.

4.5 ERROR CORRECTION MODEL (ECM)

Having established that two variables are cointegrated implies there exists a long run Equilibrium relationship between them. But in the short run, there may be deviations from this equilibrium and it is required to verify whether such disequilibrium converges to long run equilibrium or not. For that we make use of VECM, which is used to generate short run dynamics as a means to reconcile short and long run behaviours.

In this study, the Error Correction Model (ECM) as suggested by Hendry (1995) has been used. The general form of the VECM is as follows:

$$\Delta TE = \alpha_0 + \varphi_1 EC^1_{t-1} + \sum_{i=1}^{i=m} \alpha_i \Delta TE_{t-i} + \sum_{j=1}^{j=n} \pi_j \Delta TR_{t-i} + \varepsilon_{t1} \ldots (C.10)$$

$$\Delta TR = \beta_0 + \varphi_2 EC^2_{t-1} + \sum_{i=1}^{i=m} \beta_i \Delta TR_{t-i} + \sum_{j=1}^{j=n} \pi_j \Delta TE_{t-i} + \varepsilon_{t2} \ldots (C.11)$$

Where Δ is the first difference operator, EC_{t-1} is the error correction term lagged one period, φ is the short-run coefficient of the error correction term ($-1 < \varphi < 0$) and ε is the white noise. The error correction coefficient (φ) is very important in this error correction estimation as greater coefficient indicates higher speed of adjustment of the model from the short run to the long run.

The error correction term represents the long-run relationship. An error correction model with the computed t-values of the regression coefficients is estimated and the results are reported in Tables (04.1) and (04.2).

From table it is clear that φ_1 is negative as well as significant at 5% level of significance implying that TR drives TE towards long run equilibrium and as such there is long run causality running from TR to TE. Further coefficient of lagged TR term is not significant implying absence of such causality in short run. For equation table reveals that φ_2 is negative but is not significant implying absence of long run causality from TE to TR. Also lagged TE coefficient is also not significant indicating absence of short run causality from TE to TR. Thus results of ECM go in favour of Tax and spend Hypothesis but not in favour of spend and tax hypothesis. In order to confirm these results further Granger causality test based upon F statistic is performed.

TABLE 4.1: ERROR CORRECTION RESULTS

Dependent Variable: DTE				
Method: Least Squares				
Included observations: 40 after adjustments				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.145186	0.025476	5.698925	0.0000
$EC^1(-1)$	-0.232058	0.079634	-2.914042	0.0061
DTE(-1)	0.079492	0.149233	0.532669	0.5975
DTR(-1)	-0.178638	0.120781	-1.479019	0.1478

TABLE 4.2: ERROR CORRECTION RESULTS

Dependent Variable: DTR				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.132645	0.038068	3.484382	0.0013
$EC^2(-1)$	-0.166071	0.118067	-1.406584	0.1681
DTE(-1)	-0.154188	0.223499	-0.689883	0.4947
DTR(-1)	0.161424	0.180618	0.893732	0.3774
Observations		40		

4.6 GRANGER CAUSALITY TEST

For conducting the granger causality test we must have stationary variables. since we have shown that TE and TR are non stationary at levels but stationary at first difference and also cointegration has been established then following the Granger representation theorem, either TE must cause TR or TR must cause TE. Since important assumption of stationarity is not met here we make use of extended granger causality test involving Error correction mechanism. For this we estimate

$$\Delta TE = \beta_0 + \sum_{i=1}^{i=p} \alpha_i \Delta TE_{t-i} + \sum_{i=1}^{i=q} \beta_i \Delta TR_{t-i} + \pi e_{t-1} + \varepsilon_t \ \ldots\ldots\ldots\ldots (C.11)$$

Where e_{t-1} is the lagged residual term, from the cointegration regression

$TE = \alpha + \beta(TR) + u$ …………………………… (C.12)

Which is nothing new but the error correction term (because two variables are cointegrated). So there are now two sources of causation for TE: (1) through the lagged values of TE and/or (02) through the lagged value of cointegrating vector (i.e. the EC term). The standard Granger causality test neglects the latter source of causation. The null hypothesis of no cointegration implies $\beta_1 = \beta_2 = \beta_3 = \beta_q = \pi = 0$. This can be rejected even if all $\beta's$ are zero but coefficient of lagged EC term is non zero. This is because EC term includes the impact of TR. To test this hypothesis of no causality we use F test as:

1) Estimate equation (C.11) by OLS and obtain the residual sum of squares from this regression (RSS_{ur}).
2) Re –estimate equation dropping all the lagged terms of TR and EC term. obtain the residual sum of Squares (RSS_r) from this reduced regression.

Compute the F statistic as

$F = \frac{(RSSr - RSS)/m}{RSS/(n-K)}$ with m and (n-K) degrees of freedom.

Where m is the number of lagged TR terms, k is number of parameter estimated in unrestricted regression and n is the sample size.

If computed value of F exceeds the critical value of F (for specified degrees of freedom) then we reject the null hypothesis of $\beta_1 = \beta_2 = \beta_3 = \cdots \ldots \ldots . = \beta_q = \pi = 0$. In other words, we accept that TR is caused either by lagged values of TE or EC term or both. Same procedure is repeated for the equation (C.13); So as to examine whether causality runs from TE to TR. Results pertaining to the equation (C.12) are presented in Tables 5 and 6.

TABLE 5

Dependent Variable: DTE				
Method: Least Squares				
Included observations: 40 after adjustments				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.145186	0.025476	5.698925	0.0000
DTE(-1)	0.079492	0.149233	0.532669	0.5975
DTR(-1)	-0.178638	0.120781	-1.479019	0.1478
e(-1)	**-0.232058**	**0.079634**	**-2.914042**	**0.0061**

TABLE 6: (GRANGER CAUSALITY TEST RESULTS)

RSS_{ur}	RSS_r	F statistic	Critical value (5%)	Result
0.090850	0.112395	8.157895	4.12	TR Granger causes TE

Since we have annual data only one lag has been taken into consideration. Also as checked, results do not change by taking higher order lags. The value of π is highly significant giving an indication of TR causing TE or possible rejection for null hypothesis of no cointegration. Results for F test are summarized in table (06). So from F test it is clear that lagged TR terms or/and lagged values of EC term (involving in it impact of lagged TR) terms have an influence on TE as such we conclude that TR granger causes TE.To be simple results are in favour of Tax and Spend hypothesis.

We repeat the above exercise for equation (C.13).

$\Delta TR = \beta_0 + \sum_{i=1}^{i=p} \alpha_i \, \Delta TR_{t-i} + \sum_{i=1}^{i=q} \beta_i \, \Delta TE_{t-i} + \pi e_{t-1} + \varepsilon_t$ ......(C.13)

in this equation e will represent the residuals from the regression

$TR = a_0 + a_1 TE$ +e ....(C.14)

Results for unrestricted regression pertaining to equation (C.13) are presented in table (7); Data reveals neither EC term nor lagged values are significant for changes in TR giving an indication of no causality running from TE to TR either in short or long run. To further strengthen this point, we present the results for F statistic in table (8).

Table for F test reinforces our earlier finding that TE does not Granger cause TR. Thus in Indian context out of four hypothesis only one is validated by empirical findings i.e., TR Granger causes TE or simply Tax and Spend hypothesis holds well.

TABLE 7

Dependent Variable: DTR				
Included observations: 40 after adjustments				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.132645	0.038068	3.484382	0.0013
DTR(-1)	0.161424	0.180618	0.893732	0.3774
DTE(-1)	-0.154188	0.223499	-0.689883	0.4947
e(-1)	**-0.166071**	**0.118067**	**-1.406584**	**0.1681**
RSS_{ur} = 0.20351				

TABLE 8: GRANGER CAUSALITY TEST RESULTS

RSS_{ur}	RSS_r	F statistic	Critical value (5%)	Result
0.20351	0.216510	2.32	4.12	**TE does not Granger cause TR**

4.7 CONCLUSION AND POLICY IMPLICATIONS

In this study causal nexus between government revenues and expenditures has been studied using annual data of central government of India for the time period 1970-71 to 2011-12. We test four alternative hypothesis- first, Tax and Spend hypothesis; second, Spend and tax hypothesis; third, fiscal synchronization hypothesis and fourth, institutional separation hypothesis. In the empirical exercise ADF test was used to check the stationarity of variables. Engel-granger and Cointegration Regression Durbin Watson tests were used to examine long run Equilibrium relationship between two variables and Error correction model was used to analyse the reconciliation of long run and short run behaviour of two variables. Further, Engel granger test for Non stationary series was used to examine the direction of causality. Empirical analysis revealed that there exists a long run equilibrium relationship between tax revenues and expenditures. Both ECM model and Engel Granger tests established that in Indian context there exists unidirectional causality and direction of causality is from TR to TE. Thus historical behavior of two variables in India supports tax and Spend hypothesis. Further, unidirectional causal impact of TR on TE is negative in accordance with Buchanan and Wagner hypotheses. Therefore, from the policy perspective it would be in order to raise the tax levels so as to bring down expenditures and consequent desirable decrease in deficits.

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