W.P. No : EC - 15 - 28
March 2015

Working Paper

INDIAN INSTITUTE OF FOREIGN TRADE

The Case of Revenue versus Expenditure Optimization in India

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Printed and published by

Indian Institute of Foreign Trade

Delhi Centre

IIFT Bhawan, B-21, Qutab Institutional Area, New Delhi – 110016

Kolkata Centre

J1/14, EP & GP Block, Sector –V, Salt Lake, Kolkata - 700091

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How do Government's decide on Fiscal Policy? : The Case of Revenue versus Expenditure Optimization in India

Nithin K

Abstract

This paper investigates the revenue-expenditure relationship in context of central and general category states in India. In particular the analysis is pertaining to the time period, 1973-2011. Unit root test in the presence of structural breaks is employed to determine the order of integration and accordingly co integration and causality tests are applied to determine inter temporal relationship between revenue and expenditure streams. The key findings are as follows: Firstly, there exists an institutional separation between expenditure and revenue streams at the Central Government level implying the tendency towards permanent deficit finance. Secondly, in majority of the States, tax and spend hypothesis has been upheld in case of own revenue and expenditure indicating that the size of the government at the state level is determined by the resource supply and not by expenditure demand. Thirdly, In case of relationship between Central transfers and expenditure, in most of the poorer states there is causality from Central transfers to expenditure and vice versa in the better off States. Prima facie, from the results it is striking that this study refutes the prevailing wisdom that States are fiscally profligate and call for a discussion whether to empower states with further fiscal responsibilities? Given the existing dynamics of spending there is a scope for rationalizing Central Government expenditure and a greater accommodation for states in the development spending as states understand priorities well and being closer to their constituents they could foster effective spending and better public service delivery.

Key Words: Fiscal Policy, Structural breaks, Revenue-Expenditure causality, optimisation

JEL classification – H2

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Introduction

Fiscal consolidation needs to be eventually achieved through adjustments in the form of government expenditure cuts and/or tax revenue increases. However, addressing the deficit problem may be complicated by several issues. The political economy of revenue-expenditure causality has various factions fighting over allocation of the burden of adjustment between revenue and expenditure. This requires an evaluation of the initial level of taxes and expenditures to determine whether it is politically and economically feasible to change them in the desired direction. In case of a low tax to GDP ratio, tax hikes may be easier to justify than expenditure cuts. However, the composition of expenditure and revenue needs to be carefully allocated as success of fiscal adjustments greatly depends on the composition of it. In this regard, in order to chart out a fiscal consolidation strategy, it is important to understand the causality between taxes and expenditures. In particular, in order to determine which variable should be given temporal priority, one basically has to know whether changes in expenditures precede, follow, are independent of, or occur simultaneously with changes in taxes. It could be a one-way causality from spending (revenue) to revenue (spending), i.e. "tax-and-spend" ("spend-and-tax") causality, two-way causality or no causality between revenue and spending which could give critical inputs in shaping the fiscal consolidation strategy.

Empirical assessments of earlier fiscal consolidations of developed countries have identified a number of factors that tend to be associated with durable adjustment. These include a focus on expenditure reductions rather than tax increases; cuts in transfer spending and in the public sector wage bill. Lower interest payments and capital outlays have also made an important contribution to the decline in expenditure, most significantly in Europe. In a country like India having a federal structure of governance, fiscal management in member States is an interesting and

important aspect. In a federal framework like India, the dynamics of fiscal policy needs to be looked in to from the perspective of both Centre and States because of the vertical fiscal ties and responsibility of coordination which lies with the institutions. An investigation of optimisation dynamics at both Central and State level would help policy makers in articulating a comprehensive fiscal policy to sustain economic growth over long run without compromising on debt sustainability.

In this paper, we attempt the following set of questions in the context of revenue expenditure optimisation by Central Government and various State Governments in the realm of its fiscal federal framework. How does the Central Government decide on the fiscal policy? In making budgetary decisions which variable (expenditure or revenues) does the Central Government optimise? At the State level, what is the inter-temporal relationship between expenditure and own tax revenue? What is the relationship between expenditure and central transfers? The remainder of this paper is patterned as follows: In the following section we present the theory and empirical evidences so far existing. Section 3 provides the variable definition and data sources. Section 4 will describe the step by step econometric procedure with results of empirical research. Final section will present concluding comments and policy implications thereof.

Theory and Evidence

2.1 Revenue and Expenditure nexus

The revenue expenditure nexus can be explained within the framework of four different hypotheses a) the tax-and-spend hypothesis b) the spend-and-tax hypothesis c) the fiscal synchronization hypothesis and d) the institutional separation hypothesis; According to the tax and spend hypothesis advocated by

Friedman (1978), the level of expenditure adjusts to the level of tax revenues. Therefore, an increase in tax revenues will lead to higher expenditures and not

lower deficits. Another version of tax and spend hypothesis was proposed by Buchanan and Wagner (1977, 1978), wherein they argue that the tax increases would lead to spending reductions because taxpayers suffer from fiscal illusion.

Barro (1974, 1979, 1986) in his tax smoothing hypothesis argued that government expenditure is as an exogenous variable and taxes adjust residually implying spend and tax hypothesis. Furthermore, Barro contends the notion of fiscal illusion with Ricardian equivalence framework and maintains that the intertemporal budget constraint would lead to higher future taxes with an increase in current expenditures. Roberts (1978), and Peacock and Wiseman (1979) supported thespend and tax hypothesis as temporary increases in expenditures are caused due to crisis situations and are followed by higher taxes. However, if tax increases become permanent due to higher level of tolerance of citizens there is a possibility for a permanent increase in the level of government spending.

The fiscal synchronization hypothesis implies that there is a bidirectional causality existing between government revenue and expenditure. This hypothesis maintains that the level of spending and taxation are jointly determined and the changes will occur concurrently (Musgrave, 1966; Meltzer and Richard, 1981). On the other hand, Wildavsky (1988) maintains that when revenue and expenditure sides of budgets are independently determined, there would exist no consensus leading to causal independence. This decoupling of revenues and expenditures implies institutional separation hypothesis.

2.2 Optimization dynamics in a fiscal federalism

At a subnational level, units rely on transfers from higher level government for provision of local public goods due to existence of horizontal and vertical imbalances. The transfers are partially formulaic and partially discretionary in nature and would induce a potential strategic motivation to the optimisation dynamics in order to facilitate more amounts of higher level resources. Sub national

Governments may choose inefficient policies such as imposing lower amount of taxes, reducing/ increasing public good provision or changing the mix of public good provision to attract more transfers from the centre as a part of ex post transfers. Evidences are there in Zhuravskaya (2000), Schaltegger and Feld (2009), Wildasin (1997) and Pettersson-Lidbom (2010).

Buettner (2005) concludes that marginal contribution rate exerts a positive impact on local tax rates whereas volume of grants received reduces the tax effort. Local governments choose to optimise over expenditure when federal transfers subsidise tax effort and conversely governments choose tax as policy variable when transfers implicitly tax own source tax revenues (Koethenbuerger, 2011). Lack of pre commitment at higher government level leads to inefficiency in the form of under taxation or over spending (Akai and Sato, 2008). From a political economy perspective, the politically favourite region chooses tax optimisation whereas the other region chooses expenditure optimisation (Sengupta, 2010).

2.3 Empirical studies

Theoretical and empirical studies on the revenue – expenditure relationship and the concerned optimisation dynamics are widespread due to its critical role in maintaining appropriate levels of public good and private consumption which in turn plays a significant role in long run sustainable economic development. However, researchers are not on the same page on the direction of causality between Revenue and Expenditure. For eg:- In case of United States spend and tax hypothesis was upheld by Von Furstenberg et al. (1985), Anderson et al. (1986), Ross and Payne (1988), Islam (2001) whereas Tax-spend and Fiscal synchronisation hypothesis was upheld by other researchers (See Blackley,1986; Manage & Marlow,1986; Ram,1988; Bohn,1991). Similarly conflicting results are present in papers on revenue – expenditure causality at State level in United States. While Von Furstenberg et al. (1985), Ram (1988) support spend and tax hypothesis, Marlow and Manage (1988), Chowdhury (1988) have supported tax-spend hypothesis.

This study is aimed at investigating inter temporal relationship between government revenue and expenditure in India. The empirical results so far relating to revenue expenditure causality in India have remained confined to the national level and these have also not paid attention to the possibility of structural breaks in the public finance data series. The contribution of this paper is to examine the revenue and expenditure inter temporal relationship in India at Central and State level by incorporating the structural break framework in to the empirical analysis.

Variables specification and Data

The scope of the research is pertaining to the Central Finances and General Category States. In India, States are categorised in to two groups, a) General Category States (GCS) and b) Special Category States (SCS). The scope of research is confined to GCS. SCS are hilly regions, having an international border and a very low fiscal capacity making them dependent on Centre for resources. GCS account for over 80% of country's GDP. SCS were left out of analysis as these states have a high variability in the fiscal policy behaviour because of low base of GSDP. States of Bihar (BR), Madhya Pradesh (MP) and Uttar Pradesh (UP) were bifurcated during 2000-01 and new States of Jharkhand (JKD), Chattisgarh (CG) and Uttarakhand (UKD) were carved out. Analysis of Fiscal Policy behaviour of UKD, JKD and CG will be constrained due to the shortage of data points. Hence I choose to carry on with the analysis of UP, MP, BR on an undivided basis. Therefore, analysis is confined to 14 States namely Andhra Pradesh (AP), Bihar (BR), Haryana (HR), Gujarat (GJ), Karnataka (KA), Kerala (KE), Maharashtra (MH), Madhya Pradesh (MP), Orissa (OR), Punjab (PB), Rajasthan (RJ), Tamil Nadu (TN), Uttar Pradesh (UP) and West Bengal (WB).

At the Central level the variables taken in to consideration are total revenue which includes tax receipts, non-tax receipts and non-debt capital receipts and total expenditure which includes revenue and capital expenditure (net of debt

repayments). In the Indian fiscal federal framework, the magnitude of vertical inequality is highest after China. States are assigned many expenditure responsibilities requiring considerable resources which make them dependent on central transfers. Furthermore, central transfers are highly varying with respect to States due to a huge horizontal inequality existing amongst them. For eg.: For the period 2005-08, per capita Finance commission devolution towards BR was Rs. 1398 versus Rs. 592 for Maharashtra. Hence to test the revenue expenditure nexus at the state level it is important to segregate the revenue in to two categories, a) Own Revenue b) Central transfers and test for their relationship with the expenditure levels. Furthermore, with the inclusion of Central transfers, the existence of 'fly paper effect' can also be examined. The variables considered are own revenue which consists of own tax revenue, own non tax revenue and non-debt capital receipts; central transfers which consist of central tax transfers and central grants; total expenditure includes revenue expenditure (net of natural calamities) and capital expenditure (net of debt repayments).

Annual data over the period 1973-2011 was considered to examine the revenue expenditure relationship. The nominal data has been converted in to real values at 04-05 price levels and log of real values are used for analysis. For Centre LTR and LTE represents Log of per capita total revenue and Log of per capita total expenditure respectively. In case of States, LTOR represents log of per capita total own revenue, LCT – log of per capita central transfers, LTE – log of per capita total expenditure at 04-05 price level. Data was obtained from Central Budget and individual State Budget documents.

Econometric Procedure

The analysis of the paper is detailed in the following sequential steps. First, Unit root test of Phillips- Perron is used to investigate the time series properties of the individual series. In the second step, unit root test in the presence of two

endogenously determined structural breaks using the Lee and Strazicich (2003) procedure is applied to confirm if the same time series properties exist in the presence of structural breaks. The third step of analysis involves testing for existence of cointegration among the variables. In the fourth step causality between the revenue and expenditure is tested by the granger causality test.

4.1 Unit root test

The method of estimating an ordinary least square model is based on the assumption that the mean & variance of the variables being tested are constant over the time. Non stationary variables or unit root variables are those whose means and variances change over time, hence incorporating them in estimating OLS models would give misleading inferences.

The precondition of testing the existence of unit root of the series is done by Philips Perron test. The results of Philips Perron unit root test are summarised in Table 1. Null hypothesis of Unit root could be rejected only for first difference of the series implying majority of the series under consideration being I(1). However, Unit root tests without allowing for an existing break are biased towards non rejection of the null hypothesis (Perron, 1989). As the data is spanning across forty years there exists a strong likelihood that the data series under consideration are subject to structural breaks. Hence, misleading conclusions could be drawn out of standard unit root tests.

Table 1: Unit Root Test (in the Absence of Structural Breaks)

Central Finances - Philips-Perron test			
Series	Level (T Statistic)	First Difference (F.D) (T statistic)	Conclusion
LTR	-2.799531	-7.37*	I(1)
LTE	-2.292094	-6.53*	I(1)
State Finances - Philips-Perron test			

	LTOR			LTE	LCT				
Series	Level	F.D	Conclusion	Level	F.D	Conclusion	Level	F.D	Conclusion
AP	-1.79	(0.00)	I(1)	-2.50	(0.00)	I(1)	-2.99	(0.00)	I(1)
BR	-1.33	-6.44*	I(1)	-1.62	-6.09*	I(1)	-1.94	-6.44*	I(1)
GJ	-2.27	-6.96*	I(1)	-2.52	-8.21*	I(1)	-3.76**	--	I(0)
HR	-2.90	-6.45*	I(1)	-2.75	-8.41*	I(1)	-2.14	-8.17*	I(1)
KA	-2.34	-5.97*	I(1)	-3.68**	--	I(0)	-2.50	-7.21*	I(1)
KE	-2.08	-7.56*	I(1)	-4.06*	--	I(0)	-3.17	-9.11*	I(1)
MH	-0.40	-6.13*	I(1)	-1.49	-10.76*	I(1)	-1.20	-6.52*	I(1)
MP	-0.40	-5.86*	I(1)	-1.49	-6.20*	I(1)	-1.20	-6.46*	I(1)
OR	-2.01	-8.55*	I(1)	-2.75	-6.71*	I(1)	-2.09	-5.95*	I(1)
PB	-5.19*	--	I(0)	-3.40***	--	I(0)	-2.98	-7.89*	I(1)
RJ	-2.74	-7.71*	I(1)	-3.12	-9.22*	I(1)	-2.42	-6.73*	I(1)
TN	-2.08	-8.33*	I(1)	-2.16	-7.30*	I(1)	-2.52	-5.54*	I(1)
UP	-1.70	-6.59*	I(1)	-2.02	-6.99*	I(1)	-1.74	-5.79*	I(1)
WB	-2.02	-6.93*	I(1)	-4.13*	--	I(0)	-3.04	-13.16*	I(1)

Note: Asterisks (*), (**) and (***) denote statistically significant at 1%, 5% and 10% levels respectively.
Results reported are those with drift and trend.

4.2 Assessments of structural breaks in Fiscal variables

Perron (1989) proposed a modified Dickey fuller Unit root test allowing for a known exogenous structural break. However, Perron's approach of known assumption of the break date invalidates the distribution theory underlying conventional testing and is subject to 'data mining' problem (Christiano, 1992). Subsequent to this development, Zivot and Andrews (1992) have developed different methodology for endogenously determining the break date which was later extended to a two break alternative by Lumsdaine and Papell (1997). However these tests are based on the assumption that there are no breaks under the unit root null and critical values are derived accordingly. In case of an existence of a break under the null of unit root, 'size distortions' would be exhibited in a manner that rejection of null does not necessarily imply rejection of unit root per se, but would imply rejection of a unit root without breaks (Altinay, 2005; Nunes et al., 1997). In order to overcome this limitation, Lee &Strazicich (2003) have proposed a unit root test with two endogenous structural breaks which uses the Lagrange Multiplier (LM) test statistics and allows for breaks both under the null and the alternative hypothesis. Hence, stationarity can be concluded on rejection of unit root null based on this LM test.

Table 2: Unit Root Tests with two Structural Breaks (at Level)[1]

Central Finances					
Series	T- Statistic	Break Points	Critical Values at 1%	Critical Values at 5%	Result
LTR	-4.9119	2002, 2006	-6.16 to -6.45	-5.59 to -5.74	Unit Root

LTE	-4.7668	1985, 1994	-6.16 to -6.45	-5.59 to -5.74	Unit Root	
State Finances						
	LTOR		LTE		LCT	
Series	T- Statistic (Break Points)	Result	T- Statistic (Break Points)	Result	T- Statistic (Break Points)	Result
AP	-7.89 (1989, 2005)	I(0)	-6.97 (1987, 1995)	I(0)	-6.97 (1997, 2004)	I(0)
BR	-3.51 (1989, 2000)	Unit root	-5.58 (1984, 1998)	Unit root	-8.32 (1984, 1998)	I(0)
GJ	-6.03 (1990, 2000)	I(0)	-5.30 (1985, 2003)	Unit root	-8.35 (1986, 2002)	I(0)
HR	-7.67 (1993, 2000)	I(0)	-5.58 (1977, 1999)	Unit Root	-6.83 (1988, 2004)	I(0)
KA	-7.74 (1998, 2003)	I(0)	-6.25 (1984, 2004)	I(0)	-7.50 (1993, 2005)	I(0)
KE	-5.70 (1981, 2007)	I(0)	-6.67 (1989, 2001)	I(0)	-6.20 (1987, 1997)	I(0)
MH	-5.59 (1985, 2003)	I(0)	-6.03 (1990, 2007)	I(0)	-5.13 (2000, 2007)	Unit root
MP	-10.12 (1992, 2008)	I(0)	-6.71 (1992, 2003)	I(0)	-6.48 (1985, 1998)	I(0)
OR	-11.60 (1998, 2007)	I(0)	-6.23 (1994, 1999)	I(0)	-7.14 (1986, 1999)	I(0)
PB	-8.48 (1991, 2004)	I(0)	-7.01 (1980, 1987)	I(0)	-4.94 (1986, 2001)	Unit root
RJ	-7.05 (1986, 1995)	I(0)	-6.58 (1992, 2002)	I(0)	-6.70 (1989, 1997)	I(0)
TN	-5.53 (1995, 2003)	Unit root	-6.84 (1994, 2002)	I(0)	-7.39 (1986, 1997)	I(0)
UP	-5.71 (1988, 2002)	I(0)	-6.58 (1992, 2002)	I(0)	-6.49 (1985, 1992)	I(0)
WB	-7.37 (1997, 2007)	I(0)	-8.48 (1986, 1992)	I(0)	-6.58 (1992, 1999)	I(0)
Note: 1. Method applied is Lee and Strazicich's (2003)						

Table 2 and 3 contains the results for the LM test (full break model) with two endogenous breaks at level and first difference respectively. The results suggest that null hypothesis of unit root could be rejected for most of the series under consideration. In other words most of the series are stationary in presence of two structural breaks at 5% level of significance, suggesting that most of them are integrated of order 0 i.eI(0). This is in contrast to the results without structural breaks wherein most of the series were found to be of order I(1).

In case of Central Finances, the estimated break points for per capita expenditures are roughly clustered around two periods (a) Mid 1980s: As Indian economy emerged out of low growth syndrome of previous three decades due to initiation of some reform measures to boost domestic competitiveness coupled with a higher Government spending.(b) Mid 2000s: As India entered the 'boom phase' due to global liquidity and reforms payoff which led to an unprecedented level of FDI and fiscal space for higher expenditure by the government. The break points for per capita tax revenues are clustered around (a)1990s: Gulf war and instability led to higher current account deficits and fiscal contraction from 1990-91 to 92-93. Post this period growth impulse as a result of liberalisation/ Reforms created fiscal space for an upward trend in expenditure. (b) 2000s: US recession coupled with International sanctions created a bleak investment scenario impacting the Country's GDP growth rate and tax revenues.

In case of State Finances, different States have different regime shifts coinciding with the concerned State's response to the macroeconomic policy changes occurring in the Country. In general, domain knowledge suggests that States LTOR and LTE had shifts in 1980s: due to State led development spending; 1990s: CAD crisis and Economic reforms; mid 2000s: due to boom and enactment of FRBM; this observation is strongly suggestive of an indelible effect of policy reforms on improvement of per capita revenues. In general, Central transfers experienced

regime shifts around 1975, 1985, 2000 coinciding with the implementation of recommendation of 6th, 8th and 11th FC.

Table 3, contains the series which are I(1). The series which are of order I(1) are Centre (LTR and LTE), BR (LTOR and LTE), GJ (LTE), HR (LTE), MH (LCT), PB (LCT). However, In case of TN – LTOR, null hypothesis of unit root has not been rejected indicating further higher order of integration.

Table 3: Unit Root Tests with Two Structural Breaks (at First Difference)[1]

Central Finances						
Series	Break Points	T-Statistic	Critical Values at 1%		Critical Values at 5%	Result
LTR	1989, 2000	-10.39	-6.16 to -6.45		-5.59 to -5.74	Unit Root
LTE	1985, 2006	-8.08	-6.16 to -6.45		-5.59 to -5.74	I(0)
State Finances						
	LTOR		LTE		LCT	
Series	T-Statistic (Break Points)	Result	T-Statistic (Break Points)	Result	T-Statistic (Break Points)	Result
BR	-8.74 (1977,1989)	I(1)	-7.53 (1977, 2001)	I(1)	--	--
GJ	--	--	-7.76 (1978,2003)	I(1)	--	--
HR	--	--	-10.51 (1993, 2000)	I(1)	--	--
MH	--	--	--	--	-8.26 (1981,2003)	I(1)

PB	--	--	--	--	-7.44 (1988,2005)	I(1)
TN	5.47 (1989,2003)	Unit root	--	--	--	--
Note: 1. Method applied is Lee and Strazicich's (2003)						

4.3 Co integration test

Upon determining the order of integration of each variable, test of cointegration is carried out to examine if any long run relationship exists between the expenditure and the revenue streams. Kunitomo(1996) showed that, standard cointegration techniques are biased towards accepting null of no cointegration, in case of presence of structural breaks in the relationship and produce "spurious cointegration results". Hence, it is therefore deemed to apply cointegration techniques in the presence of structural breaks. Based on the order of integration of the series there are three combinations of co integration

a) I(1) Versus I(1)

b) I(0) versus I(0)

c) I(0) Versus I(1).

4.3.1 Gregory and Hansen (1996)

In case of I(1) versus I(1) it is decided to apply Gregory and Hansen (1996) cointegration procedure that allows for an endogenously determined structural break. This test depending on the nature of shift presents three models, where shift can be in a) intercept alone (C), b) in both trend and level shift (C/T) and c) full break or the regime shift model (C/S). It is decided to examine the cointegration aspect in accordance with an assumption of a full break.

Table 4: Gregory and Hansen (1996) Cointegration Tests with Structural Break

Model	Break Point	Test Statistic	Critical Value (5%) {10%}	Result*
Central Finances (Cointegration between LTR and LTE)				
LTR is dependent variable	1984	-4.199	-5.500{5.24}	Do not Reject the null hypothesis
LTE is dependent variable	1993	-4.680	-5.500{5.24}	Do not Reject the null hypothesis
State Finances: Bihar (Cointegration between LTOR and LTE)				
LTOR is dependent variable	1984	-5.541	-5.500{5.24}	Reject the null hypothesis
LTE is dependent variable	1988	-5.252	-5.500{5.24}	Reject the null hypothesis
*The null hypothesis being no Cointegration between Revenue and Expenditure streams				

The results are presented in table 4. In case of Central Finances, the results fail to reject the null hypothesis of no cointegration. However, in case of BR the test rejects the null hypothesis of no cointegration between LTOR and LTE indicating an existence of presence of a long run relationship.

Granger two steps

Granger two step procedure in the presence of two structural breaks is used to test the cointegration of two series which are of same order of cointegration and I(0). To examine the co integration between LTOR and LTE, the following cointegration regression is estimated by the OLS method:

$$LTE_{1t} = \mu_1 + \mu_2 D_1 + \mu_3 D_2 + \alpha_1^T LTOR_{1t} + \alpha_2^T D_1 LTOR_{1t} + \alpha_3^T D_2 LTOR_{1t} + U_{1t} \ldots\ldots\ldots(a)$$

Where D_1= {0, if t < [Break Date]; 1, if t ≥ [Break Date]}

$LTE_{1t} = \mu_1 + \mu_2 D_1 + \mu_3 D_2 + \alpha_1^T LTOR_{1t} + \alpha_2^T D_1 LTOR_{1t} + \alpha_3^T D_2 LTOR_{1t} + V_{1t}$……..(b)

Where D_2= {0, if t < [Break Date]; 1, if t ≥ [Break Date]}

The residuals U_{1t} and $V_{1t}$from regressions (a) and (b) are tested for stationarity using the standard Philips Perrontest. When both the residuals are found to be I(0), it can be concluded that both the series are cointegrated and therefore there is a long run relationship existing between them.

In case only U_{1t} (V_{1t}) is found to be I(0), then longterm relationship is only possible when LTOR (LTE) is the independent variable and going forward causality relationship is only checked from LTOR to LTE (LTE to LTOR).

The results of unit root test of the residuals are as in table 5. In case of cointegration between LTOR and LTE, there exists a long run relationship in case of KA, KE, MH, MP, OR, PB, RJ, UP. However, In case of AP long run relationship only exists when LTE is dependent variable. In case of WB long run relationship exists only when LTOR is a dependent variable. In case of cointegration between LCT and LTE, there exists a long run relationship between AP, KA, KE, OR, RJ, TN, UP and WB. In case of MP, long run relationship only exists when LTE is the dependent variable.

Table 5: Granger Two Step Procedure with Two Structural Breaks

State Finances - Philips-Perron Unit Root Test For Residuals								
	LTOR -»LTE		LTE -» LTOR		LCT -» LTE		LTE -»LCT	
Series	T Stat	Conclusion	T Stat	Conclusion	T Stat	Conclusion	T Stat	Conclusion
AP	-2.982	Unit Root	-3.776**	I(0)	-4.221*	I(0)	-3.81**	I(0)
KA	-5.020*	I(0)	-4.867*	I(0)	-6.748*	I(0)	-7.32*	I(0)

KE	-4.825*	I(0)	-4.526*	I(0)	-3.41***	I(0)	-4.53*	I(0)
MH	-5.50*	I(0)	-8.40*	I(0)	--	--	--	--
MP	-3.55**	I(0)	-3.87**	I(0)	-2.457	Unit Root	-3.56**	I(0)
OR	-5.09*	I(0)	-3.37***	I(0)	-5.39*	I(0)	-4.55*	I(0)
PB	-5.04*	I(0)	-5.35*	I(0)	--	--	--	--
RJ	-5.05*	I(0)	-5.13*	I(0)	-4.53*	I(0)	-4.18**	I(0)
TN	--	--	--	--	-7.62*	I(0)	-4.08**	I(0)
UP	-4.180**	I(0)	-4.972*	I(0)	-5.857*	I(0)	-4.314*	I(0)
WB	-5.695*	I(0)	-2.654	Unit Root	-5.108*	I(0)	-3.84**	I(0)
Note: Asterisks (*), (**) and (***) denote statistically significant at 1%, 5% and 10% levels respectively. 4. Results reported are those with drift and trend.								

ARDL

Cointegration amongst variables whose series are integrated of order I(0) versus I(1) is examined by applying the ARDL bounds testing (but without any consideration of structural breaks in the cointegrating relationship) developed by Pesaran et al. (2001). The advantages of using this approach are that it can be applied irrespective of the order of integration of regressors (Pesaran&Pesaran, 1999) and it performs better than the other test in small samples (Hang, 2002).
The ARDL framework is as follows:

$$\Delta LTOR = \propto_0 + \sum_{j=1}^{n} b_j \, \Delta \, LTOR_{t-j} + \sum_{j=0}^{n} c_j \, \Delta \, LTE_{t-j} + \delta_i LTOR_{t-i} + \delta_i LTE_{t-i} + \in_{it}$$

The parameters δ_i where i=1,2,3 are the corresponding long run multipliers, while the parameters b_j, c_j are the short run dynamic coefficients of the underlying ARDL model. We test the null of no cointegrationi.e$H_0: \delta_1 = \delta_2 = 0$ using the F-test.

ARDL model testing procedure starts with identifying the optimal lag length by means of various criteria's such as Schwartz Bayesian Criteria and Akaike Information Criteria. In the second stage, F-statistic of bounds tests is computed and compared with the critical values tabulated by Pesaranet al. (2001). In case the F-statistic exceeds the upper critical value, the null hypothesis of no cointegration can be rejected. Similarly, in case the F-statistic falls below the lower critical value, the null hypothesis is not rejected. Finally, the result is inconclusive if the F stat falls between these two bounds.

The results of cointegration test based on ARDL bounds test is presented in Table 6. In case of a long term relationship between expenditure and own revenue, null hypothesis of no cointegration is rejected in both the states of GJ and HR, when LTE is the dependent variable, indicating the presence of a long run relationship only when LTE is dependent variable. In case of relationship between expenditure and Central transfers, there exists no long run relationship in case of States of MH and

PB. In case of BR long run relationship exists only when LTE is a dependent variable. In case of GJ and HR long run relationship exists only when LCT is a dependent variable.

Table 6: F and W Statistics for the Cointegrating Relationship using the ARDL

State Finances												
	Relationship between Expenditure and Own Revenue						Relationship between Expenditure and Central Transfers					
	LTE -> LTOR			LTOR -> LTE			LTE -> LCT			LCT -> LTE		
State	F	W	Re	F	W	Re	F	W	Re	F	W	Re
GJ	1.35	8.11	DR	3.85	23.12	R	3.89	23.34	R	1.08	6.52	DR
HR	2.72	16.32	DR	4.10	24.62	R	4.43	26.62	R	1.86	11.20	DR
TN	--	--	--	--	--	--	--	--	--	--	--	--
BR	--	--	--	--	--	--	0.62	3.73	DR	3.92	23.55	R
MH	--	--	--	--	--	--	1.41	8.48	DR	0.38	2.28	DR
PB	--	--	--	--	--	--	2.32	13.95	DR	0.94	5.65	DR

F: F statistic; 95% Critical Value: {2.98, 4.39}; 90% Critical Value {2.50, 3.69}
W: W statistic; 95% Critical Value: {17.88, 26.39}; 90% Critical Value: {15.04, 22.19};
TN: F: 95% Critical Value: {3.06,4.39}; 90% Critical Value: {2.53, 3.72}
TN: W: 95% Critical Value: {18.38, 26.35}; 90% Critical Value:{15.21, 22.32}
Re: Result
The null hypothesis being no cointegration between Revenue and Expenditure; R: Reject the Null hypothesis; DR: Don not Reject the Null hypothesis

4.4 Granger causality test

The possible direction of causation is assessed with the granger (1969) causality test, contingent on the occurrence of cointegration. The granger (1969) causality test in the context of LTOR and LTE can be arithmetically represented as follows:

$$LTOR_t = \propto + \sum_{i=1}^{p} \beta_i LTOR_{t-i} + \sum_{j=1}^{q} \gamma_j LTE_{t-j} + U_{1t}$$

$$LTE_t = \varphi + \sum_{i=1}^{p} \theta_i LTOR_{t-i} + \sum_{j=1}^{q} \delta_j LTE_{t-j} + U_{2t}$$

Where U_{1t} and U_{2t} are mutually uncorrelated terms, t denotes the time period and i and j denotes the number of lags. The null hypothesis is γ_j= 0 for all j's and $\theta_i = 0$ for all i's versus alternate hypothesis of $\gamma_j \neq 0$ and $\theta_i \neq 0$ for at least some j's and i's. If the coefficientγ_j's are statistically significant but θ_i's are not, then LTE causes LTOR. In the reverse case, LTOR causes LTE. But if both γ_j and θ_i are statistically significant, then there is a bidirectional causality existing between LTOR and LTE. In case both γ_j and θ_i are statistically insignificant then there is an institutional separation between LTE and LTOR.

Table 7: Granger Causality Test

		F Value (P Value)	Result			
Centre	LTE -> LTR	--	--			
	LTR -> LTE	--	--			
State Finances		F Value (P value)	Result		F Value (P value)	Result
AP	LTE -» LTOR	0.82 (0.37)	DR	LTE -» LCT	14.27 *** (0.00)	R
	LTOR -» LTE	--	--	LCT -» LTE	1.14(0.29)	DR
BR	LTE -»	0.00 (0.98)	DR	LTE -»	--	--

	LTOR			LCT		
	LTOR -» LTE	3.76 (0.06)*	DR	LCT -» LTE	14.83*** (0.00)	R
HR	LTE -» LTOR	--	--	LTE -» LCT	4.41** (0.04)	R
	LTOR -» LTE	4.14** (0.0493)	R	LCT -» LTE	--	--
GJ	LTE -» LTOR	--	--	LTE -» LCT	8.59*** (0.00	R
	LTOR -» LTE	10.78*** (0.00)	R	LCT -» LTE	0.85 (0.36)	DR
KA	LTE -» LTOR	1.03 (0.31)	DR	LTE -» LCT	13.13*** (0.00)	R
	LTOR -» LTE	21.60*** (0.00)	R	LCT -» LTE	0.00 (0.98)	DR
KE	LTE -» LTOR	2.02 (0.16)	DR	LTE -» LCT	--	--
	LTOR -» LTE	2.09 (0.15)	DR	LCT -» LTE	0.03 (0.85)	DR
MH	LTE -» LTOR	0.17 (0.67)	DR	LTE -» LCT	--	--
	LTOR -» LTE	15.39*** (0.00)	R	LCT -» LTE	--	--
MP	LTE -» LTOR	0.83 (0.36)	DR	LTE -» LCT	2.50 (0.12)	DR
	LTOR -» LTE	0.40 (0.52)	DR	LCT -» LTE	--	--
OR	LTE -» LTOR	--	--	LTE -» LCT	0.52 (0.47)	DR

	LTOR -» LTE	3.04* (0.08)	R	LCT -» LTE	4.14** (0.0494)	R
PB	LTE -» LTOR	3.18* (0.08)	R	LTE -» LCT	--	--
	LTOR -» LTE	0.99 (0.32)	DR	LCT -» LTE	--	--
RJ	LTE -» LTOR	0.03 (0.86)	DR	LTE -» LCT	0.61 (0.43)	DR
	LTOR -» LTE	4.04* (0.05)	R	LCT -» LTE	4.58** (0.04)	R
TN	LTE -» LTOR	--	--	LTE -» LCT	4.00* (0.05)	R
	LTOR -» LTE	--	--	LCT -» LTE	0.02 (0.87)	DR
UP	LTE -» LTOR	0.34 (0.56)	DR	LTE -» LCT	4.07* (0.05)	R
	LTOR -» LTE	5.14** (0.03)	R	LCT -» LTE	0.15 (0.69)	DR
WB	LTE -» LTOR	--	--	LTE -» LCT	5.530** (0.02)	R
	LTOR -» LTE	1.40 (0.24)	DR	LCT -» LTE	1.53 (0.22)	DR
Null Hypothesis: H0: x-» y:x does not Granger cause y. DR: Do not reject Null Hypothesis R: Reject Null Hypothesis						

The results of the F-statistic of Granger causality test is reported in table 7. In case of Central Finances as there is no cointegration existing between LTR and LTE, absence of causal linkage could be concluded. In case of LTE and LTOR, we find

unidirectional causality flowing from LTOR to LTE for HR, BR, GJ, KA, MH, OR, RJ and UP. PB is the only state wherein there is a unidirectional causality moving from LTE to LTOR. In case of LTE and LCT, we find unidirectional causality flowing from LTE to LCT for AP, HR, GJ, KA, TN, UP, WB. Causality leading from LCT to LTE is found only in States of BR, OR, RJ.

Table 8: Conclusion

	Causality	
Centre	Institutional Separation	
State Finances	Own Revenue and Expenditure	Central Transfers and Expenditure
AP	Institutional Separation	Expenditure drives Central Transfers
BR	Tax and Spend	Central transfers drive Expenditure
HR	Tax and Spend	Expenditure drives Central Transfers
GJ	Tax and Spend	Institutional Separation
KA	Tax and Spend	Expenditure drives Central Transfers
KE	Institutional Separation	Institutional Separation
MH	Tax and Spend	Institutional Separation
MP	Institutional Separation	Institutional Separation
OR	Tax and Spend?	Central transfers drive Expenditure
PB	Spend and Tax	Institutional Separation
RJ	Tax and Spend	Central transfers drive Expenditure
TN	--	Expenditure drives Central Transfers
UP	Tax and Spend	Expenditure drives Central Transfers
WB	Institutional Separation	Expenditure drives Central Transfers

Concluding Remarks and Policy implications

This study investigates the nature and direction of relationship between revenue and expenditure streams in India at Central and State level over the period 1972 - 2011. The analysis relied on the time series techniques like Unit root test (in presence of two structural breaks- Lee &Strazicich, 2003), Cointegration techniques that allow for endogenously determined structural breaks (Gregory and Hansen, 1996 & Granger two step method), ARDL technique and Granger causality test. The concluding results are tabulated in Table 8.

In the United States, the period since 1970, several major institutional reforms were undertaken which includes Congressional Budget and Impoundment Act, 1974 and Graham Rudman laws to create causal interdependence between expenditure and taxes (Hoover and Sheffrin, 1992). However, the institutional reform measures were not very successful. Similarly, in the Indian perspective there appears enough evidence to show that measures like FRBM and phase out of adhoc treasury bills do not appear to have been successful at the Central level. The Initial target of completely eliminating revenue deficit by FY 2008-09 has not yet been achieved. The results of this paper indicate existence of institutional separation between expenditure and revenue streams at the Central level implying that revenue decisions are made independent of expenditure decisions and vice versa. This missing causal relationship between the expenditure and Revenue remains an important concern area, indicating problems in the unconstrained spending which is being met by increased borrowing rather than revenues, leading to budget deficits. This tendency of revenue expenditure imbalance shows a gradual shift towards permanent deficit finance which would lead to an increase in debt stock and trigger macro-economic problems adversely effecting savings and investment and stoking up inflation and interest rates thus leading to a costly and abrupt adjustment down the road. Central Government should take the lead to motivate the States towards fiscal discipline, howeverin India the scenario is completely different.

States have effectively implemented the Fiscal consolidation objectives and have been majors drivers of public investment in the past few years. It is worth mentioning that Finance Commission an independent grant allocation body through an effective devolution mechanism paved a way for fiscal discipline at the State level. The contribution of Finance Commission is in restructuring the fiscal transfer system by incentivising fiscal responsibility. Though, the transfer system is guided by the parameters of efficiency and equity, traditionally it was heavily skewed by equity parameters. It is generally not the case that full equalisation is efficient (Bucovetsky and Smart, 2002). Historically, many federal countries with Intergovernmental transfers systems provide incentives for lower level governments to raise tax effort (Smart,1998). On inclusion of the parameters of 'tax effort' and 'fiscal discipline' in the devolution criteria with an upward trajectory for the weightage over time (10th FC (10%), 11th FC (12.5%), 12th FC (15%), 13th FC (17.5%) coupled with a phased reduction in normalisation grants by linking equalisation transfers to "fiscal capacity" provided an incentive for better fiscal management.

In case of causal relationship between own revenue and expenditure, results indicate tax and spend hypothesis in all the States except AP, MP, PB, KE and WB. The absence of tax to spend relationship in case of fiscally stressed states (FSS) of PB, KE and WB is not surprising. KE and WB exhibit causal independence between expenditure and revenue streams, where as there is causality moving from expenditure to revenue in case of PB. Two non FSS, where in tax and spend hypothesis is non-existent are AP and MP. This particular aspect underscores the important role of revenues in the fiscal management at State level. The evidence implies that the size of the government at the state level is determined by the resource supply and not by expenditure demand. This finding is consistent with Westerlund et al. (2011) study at State and Local level in United States despite the fact that unlike in USA the constitutional and legislative limitations to constrain deficits are a recent phenomenon in India. The presence of tax and spend

hypothesis even in case of Lower income states despite having a higher share of spending on 'regrettable necessities' conveys that resource supply plays an exogenous role and expenditure bears the adjustment burden.

In case of relationship between Central transfers and expenditure, in most of the poorer states (OR, RJ, BR) there is causality from Central transfers to expenditure. UP and MP are exceptions where there is an evidence of institutional separation hypothesis. The revenue base in the poorer states is smaller but the expenditure responsibilities are larger because of lower private capacity to pay for various services and the requirement for larger public investments for development. In a transfer scheme with a suitable degree of equalisation, it is on expected lines that Central transfers drive expenditure decisions in the states that have relatively lower fiscal capacities. In case of fiscally stressed states of KE and PB, institutional separation exists between central transfers and expenditure. However, in case of WB, expenditure has driven Central transfers. In the better off States (Higher and Middle income States) expenditure has driven Central transfers in exception to MH and GJ which displayed Institutional separation. A finding, that is not too surprising, bearing in mind how the grant system is designed and evolved over time. The central transfers are partly connected to factors that the State governments can influence. The major reasons could have been due to a) higher plan transfers as these states had higher fiscal space for States portion of Plan investments b) This scenario due to Finance Commission transfers, reflect a moral hazard problem as the data set looked in to was from 1973 to 2011. The normalization procedure to determine the finance commission transfers was only implemented since 1990 from Ninth FC and many modifications have been in place since 11th and 12th FC which addressed the moral hazard problem to a major extent. Hence, the period after 2000's may not support the moral hazard theory.

Clearly more extensive research will be needed to confirm whether it is the institutional structure, preferences or constraints which affected the state government behaviour. It may be that the institutional structure of states has

evolved to have the government act responsibly by limiting expenditures to equal revenue. Prima facie, it is striking that this empirical evidence is not very consistent with the intuitive assumption that Centre is a well-meaning Institution and fiscally more responsible than States. Unfortunately, institutionally incentivising central government to undertake reforms and solving the problem of soft budget constraint is difficult and only electoral dissatisfaction arising from poor fiscal policy calibration can cause the motivation (Rao &Sen, 2011). Long run sustainable growth is a powerful tool to achieve fiscal sustainability and quality of Institutions is a key determinant to address structural weaknesses in the economy. The results of this study refute the prevailing wisdom that States are fiscally profligate and call for a discussion whether to empower states with further fiscal responsibilities? Given the existing dynamics of spending there is a scope for rationalising Central Government expenditure and a greater accommodation for states in the development spending as states understand priorities well and being closer to their constituents they could foster effective spending and better public service delivery. This graduation process is however very arduous and require clear economic leadership and a strong political consensus.

Acknowledgements

I would like to thank Dr.Jaydeep Mukherjee for useful comments and suggestions on the earlier versions of this paper.

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