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**DEPARTMENT OF ECONOMICS**

**ANALYZING THE FISCAL STANCE OF STATE  
GOVERNMENTS IN INDIA: EVIDENCE FROM FOURTEEN  
MAJOR STATES**

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Analyzing The Fiscal Stance Of State Governments In India: Evidence From Fourteen Major States

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**Abstract**

*Sustainability of government finances is conceptually associated with the idea of solvency and assesses whether governments can continue with their existing fiscal policies indefinitely and remain solvent. The paper employs the deficit indicators approach to analyze sustainability of the fiscal stance of the fourteen major non special category State governments (individually). Four major deficit indicators viz. the revenue deficit, the primary revenue balance, the primary deficit and the gross fiscal gap were examined using the Gregory-Hansen test of cointegration. Evidence from the fourteen major States using a time series of annual data for 1971-2006 presents a disconcerting fiscal scenario. Less than a third of the States had a sustainable revenue deficit, primary deficit and primary revenue balance while the gross fiscal gap was found to be sustainable for just four of the fourteen States thereby reinforcing the serious concerns raised on the sustainability of State level (sub-national) finances in India.*

**Key Words:** fiscal sustainability, Gregory-Hansen test for cointegration

**JEL Code(s):** H6

## I Introduction

The perilous fiscal health of State governments in India over the past few years has led to concerns regarding the sustainability of their government finances. The notion of sustainability is conceptually synonymous with the concept of solvency. Alternatively, fiscal sustainability analysis *'relates to a government's ability to indefinitely maintain the same set of policies while remaining solvent'* (Burnside, 2005). Although revenue deficits emerged at the State (sub-national) level in the later half of the 1980s and have been persistent ever since, the progressive deterioration in State finances since the late 1990s focused attention of policy makers to fiscal reform at the State level. The six year period from 1997-98 to 2002-03 has been the worst for State finances ó state deficits recorded their highest levels while central transfers to States were at their lowest. Several factors can be attributed to worsening State finances, viz. growing revenue expenditure, particularly wages, salaries and pensions arising out of the implementation of the awards of the Fifth Pay Commission which saw salaries and pensions rising by about 60 percent over three years; losses of state public sector enterprises (especially State Electricity Boards as also State Road Transport Corporations) and declining transfers from the central government. Besides, States were competing with each other in *'exemption proliferating tax competition'* resulting in a fall in the level of States own tax revenue relative to GDP. Further, subsidies provided by States are largely implicit and inadequate user charges have contributed to the deterioration in State fiscal health (Government of India, 2004). The widening gap between revenues and expenditures saw States, consequently, resorting to borrowing at high nominal interest rates resulting in rising debt servicing costs which further exacerbated the worsening fiscal imbalance. For instance the weighted average of interest rates on State government dated securities was in the range of 12-fourteen% over 1995-96 to 1999-2000 and the internal debt of State governmentsø more than doubled from Rs.35875 crores in 1994-95 to Rs. 77190 crores by 1998-99. Table 1 shows the deficit profile of the Statesøfor different deficit indicators

improvement in States' fiscal situation on the deficit  
2004-05.

**Table 1 Major Deficit Indicators of State Governments**  
(Percent of GDP)

<b>Year</b>	<b>Revenue Deficit</b>	<b>Primary Deficit</b>	<b>Gross fiscal gap</b>
<b>1990-91 to 1994-95</b>	<b>0.7</b>	<b>1.1</b>	<b>2.8</b>
<b>1995-96 to 1997-98</b>	<b>1.0</b>	<b>0.9</b>	<b>2.8</b>
<b>1998-99 to 2003-04</b>	<b>2.5</b>	<b>1.8</b>	<b>4.3</b>
<b>2004-05</b>	<b>1.24</b>	<b>0.68</b>	<b>3.42</b>
<b>2005-06</b>	<b>0.20</b>	<b>0.17</b>	<b>2.52</b>
<b>2006-07</b>	<b>-0.60</b>	<b>-0.38</b>	<b>1.87</b>
<b>2007-08 (RE)</b>	<b>-0.48</b>	<b>0.11</b>	<b>2.29</b>
<b>2008-09 (BE)</b>	<b>-0.54</b>	<b>0.08</b>	<b>2.12</b>
<b>Source: Reserve Bank of India, Handbook of Statistics on the Indian Economy 2005-06 and 2007-08.</b>			

Several initiatives were implemented to improve State finances such as the creation of a Fiscal Reform Facility (2000-01 to 2004-05) to provide incentives to States to undertake Medium Term Fiscal Reform; the introduction of a debt swap scheme over 2002-03 to 2004-05 and enactment of institutional measures such as adoption of a rule-based fiscal policy through the enactment of Fiscal Responsibility Legislations (FRLs) (26 of the 28 States with the exception of Sikkim and West Bengal have enacted FRLs till date ó most states have set their targets along the lines of the recommendations of the Twelfth Finance Commission); setting up of consolidated sinking funds and guarantee redemption funds. The Twelfth Finance Commission (TFC) has also prescribed a time bound plan for fiscal restructuring of State finances - elimination of revenue deficits by March 31, 2009 and a gross fiscal gap target of 3% of GDP by March 31, 2010 - offer hope for achieving

part from these measures, States have also focused on widening and rationalizing their tax systems, improving the efficiency of their tax administration, simplification of their tax laws and focusing on better compliance along with expenditure containment by trying to reduce administrative expenditure, non-plan revenue expenditure, non-development expenditure and growing pension liabilities. State governments, generally, face a *hard budget constraint* as they cannot resort to deficit financing and their access to borrowing is regulated, however, as per the recommendations of the Twelfth Finance Commission, state governments would henceforth access the market directly and each State's capability in raising resources will be market determined and based on their respective financial health. Hence it becomes imperative for States to have viable fiscal figures (Reserve Bank of India, 2006; Reserve Bank of India, 2007).

The paper seeks to examine the fiscal sustainability of State level finances for each of the fourteen major non-special category States which together account for nearly 95 percent of the total population and traverse the space of high, middle and low income States. Fiscal sustainability is examined using 15 fiscal indicators which are generally expressed as ratios of gross state domestic product at current prices and can be classified into four major groups, namely, (i) deficit indicators (ii) revenue performance (iii) expenditure pattern and (iv) debt position (Reserve Bank of India, 2007). The *deficit indicators approach*, in turn, analyzes fiscal health of States by looking at a spectrum of deficit indicators of which the paper focuses attention on the four major deficit indicators each of which provides insight into a different facet of fiscal health viz. the revenue deficit, the primary deficit, the gross fiscal gap and the primary revenue balance.

A comparison of the fiscal health (Table 2) through the four deficit indicators, viz. revenue deficit, primary deficit, primary revenue balance and gross fiscal gap across the fourteen major non-special category states vis-à-vis their median values for the period 2003-04 to 2005-06 (on average) points to a rather disconcerting scenario. Nearly half of the fourteen major states considered have a revenue deficit, gross fiscal gap and primary revenue balance which is greater than the median value. Fewer States (only four of the fourteen states) have a primary deficit which is higher than the median value indicating

the fiscal reform initiatives. A State-wise comparison of 2003-04 to 2005-06 shows wide variations. Five states - Andhra Pradesh, Haryana, Karnataka, Orissa and Tamil Nadu have fiscal figures that are either better than or at least match the median value on all the four deficit indicators. Interestingly, Bihar except for its gross fiscal gap has deficit figures that are better than or at least match the median value on the other three deficit indicators. While Madhya Pradesh (revenue deficit and primary revenue balance), Punjab (primary deficit and gross fiscal gap) have performed well on at least 2 deficit indicators; Gujarat (gross fiscal gap), Kerala (gross fiscal gap), Rajasthan (primary revenue balance) and West Bengal (primary deficit) have fiscal figures matching the median value on just one deficit indicator. Whereas, deficit figures for Maharashtra and Uttar Pradesh are higher than the median value on all the four deficit indicators. It is important to note here, though, that the median values are higher than the recommendations of the TFC (and most States have their FRL targets that coincide with the recommendations of the TFC).

**Table 2 Major Deficit Indicators 2003-04 to 2005-06 (Average)**

(Percent of GSDP)

<b>States</b>	<b>RD</b>	<b>PD</b>	<b>PRB</b>	<b>GFG</b>
<b>AP</b>	<b>1.0</b>	<b>0.5</b>	<b>-2.4</b>	<b>3.9</b>
<b>BIH</b>	<b>0.0</b>	<b>-0.8</b>	<b>-6.1</b>	<b>5.4</b>
<b>GUJ</b>	<b>1.6</b>	<b>1.2</b>	<b>-1.7</b>	<b>4.4</b>
<b>HAR</b>	<b>-0.2</b>	<b>-0.6</b>	<b>-2.7</b>	<b>1.9</b>
<b>KAR</b>	<b>-0.7</b>	<b>0.1</b>	<b>-3.2</b>	<b>2.7</b>
<b>KER</b>	<b>3.5</b>	<b>1.2</b>	<b>0.0</b>	<b>4.7</b>
<b>MP</b>	<b>1.0</b>	<b>2.7</b>	<b>-2.4</b>	<b>6.0</b>
<b>MAH</b>	<b>2.0</b>	<b>2.5</b>	<b>-0.3</b>	<b>4.8</b>
<b>ORI</b>	<b>0.9</b>	<b>-2.5</b>	<b>-4.7</b>	<b>3.1</b>
<b>PUN</b>	<b>3.1</b>	<b>0.2</b>	<b>-1.1</b>	<b>4.4</b>
<b>RAJ</b>	<b>1.9</b>	<b>1.1</b>	<b>-2.5</b>	<b>5.5</b>
<b>TN</b>	<b>0.1</b>	<b>0.0</b>	<b>-2.4</b>	<b>2.4</b>
<b>UP</b>	<b>4.0</b>	<b>1.3</b>	<b>-0.4</b>	<b>5.7</b>
<b>WB</b>	<b>4.0</b>	<b>0.8</b>	<b>-0.6</b>	<b>5.4</b>

0.8

-2.4

4.7

**RD - Revenue Deficit, PD - Primary Deficit, PRB - Primary Revenue Balance, GFG- Gross Fiscal Gap**

**1. Negative sign indicates surplus in deficit indicators 2. Median Values are for the Non-Special Category States.**

**Source: Reserve Bank of India, State Finances: A Study of Budgets of 2007-08.**

Given the rather disparate fiscal performance of the fourteen major non-special category States, it seems interesting to examine the fiscal sustainability of State level government finances

The four deficit measures taken up for consideration are defined as follows:

$$RD = \text{Revenue Expenditures} \text{ } \ominus \text{ Revenue Receipts} \quad (1)$$

$$GFG = (\text{Revenue Expenditure} + \text{Capital Expenditure}) \text{ } \ominus \text{ Revenue Receipts} \quad (2)$$

Following Karnik (2005), capital expenditure includes discharge of internal debt and repayments of loans to the Centre as both of these are committed expenditures of the States and hence should be included whilst considering the sustainability of State finances.

$$PD = GFG \text{ } \ominus \text{ Interest Payments} \quad (3)$$

$$= [(\text{Revenue Expenditure} \text{ } \ominus \text{ Interest Payments}) + \text{Capital Expenditure}] \text{ } \ominus \text{ Revenue Receipts}$$

$$PRB = RD \text{ } \ominus \text{ Interest Payments} \quad (4)$$

$$= [(\text{Revenue Expenditures} \text{ } \ominus \text{ Interest Payments}) \text{ } \ominus \text{ Revenue Receipts}]$$

Fiscal policy is constrained by the need to finance the deficit and any deficit could be financed if it were possible for the government to borrow without restraint and finance the interest on debt by additional borrowing or engage in Ponzi financing. However,

ing in the form of an inter-temporal budget constraint  
constraint). If the inter-temporal budget constraint is  
violated then expenditures must be reduced and/or revenues must be increased at some  
point in time. Hence, as long as government expenditure and revenue are stationary in  
first differences and are cointegrated, the fiscal position can be termed sustainable.  
Cointegration between revenue and expenditure limits the extent to which revenues and  
expenditures can deviate from each other over time and indicates that there is a  
mechanism that pushes government finances towards the equilibrium level as defined by  
the inter-temporal budget constraint. Absence of a cointegrating relationship would hence  
indicate that the fiscal position is not sustainable.

The paper, thus, contributes to the to the literature on sustainability of State level finances  
in India by examining sustainability using the *deficit indicators approach* for each of the  
fourteen major non-special category states (individually) in the Hakkio and Rush (1991)  
framework by applying unit root and cointegration tests with structural break such as the  
Zivot-Andrews (ZA) and Gregory-Hansen (GH) tests. Section II.A of the paper provides  
the theoretical framework and a brief description of the Hakkio- Rush (1991) approach  
and Section II.B discusses in brief the literature on sustainability studies in the Indian  
context. Section III contains the empirical evidence for the fourteen States while Section  
IV concludes the paper. Appendix A lists the fourteen States and variables used in the  
paper while Appendix B contains the detailed results of the unit root tests.

## II.A Theoretical Framework

Government deficits are usually money and/or bond financed. Sustainability of the  
debt/deficit can be ascertained through the inter-temporal budget constraint. For  
simplicity, if we assume away money financing (in other words, assume that deficits are  
only bond financed), then the budget constraint of the government would be as follows:

$$G_t + (1 + r_t)B_{t-1} = R_t + B_t \tag{5}$$

where,  $G_t$  government expenditures                       $B_t$  government debt at the end of period  $t$   
 $r_t$  rate of interest in period  $t$                                $R_t$  government revenue

If we follow Wilcox (1989), the accounting identity that describes the accumulation of  
government debt would be:



(6)

of the government

If  $q_t$  is the discount factor from period  $t$  back to period zero and is known at time  $t$ , then

$$q_t = \prod_{j=0}^{t-1} (1 + r_j)^{-1}, q_0 = 1 \quad (7)$$

If each variable in (6) is discounted by  $q_t$  back to period 0 and multiplying (6) throughout by  $q_t$  we obtain:

$$q_t B_t = q_{t-1} B_{t-1} + q_t (G_t - R_t) \quad (8)$$

Let  $D_t$ , now be the discounted value of the debt and  $DEF_t$  be the discounted value of the non-interest (primary) deficit, then (8) can be written as:

$$D_t = D_{t-1} + DEF_t \quad (9)$$

i.e. the change in the discounted value of debt should equal the discounted value of the primary deficit

Iterating (9)  $N$  periods forward gives

$$D_{t+N} = D_{t-1} + DEF_t + \sum_{j=1}^N DEF_{t+j} \quad (10)$$

$$D_{t+N} = D_t + \sum_{j=1}^N DEF_{t+j} \quad (11)$$

$$D_t = D_{t+N} - \sum_{j=1}^N DEF_{t+j} \quad (12)$$

If the first term ( $D_{t+N}$ ) of (12) tends to zero in the limit (equation 13), then the current value of the debt equals the sum of expected future non-interest deficits or surpluses.

$$\lim_{N \rightarrow \infty} E_t D_{t+N} = 0 \quad (13)$$

$$D_t = \sum_{j=1}^{\infty} E_t DEF_{t+j} \quad (14)$$

Equation (14) is the present value borrowing (or the inter-temporal borrowing) constraint, which holds when the expectation of the discounted debt tends to zero in the limit. Whilst looking at the issue of sustainability of the deficit, we are testing for violations of (13) or (14). According to Hamilton and Flavin (1986), if (13) or (14) were violated in data, they conclude that the borrowing constraint is not satisfied and hence the fiscal position not

allow for Ponzi financing and hence the current debt in the future. Under the Ponzi scheme, government issues new debt when the old debt retires and still continues to finance deficit through issuance of debt. Therefore if the limit term is not zero in (13) then government indulges in a Ponzi scheme. Alternatively, while equations (13) and (14) may exclude a permanent primary deficit, they may not exclude the permanent occurrence of a deficit measure inclusive of interest payments as long as the debt stock grows at a rate that is less than the rate of interest (Olekalns and Cashin, 2000).

Hakkio and Rush (1991) provide an alternative framework to test for sustainability of the government budget constraint. According to Hakkio and Rush the deficit is sustainable when government revenues and expenditures inclusive of interest payments are each I(1) processes and cointegrated. They estimate the following cointegrating regression between federal government revenue and expenditure for the United States over the period 1950:II to 1988:IV and for two sub-samples :1964:I to 1988:IV and 1976:III to 1988:IV

$$R_t = a + bGG_t + \varepsilon_t \quad (15)$$

Where, R- federal government revenues GG- federal government expenditure inclusive of interest on debt

They seek to determine if  $\hat{b} = 1$  in equation (15) and  $\varepsilon_t$  are stationary i.e. are GG and R cointegrated. When GG and R are non-stationary then cointegration is a necessary condition to satisfy the present value borrowing constraint. However, Hakkio and Rush (p.433) show that when  $\hat{b} < 1$  the limit of the undiscounted value of debt equals infinity and as the undiscounted value of debt gets large the incentive to default on part of the government increases especially when revenues and expenditures are expressed relative to real GNP or population. Thus, though  $\hat{b} < 1$  is consistent with a strict interpretation of the government's inter-temporal budget constraint, it is inconsistent with the requirement that the debt-GNP ratio must be finite and therefore the government will find it difficult to market its debt.

## II.B A Brief Review of Fiscal Sustainability Studies for India

Some of the recent studies that have examined fiscal inter-temporal budget constraint. Buitert and Patel (1992) tested the sustainability of overall discounted public sector debt for 1971-1989 using stationarity tests. The paper finds that irrespective of the alternative interest rate measures used to discount the debt, the overall public sector debt was found to be unsustainable. Rajaraman and Mukhopadhyay (2000), test the public debt-GDP ratio of Central and State governments (combined) over the period 1952-1998 for sustainability using stationarity tests and conclude that the debt-GDP ratio of combined government is not sustainable. Olekalns and Cashin (2000) adopt the Hakkio and Rush (1991) approach of cointegration to examine the sustainability of budgetary deficits for the Central Government over the period 1951-1998. The paper does not find cointegration and hence concludes that the current stance of India's fiscal policy is not sustainable though the size of the fiscal deficit as a proportion of GDP has fallen since 1991. Jha and Sharma (2001) re-look the issue of the sustainability of the Indian fiscal deficit of the central government for 1872-1997 with Independence providing a natural break in the chosen data set. The paper finds that for the post Independence period public expenditures and revenues are actually stationary processes with either one or two structural breaks and therefore concludes that the public debt situation in India is sustainable. Goyal, Khundrapakam and Ray (2004) have assessed the sustainability of central and state government finances independently as well as combined finances of the Centre and States over the period 1951-2000 and conclude that while the fiscal stance of the Central and the State Governments (combined) when examined individually is unsustainable, it is weakly sustainable for the combined finances as it nets out inter-governmental financial flows. Hence they conclude that claims about sustainability of India's public finance, made on the basis of the assessment of individual finances and neglecting inter-governmental flows and the possibility of regime shifts seems exaggerated.

### III Empirical Evidence

Sustainability of state finances of the fourteen major non-special category states (individually) has been analyzed with annual data for 1970-71 to 2005-06 using the *deficit indicators approach* in the Hakkio-Rush framework (equation 15) discussed above. Consequently, it is of interest whether the concerned revenue-expenditure

measures defined above are cointegrated. The variables in Appendix A are considered either as (i) ratios of Net State Domestic Product (NSDP) with a suffix  $-G$  (ii) as real measures in their logarithmic form with the pre-fix  $-L$  and suffix  $-R$  or (iii) as nominal measures in their logarithmic form with the pre-fix  $-L$ . The NSDP deflator was used to obtain the real variant of the revenue and expenditure variables.

The concerned revenue and expenditure pairs for each of the deficit indicators, were thus, tested for stationarity using the Zivot-Andrews (ZA) test. The ZA test examines for unit root in the presence of structural break. Testing for stationarity in the presence of a structural break becomes relevant as the standard unit root tests such as the ADF test do not take into account the presence of structural break in the series and this could at times lead an error when the null hypothesis is not rejected. Consequent to determining the stationarity of the concerned pairs of revenue-expenditure, we proceed to estimate a cointegrating regression in the Hakkio and Rush (1991) framework by employing the Gregory-Hansen test of cointegration with structural breaks.

The paper, thus, whilst empirically examining the fiscal sustainability for the fourteen States adopts the following order of preference so as to have a comprehensive and broad coverage of the deficit indicators across States. First priority is accorded to estimating sustainability of deficit indicators as ratios of NSDP followed by real measures and lastly as nominal measures. For instance, if a deficit indicator for a particular State can be estimated for sustainability as ratio of NSDP then that deficit indicator would not be estimated for sustainability either as real or nominal measures. The same method was adopted for deficit indicators as real measures. Thus, those deficit indicators which are examined for sustainability as nominal measures could not be estimated when considered as ratios of NSDP or as real measures.

Table 3 provides a glimpse into the spread of States and the deficit indicators for which we proceeded to estimate the cointegrating regression employing the Gregory-Hansen test for either of the three variants of the deficit measures. (Detailed results of the Zivot-Andrews unit root tests are in Tables C.1 to C.3, Appendix C). It is important to note here that of the fourteen major non-special category States considered, Uttar Pradesh is the

proceed to estimate the cointegrating regression for any ant.

**Table 3 Summary of the Zivot-Andrews Unit Root Test**

Deficit Measures	Ratio of NSDP	Real Measure	Nominal Measure
	States		
RD	AP, KAR, MP, WB	ORI, PUNJ, TN	BIH, GUJ, KER, MAH, RAJ
PD	AP, HAR, KAR, MP	ORI, PUNJ, TN	BIH, GUJ, RAJ
GFG	AP, HAR, KAR, MP, WB	ORI, PUNJ, TN	BIH, GUJ, RAJ
PRB	AP, KAR, MP, WB	PUNJ, TN	BIH, GUJ, MAH, RAJ

So as to analyze fiscal sustainability, it is of interest to determine whether the relevant revenue and expenditure variables for the different deficit measures are cointegrated. Section I of the paper contends that as long as the revenue and expenditure series are cointegrated then the fiscal situation is sustainable. While absence of a cointegrating relationship would indicate that the fiscal position is not sustainable. The results of the Gregory-Hansen test (Table 4), which tests for cointegration in the presence of a structural break or regime shift (where the time of the break is to be determined by the estimation procedure) using the *deficit indicators approach* can be assessed in two ways which in turn highlight the precarious fiscal health of the fourteen major States: (i) the number of States which have sustainable profile for a deficit indicator and (ii) performance of a State across deficit measures.

**Table 4 Results of Gregory-Hansen Cointegration Test**

Deficit Measure	GH <sub>A</sub>	GH <sub>B</sub>	GH <sub>C</sub>
A. Ratio of NSDP			
AP			
RD	-3.53 (1994)	-4.88 (1999)	-4.21 (1997)
PD	-2.94 (1997)	-4.61 (1994)	-4.58 (1994)
GFG	-3.39 (1996)	-4.47 (1994)	-4.53 (1994)
PRB	-3.46 (1994)	-4.68 (1999)	-3.88 (1997)

HAR			
	(1989)	-3.14 (1999)	-2.58 (1999)
GFG	-1.88 (1999)	-3.27 (1999)	-2.51 (1999)
KAR			
RD	-4.17 (1997)	-5.00 <b>**</b> (1999)	-3.93 (1997)
PD	-4.37 (1989)	-4.31 (1989)	-4.19 (1997)
GFG	-4.21 (1989)	-4.43 (1997)	-4.43 (1997)
PRB	-3.97 (1999)	-5.13 <b>**</b> (1999)	-4.11 (1997)
MP			
RD	-2.80 (1999)	-4.85 (1999)	-3.21 (1992)
PD	-3.46 (1989)	-4.86 (1997)	-4.85 (1999)
GFG	-2.35 (1988)	-5.07 <b>**</b> (1999)	-4.73 (1997)

Table 4 Results of Gregory-Hansen Cointegration Test (Contd.)

Deficit Measure	GH <sub>A</sub>	GH <sub>B</sub>	GH <sub>C</sub>
PRB	-4.16 (1997)	-4.91 (1999)	-3.82 (1995)
WB			
RD	-3.78 (1998)	-3.93 (1998)	-4.10 (1994)
GFG	-2.47 (1999)	-4.08 (1997)	-4.19 (1996)
PRB	-3.21 (1998)	-4.03 (1998)	-4.22 (1996)
B. Real Terms			
ORI			
RD	-3.68 (1997)	-4.17 (1997)	-4.21 (1991)
PD	-3.47 (1989)	-3.43 (1989)	-3.85 (1989)
GFG	-3.25 (1988)	-3.85 (1988)	-3.64 (1989)
PUNJ			
RD	-4.17 (1987)	-4.23 (1999)	-4.24 (1994)
PD	-4.85 <b>**</b> (1992)	-5.35 <b>**</b> (1999)	-4.98 <b>**</b> (1992)
GFG	-6.36 <b>**</b> (1999)	-5.82 <b>**</b> (1999)	-6.23 <b>**</b> (1996)
PRB	-3.60 (1994)	-4.13 (1999)	-3.65 (1994)
TN			

	6.29 (1990)	-3.83 (1983)	-4.12 (1984)
	3.20 (1992)	-3.82 (1997)	-4.34 (1999)
<b>GFG</b>	<b>-4.77 (1983)**</b>	<b>-4.97 (1983)</b>	<b>-5.46 (1999)**</b>
<b>PRB</b>	<b>-3.26 (1988)</b>	<b>-3.72 (1983)</b>	<b>-4.07 (1985)</b>
<i>C. Nominal Terms</i>			
BIH			
<b>RD</b>	<b>-3.42 (1986)</b>	<b>-4.67 (1985)</b>	<b>-4.02 (1985)</b>
<b>PD</b>	<b>-2.96 (1979)</b>	<b>-3.83 (1996)</b>	<b>-3.41 (1996)</b>
<b>CV @ 5%</b>	<b>-4.61</b>	<b>-4.99</b>	<b>-4.95</b>

Table 4 Results of Gregory-Hansen Cointegration Test (Contd.)

Deficit Measure	GH <sub>A</sub>	GH <sub>B</sub>	GH <sub>C</sub>
<b>GFG</b>	<b>-3.32 (1985)</b>	<b>-3.96 (1999)</b>	<b>-3.37(1988)</b>
<b>PRB</b>	<b>-3.42 (1986)</b>	<b>-4.67 (1985)</b>	<b>-5.02 (1985)**</b>
GUJ			
<b>RD</b>	<b>-4.35 (1992)</b>	<b>-4.37 (1992)</b>	<b>-4.89 (1994)</b>
<b>PD</b>	<b>-4.31 (1992)</b>	<b>-4.47 (1992)</b>	<b>-5.15 (1992)**</b>
<b>GFG</b>	<b>-4.29 (1992)</b>	<b>-4.37 (1992)</b>	<b>-6.87 (1994)**</b>
<b>PRB</b>	<b>-4.35 (1992)</b>	<b>-4.37 (1992)</b>	<b>-4.89 (1994)</b>
KER			
<b>RD</b>	<b>-2.64 (2000)</b>	<b>-3.68 (1999)</b>	<b>-4.12 (1994)</b>
MAH			
<b>RD</b>	<b>-4.10 (1990)</b>	<b>-6.81 (1998)**</b>	<b>-6.89 (1995)**</b>
<b>PRB</b>	<b>-4.65 (1991)</b>	<b>-4.81 (1997)</b>	<b>-7.00 (1995)**</b>
RAJ			
<b>RD</b>	<b>-3.17 (1997)</b>	<b>-2.94 (1999)</b>	<b>-3.39 (1993)</b>

	<b>.92 (1998)</b>	<b>-2.91 (1999)</b>	<b>-3.09 (1993)</b>
	<b>.85 (1998)</b>	<b>-2.99 (1999)</b>	<b>-3.19 (1993)</b>
<b>PRB</b>	<b>-3.74 (1989)</b>	<b>-3.25 (1989)</b>	<b>-3.23 (1989)</b>
<b>CV @ 5%</b>	<b>-4.61</b>	<b>-4.99</b>	<b>-4.95</b>
<p><b>** indicates rejection of null hypothesis at 5% level of significance</b>  <b>Years in parentheses indicate break points using the GH procedure.</b>  <b>Lag length is determined using the AIC criterion</b></p>			

An analysis of the results by examining each of the deficit indicators (across variants of deficit measure used) shows that of the twelve States for which the revenue deficit sustainability was analyzed only two States ó Karnataka and Maharashtra have sustainable revenue deficits. A similar result has been observed for the primary deficit, only two (Punjab and Gujarat) of the ten States for which this deficit measure was examined for sustainability are observed to have sustainable primary deficits. While four of the eleven States (Madhya Pradesh, Punjab, Tamil Nadu and Gujarat) for which gross fiscal gap sustainability was examined have a sustainable gross fiscal gap. Likewise, with primary revenue balance indicator only three of the ten States (Karnataka, Bihar and Maharashtra) are observed to be sustainable on this indicator.

A State-wise analysis of the deficit measures across variants that could be examined for sustainability highlights the grim fiscal scenario. Of the eight States for which all four deficit indicators viz. revenue deficit, primary deficit, gross fiscal gap and the primary revenue balance were examined for sustainability, two States - Andhra Pradesh and Rajasthan - none of the deficit indicators have been found to be sustainable. Madhya Pradesh and Tamil Nadu show sustainability on only one deficit indicator ( namely, the gross fiscal gap) while all the other three deficit indicators are found to be not sustainable. Bihar, on the other hand, presents a different profile on sustainability, wherein, excepting the primary revenue balance the other three deficit indicators are not sustainable. The other States for which all the four deficit indicators were assessed for sustainability and two deficit indicators were found to be sustainable are Karnataka (revenue deficit and primary revenue balance was observed to be sustainable) and Punjab and Gujarat (primary deficit and gross fiscal gap are sustainable). Orissa and West Bengal are the only two States where only three deficit indicators were examined for



indicators were not found to be sustainable. For Orissa, primary deficit and gross fiscal gap while for West Bengal it was the revenue deficit, gross fiscal gap and the primary revenue balance. Fiscal sustainability for Haryana and Maharashtra could be examined only for two deficit indicators and the outcomes on sustainability as well as the deficit indicators examined for both these States was varied. Haryana (primary deficit and gross fiscal gap) could be examined for sustainability and both were found to be unsustainable while for Maharashtra (revenue deficit and primary revenue balance) were assessed and the performance on both these indicators was sustainable. Kerala was the only state where just one deficit indicator i.e. revenue deficit could be assessed and it was found to be unsustainable. Uttar Pradesh is the only State in this group for which none of the deficit indicator could be examined for sustainability.

The results of the sustainability analysis bring out some interesting patterns. In the case of Karnataka the revenue deficit and the primary revenue balance is sustainable while the broad deficit measure of the gross fiscal gap emerges as not sustainable while Gujarat, Madhya Pradesh, Punjab and Tamil Nadu reveal the revenue deficit to be not sustainable while broader deficit measure of the gross fiscal gap is sustainable. The decomposition of the gross fiscal deficit can provide some insights into the emergence of such patterns. Karnataka has always seen a smaller revenue deficit as compared to the other four States whereas it has always had higher capital outlays. Results of Table 4, thus, reinforce the concerns raised on the sustainability of State finances in India and the ability of State governments to continue with their fiscal stance and still remain solvent. Less than one-third of the fourteen States have a sustainable revenue deficit, primary deficit and primary revenue balance while just about one-third of the fourteen States have a sustainable gross fiscal gap. However, the sustainability on the gross fiscal gap needs to be viewed with caution as it may not reveal the entire fiscal stress faced by States as this measure does not take into consideration the several quasi-fiscal activities such as government guarantees and significant off-budget liabilities of state level financial institutions which finance infrastructure development and investment projects. Further, such guarantees and quasi-fiscal activities are a pointer to the hidden fiscal burden on State finances. The outstanding guarantees of the fourteen major States governments as of end - March 2006

increase of nearly 1.19 times from Rs.158386 crores. These liabilities do not directly form part of the debt burden of the States, in the event of default, States will be required to meet these obligations. It must be noted here that several States have taken initiatives to place either statutory or administrative ceilings on guarantees or are in the process of setting up Guarantee Redemption Fund (10 States) through earmarked guarantee fees as recommended by the TFC. Further, as can be gleaned from Table 4, the regime shift across States has taken place in the late 1990s (around 1997-1999) and can be attributed to the impact of the implementation of the awards of the Fifth Pay Commission which put tremendous pressure on State finances along with declining transfers from the Centre. In 1999-2000, six of the fourteen major States had a revenue deficit as a percent of NSDP greater than 4 percent while four States had a revenue deficit greater than 3 percent of NSDP. Likewise the fiscal deficit as a percent of NSDP was greater than 7 percent in five States and in six States the fiscal deficit was greater than 5 percent. For some States a regime shift is observed in the late 1980s and the early 1990s. This can be attributed to the declining total revenue to GDP ratio since the mid 1980s which has declined from 12.02 percent in 1985-86 to 11.69 percent in 1990-91 to 11.32 percent in 1995-96 and 9.83 percent in 1998-99 accompanied by a high total expenditure-GDP ratio which grew from 14.73 percent in 1985-86 to 14.99 percent in 1990-91 and later declined to 14.02 percent in 1998-99. The decline in the total revenue-GDP ratio of States can be attributed to falling State own revenues simultaneous with a decline in central transfers. Central transfers declined substantially from 4.89 percent of GDP in 1985-86 to 4.73 percent in 1990-91 to 4.20 percent in 1995-96 to 3.58 percent in 1998-99. States' own revenue collections also correspondingly declined from 7.14 percent of GDP in 1985-86 to 6.95 percent in 1990-91. While a mild recovery in own revenue collections was observed in 1995-96 to 7.12 percent it slipped again to 6.25 percent of GDP in 1998-99. Consequently, the revenue-expenditure gap for States increased from 2.71 percent in 1985-86 to 3.3 percent in 1990-91 to 4.19 percent in 1998-99 (Rao, 2002; Reserve Bank of India, 2007). Table 5 summarizes the results of our empirical exercise and highlights the disconcerting State-wise performance on the different deficit indicators.

#### **Table 5 Summary of Cointegration Results**

<b>Deficit Measures</b>				
	<b>Revenue Deficit</b>	<b>Primary Deficit</b>	<b>Gross Fiscal Gap</b>	<b>Primary Revenue Balance</b>
<i>A. Ratios of NSDP</i>				
<b>AP</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>
<b>HAR</b>	<b>--</b>	<b>X</b>	<b>X</b>	<b>--</b>
<b>KAR</b>	<b>✓</b>	<b>X</b>	<b>X</b>	<b>✓</b>
<b>MP</b>	<b>X</b>	<b>X</b>	<b>✓</b>	<b>X</b>
<b>WB</b>	<b>X</b>	<b>--</b>	<b>X</b>	<b>X</b>

Table 5 Summary of Cointegration Results (Contd.)

<b>B. Real Terms</b>				
<b>States</b>	<b>Revenue Deficit</b>	<b>Primary Deficit</b>	<b>Gross Fiscal Gap</b>	<b>Primary Revenue Balance</b>
<b>ORI</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>--</b>
<b>PUNJ</b>	<b>X</b>	<b>✓</b>	<b>✓</b>	<b>X</b>
<b>TN</b>	<b>X</b>	<b>X</b>	<b>✓</b>	<b>X</b>
<i>C. Nominal Terms</i>				

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		X	X	✓
<b>GUJ</b>	X	✓	✓	X
<b>KER</b>	X	--	--	--
<b>MAH</b>	✓	--	--	✓
<b>RAJ</b>	X	X	X	X
<p><b>✓ denotes cointegration hence sustainable    X denotes no cointegration hence not sustainable</b>  <b>-- denotes cannot estimate for cointegration</b></p>				

#### IV Conclusions

The paper, thus, has examined the issue of sustainability individually for each of the fourteen major non-special category States employing the *deficit indicators approach* for four vital deficit indicators of fiscal health viz. the revenue deficit, primary deficit, gross fiscal gap and the primary revenue balance and seeks to address whether the fourteen major State governments can continue with their fiscal stance indefinitely and maintain solvency.

The paper has adopted the Hakkio-Rush (1991) framework to study sustainability for a spread of deficit indicators across the fourteen major States either as a ratio of Net State Domestic Product, as real measures or as nominal measures so as to obtain a comprehensive coverage of States and deficit measures. Each measure of the deficit reveals a different facet of fiscal health. The revenue deficit indicates the extent of public dis-saving, the primary deficit reflects the non-interest deficit (which excludes the past fiscal burden in terms of interest payments) and the primary revenue balance can also be described as the non-interest revenue deficit. In other words, the primary revenue balance would reflect the actual gap between current revenues and expenditures for a particular year. The paper finds evidence indicative of unsustainable fiscal policies adopted by the fourteen major non-special category States in India and raises serious concerns about

was the lone state for which it was not possible to sustainability. Most States have scored poorly on several of the deficit indicators. Of the fourteen States less than a third have a sustainable revenue deficit, primary deficit and primary revenue balance while just about one-third of the fourteen States have a sustainable gross fiscal gap. However, this sustainability on the gross fiscal gap needs to be viewed with caution as it may not reveal the entire fiscal stress faced by States since this measure does not take into consideration quasi-fiscal activities such as government guarantees and significant off-budget liabilities of state level financial institutions which finance infrastructure development and investment projects. Such guarantees and contingent liabilities are a pointer to the hidden fiscal burden on State finances. Besides borrowings by States from financial institutions to finance infrastructure, small savings borrowing and special purpose vehicles enable States to circumvent their hard budget constraint. Further, States should concentrate on generating a primary revenue balance which could enable them to meet the requirements of interest payments. The empirical evidence, thus, indicates that it may be difficult for governments to continue with their revenue and expenditure paths indefinitely and remain solvent. The comment in the *Economic Survey, 2007-08* 'though State finances have shown a distinct improvement, the factors of fiscal deterioration in the past – interest payments, pension liabilities, losses of State Public Sector Undertakings and inadequate user charges and a moderation in the buoyancy in taxes – will need to be monitored so as to sustain this fiscal consolidation' indicates the precipice on which States find themselves. Although the paper focuses attention on only the deficit indicators while examining for sustainability rather than the broad based debt indicators approach, it helps focus attention on the rather disconcerting scenario of fiscal health of State governments. Thus, legislated fiscal corrective action in the form of Fiscal Responsibility Legislations brought in fiscal discipline at the State level and the recommendations of the TFC have resulted in improved performance on the deficit profile of State governments in the medium term (Table 1). A strict adherence to a rule based fiscal policy - the FRLs and continued other efforts on the lines of the recommendations of the TFC such as a ceiling of guarantees, achieving and maintaining the debt-GDP at 30.8 percent at the end of March 2010 along with a overall cap on borrowings at 3 percent of GSDP by end of

commitments to revenue receipts at 15 percent by 2009-10. Improved own revenue collections and expenditure management will help sustain the gains from fiscal consolidation and can help improve the sustainability of State finances. Further, States by creating increased fiscal space through augmenting own revenues, by reducing inefficiencies in expenditure and through active implementation of public-private partnerships (PPPs) by which States can access private funds to finance projects without debt creation can improve their fiscal health.

However, the poor fiscal health of the States and the overall lack of sustainability found on the deficit indicators could have wide implications in a federal structure ó States could make a demand for greater devolution in terms of share in central taxes apart from creation of fiscal space and it could have an impact on the revenue- sharing from new taxes such as the GST that is proposed to be implemented from 1<sup>st</sup> April, 2010. Considering that the discretionary finance element comprising of central plan schemes and centrally sponsored schemes have become substantial and contributed nearly 15% of transfers from the Centre at the end of the 1990s and on an average for the period 2000-01 to 2007-08 (RE) contributes 8.28% of gross transfers from the Centre, states could vie for a share in such transfers in an effort to get resources and also raises issues for the further devolution of funds and financial support to Local Bodies.

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## APPENDIX A

List of the fourteen Major Non-Special Category States

AP	Andhra Pradesh	MAH	Maharashtra
BIH	Bihar	ORI	Orissa
GUJ	Gujarat	PUNJ	Punjab
HAR	Haryana	RAJ	Rajasthan
KAR	Karnataka	TN	Tamil Nadu
KER	Kerala	UP	Uttar Pradesh
MP	Madhya Pradesh	WB	West Bengal

List of variables used in the paper. Prefix  $L\emptyset$  denotes variables considered in logarithmic form

### Variables in Nominal Terms

LTEXP	Total Expenditure
LTEXPA	Total Expenditure exclusive of interest payments
LREA	Revenue Expenditure exclusive of interest payments
LREXPS	Revenue Expenditure
LRRS	Revenue Receipts

### Variables in Real Terms

LTEXPR	Real Total Expenditure
LTEXAR	Real Total Expenditure exclusive of interest payments
LREAR	Revenue Expenditure exclusive of interest payments
LRER	Real Revenue Expenditure of States'
LRRR	Real Revenue Receipts of States'

### Variables as a Ratio of NSDP

TEXPG	Total Expenditures as a ratio of NSDP
TEXAG	Total Expenditures exclusive of Interest payments as a ratio of NSDP
REAG	Revenue Expenditure exclusive of interest payments as a ratio of NSDP
REXPG	Revenue Expenditure as a ratio of NSDP



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ue Receipts as a ratio of NSDP

## APPENDIX B

### and Andrews Unit Root Test (Ratio of NSDP)

State s	Variable	ZA <sub>A</sub>	Lag	ZA <sub>B</sub>	Lag	ZA <sub>C</sub>	Lag
AP	TEXPG	-3.66 (1976)	0	-2.84 (1979)	0	-3.85 (1976)	0
	TEXAG	-4.03 (1976)	0	-3.07 (1979)	0	-4.16 (1976)	0
	RRG	-3.89 (1976)	0	-3.01 (1978)	0	-3.78 (1976)	0
	REG	-2.99 (1976)	0	-3.34 (1986)	0	-3.69 (1989)	0
	REAG	-2.97 (1976)	0	-3.71 (1986)	0	-3.96 (1988)	0
BIH	TEXPG	-5.62 (1981) <sup>#</sup>	0	-4.86 (1991) **	0	-5.63 (1981) #	0
	TEXAG	-5.36 (1981) <sup>**</sup>	0	-4.77 (1983) **	0	-5.67 (1981) #	0
	RRG	-2.71 (1997)	1	-4.94 (1995) **	1	-4.79 (1993)	1
	REG	-3.77 (1997)	0	-4.10 (1995)	0	-4.40 (1990)	0
	REAG	-3.36 (1997)	0	-4.00 (1995)	0	-4.00 (1990)	0
GUJ	TEXPG	-4.78 (1993)	2	-3.30 (1987)	2	-4.70 (1993)	2
	TEXAG	-4.91 (1993) <sup>**</sup>	0	-4.03 (1988)	0	-4.82 (1993)	0
	RRG	-5.18 (1995) <sup>**</sup>	0	-5.52 (1989) #	0	-5.70 (1988) #	0
	REG	-5.52 (1993) <sup>#</sup>	2	-4.46 (1989) **	2	-5.41 (1993) **	2
	REAG	-5.36 (1993) <sup>**</sup>	2	-4.56 (1989) **	2	-5.49 (1993) **	2
HAR	TEXPG	-4.08 (2000)	0	-3.89 (1996)	0	-4.64 (1995)	0
	TEXAG	-4.09 (2000)	0	-3.84 (1996)	0	-4.59 (1995)	0
	RRG	-4.38 (1999)	0	-3.84 (1996)	0	-4.24 (1995)	0
	REG	-4.43 (2000)	0	-4.49 (1998) **	0	-7.93 (1995) #	0
	REAG	-4.43 (2000)	0	-4.38 (1997)	0	-7.66 (1995) #	0

			0	-2.76 (1984)	0	-3.13 (1995)	0
			0	-2.84 (1984)	0	-3.15 (1989)	0
	RRG	-2.32 (1992)	2	-2.41 (1978)	2	-1.94 (1980)	2
	REG	-2.56 (1994)	2	-3.97 (1987)	2	-4.05 (1985)	2
	REAG	-2.38 (1979)	2	-4.40 (1987)	2	-4.45 (1985)	2
KER	TEXPG	-4.02 (1993)	0	-4.39 (1987)	0	-4.61 (1986)	0
	TEXAG	-4.00 (1981)	0	-4.60 (1987)**	0	-4.73 (1986)	0
	RRG	-3.62 (1978)	0	-5.21 (1987)#	0	-5.21 (1986)**	0
	REG	-3.56 (1992)	0	-4.49 (1988)**	0	-5.48 (1986)**	0
	REAG	-3.38 (1981)	0	-4.86 (1988)**	0	-5.59 (1986)#	0
MP	TEXPG	-3.99 (1979)	0	-3.96 (1981)	0	-4.40 (1979)	0
	TEXAG	-3.76 (1979)	0	-3.82 (1981)	0	-4.23 (1979)	0
	RRG	-3.57 (1979)	1	-4.16 (1985)	1	-4.32 (1980)	1
	REG	-1.69 (1979)	2	-3.47 (1988)	2	-3.57 (1987)	2
	REAG	-1.55 (1979)	2	-3.26 (1988)	2	-2.97 (1987)	2
MAH	TEXPG	-6.75 (1999)#	0	-6.25 (2000)#	0	-11.29 (1999)#	0
	TEXAG	-6.71 (1999)#	0	-6.28 (2000)#	0	-11.18 (1999)#	0
	RRG	-6.57 (1999)#	0	-6.41 (2000)#	0	-11.61 (1999)#	0
	REG	-6.70 (1999)#	0	-6.32 (2000)#	0	-11.90 (1999)#	0
	REAG	-6.65 (1999)#	0	-6.36 (2000)#	0	-11.86 (1999)#	0
ORI	TEXPG	-5.47 (2000)#	0	-5.25 (1999)#	0	-5.98 (1995)#	0
	TEXAG	-6.13 (1994)#	0	-5.74 (1981)#	0	-6.35 (1995)#	0
	RRG	-4.71 (1976)	0	-4.54(1978)**	0	-4.70 (1996)	0
	REG	-5.62 (2000)#	0	-5.12 (1987)#	0	-5.78 (2000)#	0
	REAG	-6.34 (1997)#	0	-6.09 (1981)#	0	-6.53 (2000)#	0
PUNJ	TEXPG	-2.77 (1993)	2	-1.64 (1984)	2	-2.33 (1993)	2
	TEXAG	-3.38 (1993)	2	-1.73 (1984)	2	-2.32 (1993)	2
	RRG	-6.56 (1988)#	0	-6.58 (2000)#	0	-7.86 (1999)#	0
	REG	-2.53 (1978)	2	-3.18 (2000)	2	-3.51 (1998)	2
	REAG	-3.21 (1994)	2	-2.32 (2000)	2	-3.60 (1996)	2
RAJ	TEXPG	-4.24 (1980)	0	-3.63 (1982)	0	-4.21 (1979)	0
	TEXAG	-4.56 (1980)	0	-3.74 (1983)	0	-4.41 (1980)	0

		0	-4.25 (1988)	0	-5.01 (1997)	0	
		0	-4.17 (1988)	0	-4.43 (1997)	0	
	REAG	-4.55 (1997)	0	-4.57 (1989)**	0	-4.63 (1990)	0
TN	TEXPG	-4.05 (1994)	0	-2.63 (1984)	0	-3.39 (1994)	0
	TEXAG	-4.13 (1994)	0	-2.74 (1984)	0	-3.48 (1981)	0
	RRG	-4.84 (1981)**	0	-3.12 (1984)	0	-4.79 (1981)	0
	REG	-4.81 (1994)**	0	-3.82 (1993)	0	-5.19 (1994)**	0
	REAG	-4.81 (1994)**	0	-3.82 (1993)	0	-5.19 (1994)**	0
UP	TEXPG	-3.95 (1981)	0	-3.74 (1979)	0	-5.42 (1981)**	0
	TEXAG	-4.15 (1981)	0	-3.46 (1979)	0	-5.40 (1981)**	0
	RRG	-4.50 (1981)	0	-3.03 (1989)	0	-6.87 (1981)#	0
	REG	-3.50 (1981)	0	-3.29 (1979)	0	-6.25 (1981)#	0
	REAG	-3.82 (1981)	0	-2.99 (1979)	0	-6.30 (1981)#	0
WB	TEXPG	-4.25 (2000)	0	-3.71 (1981)	0	-4.31 (1978)	0
	TEXAG	-5.32 (1979)**	0	-4.20 (1983)	0	-5.27 (1979)**	0
	RRG	-4.62 (1996)	0	-4.40 (1990)	0	-4.75 (1986)	0
	REG	-4.16 (1979)	0	-3.64 (1984)	0	-4.33 (1979)	0
	REAG	-4.27 (1979)	0	-3.82 (1992)	0	-4.27 (1979)	0
	CV 1%	-5.43		-4.93		-5.57	
	5%	-4.80		-4.42		-5.08	
<p># and ** indicate rejection of null hypothesis at 1% and 5 % level of significance respectively</p> <p>Years mentioned in parentheses are the break points using the ZA procedure.</p> <p>Lag length is determined using AIC criterion.</p>							

Table B.2 Results of Unit Root Tests - Zivot and Andrews (ZA) Test (Real terms)

State	Variable	ZA <sub>A</sub>	Lag	ZA <sub>B</sub>	Lag	ZA <sub>C</sub>	Lag
AP	LTEXPR	-3.56 (1991)	1	-3.49 (1979)	2	-3.12 (1991)	2
	LTEXAR	-4.62 (1976)	0	-3.58 (1980)	0	-5.20 (1976)**	0
	LRRR	-3.13 (1993)	1	-3.17 (1977)	1	-2.19 (1976)	1
	LRER	-3.60 (1976)	0	-3.91 (1985)	0	-4.08 (1991)	0

			0	-4.38 (1986)	0	-4.44 (1984)	0
			0	-3.95 (1987)	0	-4.63 (1981)	0
	LTEXAR	-4.19 (1981)	1	-3.78 (1983)	0	-4.45 (1981)	0
	LRRR	-2.05 (1980)	1	-4.46 (1990)**	1	-4.34 (1990)	1
	LRER	-3.24 (1981)	0	-3.27 (1992)	0	-3.22 (1989)	0
	LREAR	-3.10 (1981)	0	-3.13 (1991)	0	-3.10 (1989)	0
GUJ	LTEXPR	-3.92 (1990)	0	-3.12 (1997)	0	-4.36 (1994)	0
	LTEXAR	-3.93 (1990)	0	-3.26 (1982)	0	-3.97 (1994)	0
	LRRR	-4.52 (1978)	2	-4.84 (1982)**	2	-4.47 (1983)	2
	LRER	-3.47 (1994)	1	-3.09 (1989)	1	-3.40 (1979)	1
	LREAR	-5.38 (1994)**	2	-4.23 (1989)	2	-5.16 (1994)**	2
HAR	LTEXPR	-4.58 (2000)	0	-4.28 (1997)	0	-5.00 (1995)	0
	LTEXAR	-4.52 (2000)	0	-4.11 (1996)	0	-4.83 (1995)	0
	LRRR	-4.60 (1999)	0	-3.65 (1996)	0	-4.24 (1999)	0
	LRER	-4.66 (2000)	0	-4.75 (1997)	0	-7.10 (1995) <sup>#</sup>	0
	LREAR	-4.53 (2000)	0	-4.37 (1997)	0	-6.56 (1995) <sup>#</sup>	0
KAR	LTEXPR	-3.62 (2000)	0	-4.19 (2000)	0	-4.46 (1995)	0
	LTEXAR	-3.55 (1989)	0	-3.84 (2000)	0	-4.21 (1995)	0
	LRRR	-1.92 (1991)	2	-1.59 (1978)	2	-1.69 (1999)	2
	LRER	-5.09 (1991)**	0	-4.35 (1999)	0	-4.97 (1991)	0
	LREAR	-3.50 (1993)	2	-3.09 (1986)	2	-3.78 (1991)	2
KER	LTEXPR	-6.71(2000) <sup>#</sup>	1	-6.93 (2000) <sup>#</sup>	1	-6.83 (1997) <sup>#</sup>	1
	LTEXAR	-6.92 (1992) <sup>#</sup>	1	-6.48 (1987) <sup>#</sup>	1	-6.77 (1992) <sup>#</sup>	1
	LRRR	-5.12 (1976)**	0	-4.65 (1980)**	1	-5.33 (1983)**	0
	LRER	-7.08 (1983) <sup>#</sup>	1	-6.49 (1985) <sup>#</sup>	0	-6.86 (1983) <sup>#</sup>	1
	LREAR	-6.36 (1978) <sup>#</sup>	1	-6.30 (1980) <sup>#</sup>	1	-6.50 (1983) <sup>#</sup>	1
MP	LTEXPR	-4.17 (1976)	0	-3.92 (1982)	0	-4.68 (1976)	0
	LTEXAR	-4.12 (1976)	0	-3.86 (1982)	0	-4.41 (1976)	0
	LRRR	-4.38 (1976)	0	-4.47 (1984)**	0	-4.66 (1976)	0
	LRER	-1.32 (2000)	2	-2.66 (1989)	2	-2.51 (1988)	2
	LREAR	-0.88 (2000)	2	-2.03 (1987)	2	-1.84 (1988)	2
MAH	LTEXPR	-6.91 (1999) <sup>#</sup>	0	-6.03 (2000) <sup>#</sup>	0	-10.34 (1999)	0

						#	
			0	-6.09 (2000) <sup>#</sup>	0	-10.00 (1999) <sup>#</sup>	0
	LRRR	-6.37 (1999) <sup>#</sup>	0	-6.70 (2000) <sup>#</sup>	0	-11.37 (1999) <sup>#</sup>	0
	LRER	-6.72 (1999) <sup>#</sup>	0	-6.25 (2000) <sup>#</sup>	0	-11.83 (1999) <sup>#</sup>	0
	LREAR	-6.56 (1999) <sup>#</sup>	0	-6.40 (2000) <sup>#</sup>	0	-3.91 (1997)	0
ORI	LTEXPR	-3.59 (1995)	2	-3.48 (1980)	2	-4.11 (1986)	2
	LTEXAR	-4.60 (1993)	0	-4.20 (1999)	0	-4.99 (1995)	0
	LRRR	-3.02 (1995)	2	-3.45 (1978)	2	-2.66 (1996)	2
	LRER	-4.42 (2000)	0	-4.19 (1999)	0	-4.60 (1981)	0
	LREAR	-5.40 (1976) <sup>**</sup>	0	-4.84 (1980) <sup>**</sup>	0	-5.47(1976) <sup>**</sup>	0
PUNJ	LTEXPR	-3.32 (1993)	2	-2.56 (1985)	2	-2.41 (1981)	2
	LTEXAR	-3.85 (1993)	2	-2.14 (1984)	2	-2.31 (1993)	2
	LRRR	-3.21 (1978)	2	-3.41 (1980)	2	-3.29 (1999)	2
	LRER	-3.88 (1996)	2	-3.51 (1993)	2	-3.91 (1996)	2
	LREAR	-3.35 (1988)	2	-2.25 (1996)	2	-4.37 (1992)	2
RAJ	LTEXPR	-5.40 (1979) <sup>**</sup>	2	-4.85 (1983) <sup>**</sup>	2	-5.06 (1997)	2
	LTEXAR	-5.65 (1979) <sup>#</sup>	2	-5.01 (1982) <sup>#</sup>	2	-4.77 (1984)	2
	LRRR	-5.22 (1997) <sup>**</sup>	0	-4.23 (1992)	0	-5.24 (1976) <sup>**</sup>	0
	LRER	-6.22 (1987) <sup>#</sup>	0	-5.14 (1992) <sup>#</sup>	0	-5.87 (1987) <sup>#</sup>	0
	LREAR	-5.78 (1997) <sup>#</sup>	0	-5.58 (1990) <sup>#</sup>	0	-6.12 (1987) <sup>#</sup>	0
TN	LTEXPR	-4.20 (1994)	0	-3.77 (1976)	0	-4.33 (1976)	0
	LTEXAR	-4.50 (1994)	0	-3.48 (1984)	0	-4.13 (1994)	0
	LRRR	-4.68 (1981)	0	-4.06 (1993)	0	-4.69 (1981)	0
	LRER	-3.97 (1990)	0	-3.74 (1993)	0	-4.47 (1990)	0
	LREAR	-3.72 (1994)	0	-4.08 (1993)	0	-4.60 (1991)	0
UP	LTEXPR	-4.62 (1984)	2	-3.64 (1991)	2	-5.90 (1981) <sup>#</sup>	2
	LTEXAR	-4.84 (1984) <sup>**</sup>	2	-3.69 (1991)	2	-5.95 (1981) <sup>#</sup>	2
	LRRR	-4.17 (1981)	0	-2.86 (1978)	0	-8.05 (1981) <sup>#</sup>	0
	LRER	-4.76 (1984)	2	-3.99 (1979)	0	-7.23 (1984) <sup>#</sup>	2

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				--		--	
			0	-3.93 (1996)	0	-3.99 (1992)	0
	<b>LTEXAR</b>	<b>-4.78 (2000)</b>	0	<b>-4.01 (1995)</b>	0	<b>-4.21 (1992)</b>	0
	<b>LRRR</b>	<b>-4.96 (1996) **</b>	0	<b>-4.68 (1976) **</b>	0	<b>-6.09 (1976) #</b>	0
	<b>LRER</b>	<b>-4.74 (2000)</b>	0	<b>-4.52 (1976) **</b>	0	<b>-4.63 (1976)</b>	0
	<b>LREAR</b>	<b>-5.16 (1979) **</b>	1	<b>-4.67 (1983) **</b>	1	<b>-5.11 (1978) **</b>	1
	<b>CV 1%</b>	<b>-5.43</b>		<b>-4.93</b>		<b>-5.57</b>	
	<b>5%</b>	<b>-4.80</b>		<b>-4.42</b>		<b>-5.08</b>	

# and \*\* indicate rejection of null hypothesis at 1% and 5 % level of significance respectively

Years mentioned in parentheses are the break points using the ZA procedure.

Lag length is determined using AIC criterion.

-- cannot estimate



Tests - Zivot and Andrews Test (Nominal terms)

State	Variable	Z <sub>A</sub>	Lag	Z <sub>B</sub>	Lag	Z <sub>C</sub>	Lag
AP	LTEXP	-4.41(2000)	2	-4.36(1997)	2	-4.32 (2000)	2
	LTEXA	-4.75(1978)	0	-4.93 (1986) <sup>#</sup>	0	-5.10 (1984) <sup>#</sup>	0
	LRR	-2.55(1984)	1	-3.71 (1993)	1	-3.65(1993)	1
	LRE	-2.06(1984)	1	-2.93 (1998)	1	-2.93 (1984)	1
	LREA	-1.48 (1984)	1	-2.11 (1990)	1	-2.736 (1984)	1
BIH	LTEXP	-4.33 (1981)	0	-4.51 (1992)	0	-4.44 (1991)	0
	LTEXA	-4.46 (1981)	0	-4.23 (1991)	0	-4.56 (1981)	0
	LRR	-0.45 (1980)	1	-3.17 (1995)	1	-3.06 (1994)	1
	LRE	-1.82 (1981)	0	-2.70 (1995)	0	-2.61 (1981)	0
	LREA	-1.07 (1981)	2	-3.16 (1995)	2	-2.96 (1995)	2
GUJ	LTEXP	-4.60 (1981)	0	-4.35 (1985)	0	-4.58 (1981)	0
	LTEXA	-4.25 (1980)	0	-4.31 (1985)	0	-4.42 (1981)	0
	LRR	-2.39 (2000)	0	-4.09 (1999)	0	-4.03 (1999)	0
	LRE	-1.64 (1983)	0	-3.19 (2000)	0	-3.76 (2000)	0
	LREA	-1.44 (1983)	0	-3.30 (2000)	0	-3.96 (2000)	0
HAR	LTEXP	-4.17 (2000)	0	-4.10 (1998)	0	-7.64 (1995) <sup>#</sup>	0
	LTEXA	-4.28 (2000)	0	-4.04 (1998)	0	-7.04 (1995) <sup>#</sup>	0
	LRR	-4.14 (1999)	0	-3.67 (1996)	0	-5.15 (1994) <sup>**</sup>	0
	LRE	-3.70 (2000)	0	-4.19 (1998)	0	-10.45 (1995) <sup>#</sup>	0
	LREA	-3.83 (2000)	0	-4.05 (1998)	0	-9.09 (1995) <sup>#</sup>	0
KAR	LTEXP	-5.07 (1983) <sup>#</sup>	0	-4.14 (1987)	0	-5.03 (1983)	0
	LTEXA	-5.05 (1983) <sup>#</sup>	0	-4.33 (1986)	0	-4.99 (1983)	0
	LRR	-4.37 (1999)	0	-3.57 (1995)	0	-3.70 (1999)	0
	LRE	-3.56 (1985)	0	-4.09 (2000)	0	-4.12 (2000)	0
	LREA	-3.70 (1983)	0	-4.41 (1998)	0	-4.34 (1997)	0
KER	LTEXP	-4.65 (1985)	0	-4.87 (2000) <sup>**</sup>	1	-5.18 (1998) <sup>**</sup>	0
	LTEXA	-4.39 (2000)	0	-4.93 (2000) <sup>#</sup>	0	-5.10 (1998) <sup>**</sup>	0
	LRR	-3.97 (1999)	0	-4.21 (1998)	0	-4.35 (1995)	0
	LRE	-2.67 (1986)	0	-4.13 (2000)	0	-4.52 (1998)	0

			0	-4.51 (2000) <sup>**</sup>	0	-4.80 (1998)	0
			0	-3.21 (1992)	2	-3.16 (1991)	0
	LTEXA	-3.35 (2000)	0	-3.10 (1989)	0	-3.09 (1984)	0
	LRR	-3.59 (1999)	0	-3.15 (2000)	2	-4.37 (1996)	0
	LRE	-0.37 (2000)	2	-3.15 (2000)	2	-3.25 (1999)	2
	LREA	-0.19 (2000)	2	-2.50 (1999)	2	-2.57 (1999)	2
MAH	LTEXP	-5.20 (1983) <sup>**</sup>	0	-5.35 (1987) <sup>#</sup>	0	-5.54 (1984) <sup>**</sup>	0
	LTEXA	-4.78 (1998) <sup>**</sup>	0	-5.24 (1986) <sup>#</sup>	0	-5.31 (1984) <sup>**</sup>	0
	LRR	-2.78 (1998)	0	-4.28 (1996)	0	-4.19 (1995)	0
	LRE	-3.45 (1984)	0	-3.60 (2000)	0	-3.59 (2000)	0
	LREA	-3.54 (1983)	0	-3.98 (1998)	0	-3.91 (1997)	0
ORI	LTEXP	-7.00 (1981) <sup>#</sup>	0	-7.11 (2000) <sup>#</sup>	0	-7.34 (2000) <sup>#</sup>	0
	LTEXA	-4.19 (1981)	1	-3.98 (1993)	1	-4.14 (1981)	1
	LRR	-3.27 (1997)	1	-2.88 (1977)	1	-2.71 (1997)	1
	LRE	-3.74 (1991)	0	-5.07 (2000) <sup>#</sup>	0	-6.17 (2000) <sup>#</sup>	0
	LREA	-3.99 (1983)	0	-6.45 (2000) <sup>#</sup>	0	-8.03 (2000) <sup>#</sup>	0
PUNJ	LTEXP	-4.45(1984)	2	-3.34 (1987)	2	-4.61 (1984)	2
	LTEXA	-3.88 (1984)	2	-3.64 (1987)	2	-4.70 (1984)	2
	LRR	-4.43 (1992)	2	-2.54 (1998)	2	-4.77 (1992)	2
	LRE	-2.79 (1992)	2	-1.73 (2000)	2	-3.82 (1992)	2
	LREA	-3.35 (1988)	2	-2.25 (1996)	2	-4.37 (1992)	2
RAJ	LTEXP	-4.55 (2000)	0	-4.79 (1997)	0	-4.92 (1991)	0
	LTEXA	-4.63 (2000)	0	-4.93 (1997)	0	-4.88 (1991)	0
	LRR	-3.50 (1997)	0	-4.03 (1996)	0	-4.95 (1991)	0
	LRE	-1.48 (1987)	2	-2.62 (2000)	2	-2.60 (2000)	2
	LREA	-1.15 (2000)	2	-3.12 (1997)	2	-2.91 (1993)	2
TN	LTEXP	-3.85 (1981)	0	-3.27 (1993)	0	-4.47 (1981)	0
	LTEXA	-4.08 (1981)	0	-3.41 (1993)	0	-4.38 (1981)	0
	LRR	-3.53 (1999)	1	-3.86 (1997)	1	-3.89 (1992)	1
	LRE	-2.22 (2000)	0	-2.91 (2000)	0	-3.45 (1992)	0
	LREA	-2.39 (2000)	0	-3.09 (2000)	0	-3.79 (1992)	0
UP	LTEXP	-4.83 (1984)	2	-3.89 (1994)	2	-6.70 (1981) <sup>#</sup>	2

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			2	-3.93 (1994)	2	-6.86 (1981) <sup>#</sup>	2
			0	-2.73 (1978)	0	-7.58 (1981) <sup>#</sup>	0
	LRE	-4.73 (1984)	2	-3.98 (1979)	2	-7.16 (1981) <sup>#</sup>	2
	LREA	--		--		--	
WB	LTEXP	-4.32 (1999)	0	-3.60 (1976)	0	-4.13 (2000)	0
	LTEXA	-3.79 (1979)	0	-3.56 (1976)	0	-4.31 (2000)	0
	LRR	-5.68 (1998) <sup>#</sup>	0	-6.48 (1993) <sup>#</sup>	0	-7.07 (1986) <sup>#</sup>	0
	LRE	-4.32 (1999)	1	-3.91 (1987)	1	-5.18 (2000) <sup>**</sup>	1
	LREA	-3.20 (1979)	0	-3.48 (2000)	0	-5.00 (2000)	0
	CV 1%	-5.43		-4.93		-5.57	
	5%	-4.80		-4.42		-5.08	

# and \*\* indicate rejection of null hypothesis at 1% and 5 % level of significance respectively

Years mentioned in parentheses are the break points using the ZA procedure.

Lag length is determined using AIC criterion.

-- cannot estimate