Subnational-level Fiscal Health:
Stability and sustainability implications
for Kerala, Punjab, and West Bengal

Nimai Das

Subnational-level Fiscal Health:
Stability and sustainability implications
for Kerala, Punjab, and West Bengal

Nimai Das

ACKNOWLEDGEMENTS

Nimai Das is TTI Fellow, Institute of Economic Growth, New Delhi.

email: nimai@iegindia.org

Subnational-level Fiscal Health:
Stability and sustainability implications
for Kerala, Punjab, and West Bengal

ABSTRACT

The Government of India has recently announced that Kerala, Punjab, and West Bengal are fiscally unsound at the level of general category states. The study reviews this projection and assesses their financial stability and sustainability along the debt-deficit spiral over time. It finds their recent fiscal performance perilous, especially on the revenue account. In particular, West Bengal differs moderately from Punjab and Kerala in recent performance and in the long run trend of basic fiscal variables that lead to different implications in stability and sustainability. The study finds that a sharp rise in the revenue account gap caused fiscal deficit to grow steadily and hence a high-flying debt stock in all states during the late 1990s to the early 2000s. This enormous stock of outstanding debt emerged as a higher value of actual primary deficit from its stability level. Given that the rate of interest exceeded growth of output during this period, it increased debt stock above the level of primary deficit. None of the states however accomplished fiscal sustainability fully. Excepting West Bengal, they attained partial sustainability as their debt-deficit system slowly restores long run equilibrium. West Bengal is far away from sustainability because its future surpluses are not enough to service the debt. The study suggests that a sound adjustment in fiscal position on revenue account is essential for all states and that West Bengal needs special attention to achieve equilibrium in the long run.

1 INTRODUCTION

The perilous fiscal health of subnational-level governments is a priority area of concern in the literature on public finance and in contemporary policy debate in India. Various competent authorities—such as the Finance Commission (FC), Reserve Bank of India (RBI), and Comptroller and Auditor General of India (CAG)—in their recent reports have repeatedly warned against the unsound financial practices of states (Rajaraman et al. 2005). Most states have continued to borrow to meet their fiscal deficit, borrowing being an easier alternative than raising taxes or cutting expenditure (TwFC 2004). This might have sharply raised government indebtedness, which in turn adversely affected growth in recent years (Rangarajan & Srivastava 2005). Considering that immense debt financing has such detrimental effects on the economy, should there be a limit on government borrowing? In public finance literature, there are two integrated issues of government borrowing: tolerable level of public debt and ability to service such debt. Both are long run concerns of the public budget. The first issue may be explored in the light of stability and the second as sustainability for the government's fiscal position. Moreover, while the notions of stability and sustainability overlap in public finance literature, fiscal sustainability should be distinguished from stability in practice (Rangarajan & Srivastava 2005). This study employs the concept of fiscal stability using debt dynamics in Domar's (1944) canonical framework to judge the deficit level that keeps outstanding debt stock in steady state position. Allowing for a long run steady state condition of debt path under the canonical model with an exogenous rate of interest and growth of output, it is possible to determine a tolerable limit on the economy's fiscal/primary deficit through the given level of debt stock relative to output or vice versa. Further, if the rate of interest, growth of output, and deficit position of the economy are constant throughout, that is to say the long run constancy of the variables, the same can be translated into fiscal sustainability (TwFC 2004).

To attain sustainability, therefore, a government may restrict its deficit level at the long run steady state value since different levels of deficit will have different sustainability implications on the debt stock in the canonical model. But the government can face temporarily a high level of deficit in the short run, and that may be consistent with its fiscal solvency from a tax smoothing perspective. Recognising this fact (which is beyond the scope of the canonical long run steady state approach), the sustainability analysis in contemporary literature has shifted focus to study the time series properties of government budget in the intertemporal sense (Mendoza & Oviedo 2009). Nearly all formal statistical tests of fiscal sustainability have their roots in Hamilton and Flavin's (1986) analysis of intertemporal budget constraints, which serves to link the short run dynamics of debt and primary balance with the government's long run solvency condition. A government is said

to be sustainable if its net worth can service the debt, thereby indicating that the present value of future surpluses equals its outstanding liabilities. In this formulation, sustainability analysis allows judgment of a legitimate issue: can the government generate adequate revenue to service its debt in the future?

Therefore, a systematic study on stability vis-à-vis sustainability to review the government fiscal position concerning public debt and deficit behaviours is an important concern in the literature on public finance and also pertinent to the recent fiscal performance of subnational states in India. The state level study is imperative as well, because the evidence on governmental fiscal affairs so far is confined mostly to the central government or states at a consolidated level, and the few available studies by state lack a comprehensive analysis of stability and sustainability. Further, given that the central government recently declared Kerala, Punjab, and West Bengal (KPW) as fiscally unhealthy general category states in the country (Times of India 2012), this study is restricted to assessing the fiscal health for these three states and comparing their financial stability and sustainability along the path of debt dynamics.

The remainder of the paper is organised as follows. First (Section 2), we compare the recent financial performance of KPW among the general category states on debt and deficit indicators, and then identify their relative advantages and disadvantages along the long term trend of basic fiscal variables. Next, we appraise financial stability vis-à-vis sustainability through an analytical perspective that provides insight into the framework of debt dynamics for these three states (Section 3). The final section (Section 4) concludes the paper.

2 REVIEW OF STATE FISCAL PERFORMANCE

With the adoption of planning and emphasis on decentralised fiscal activities in the constitutional quasi-federal structure, the role of subnational governments to provide better social and economic services has gradually increased because of their proximity to local issues. In India, states presently spend around 60 per cent of the combined expenditure by centre and states. But their shaky fiscal health over time has won focus in most public debates. Since the latter half of the 1980s, subnational governments have experienced financial imbalance due to emergent non-development expenditure on administrative services, salaries, pensions, and interest payments as well as sluggish own revenue growth and shrinkage of central transfer; for some major states, the entire revenue became less than their committed expenditure (Kurian 1999). These facts might have led the FC to recommend state level fiscal reforms such as a rule-based framework to enact fiscal responsibility and

budgetary management (FRBM). The states overall are performing better while enacting subnational-level fiscal responsibility legislation, but some states (such as KPW) missed their target of eliminating entire revenue deficit and cutting the fiscal deficit to 3 per cent of the state domestic product in a phased manner. More worryingly, West Bengal, a highly 'stressed state' with significant debt stock since 2000s (RBI 2010), adopted the FRBM act last among all general category states in 2011, and just before her assembly election.

Nevertheless, the fiscal performance across subnational governments seems to have three broad indicators: resource gaps (deficits in budgetary position), outstanding liabilities (stocks of public debt), and spending patterns (effectiveness of expenditures). Table 1 compares the fiscal performance of 17 general category states between 2008-09 and 2012-13. The states are ranked on their average score of these past five years on selected fiscal indicators—debt and deficit positions, interest burden, and extent of idle expenditure. Despite that, the review of governments' financial health may well be started by assessing the overall resource gap in their public budget.[1] The fiscal deficit relative to state domestic product (GFD to GSDP) is found smallest for Orissa and largest for West Bengal. Kerala and Punjab rank 11th and 14th among the 17 general states. The debt-to-output position (DBT to GSDP) is found lowest for Chhattisgarh and highest for West Bengal. Kerala performs rather better than Punjab, which ranks among the bottom three. However, perhaps the most important indicator of fiscal health is revenue deficit (RD to GSDP). In addition, the primary deficit on revenue account (PRD to GSDP) might show the true resource gap in the government budget. Because the primary revenue balance does not consider interest payment liabilities on past debts, a surplus in primary revenue account is required to reduce the overall revenue account deficit. Kerala, Punjab, and West Bengal rank at the bottom in terms of overall deficit in revenue account as well as its primary balance. West Bengal experiences the highest revenue deficit among all general category states in India along with a positive primary revenue deficit.

---

[1] On the word of the Controller General of Accounts in India, the annual accounts of national and subnational governments are kept in three parts: Consolidated Fund (Part I), Contingency Fund (Part II), and Public Account (Part III). Part I of the accounts has two main divisions: *revenue accounts* and *capital accounts*. Each is subdivided into *receipts* and *expenditures*. Therefore, revenue receipts comprise the proceeds of taxation and other receipts as revenue, and revenue expenditure deals with current expenditure needs for government functioning. On the other hand, capital receipts cover receipts as capital in nature and capital expenditures comprise spending that is usually met from the borrowed funds to increase or construct permanent assets. Although all government financial statements are documented annually in the budget, the budgetary heads are broadly classified into revenue and capital accounts (RBI 2007). The overall resource gap between receipt and expenditure is known as fiscal deficit. Of course, no single criterion measures the resource gap in government finances. The traditional measurement of the resource gap considers the revenue account gap, capital account gap, and overall gap—all of which are documented in the budget.

Table 1 Ranking of major states on selected fiscal parameters in past five years

GFD to GSDP	DBT to GSDP	RD to GSDP	PRD to GSDP	IP to RR	RD to GFD
Orissa	Chhattisgarh	Madhya Pradesh	Madhya Pradesh	Andhra Pradesh	Orissa
Chhattisgarh	Haryana	Chhattisgarh	Bihar	Orissa	Bihar
Maharashtra	Tamil Nadu	Bihar	Orissa	Chhattisgarh	Madhya Pradesh
Haryana	Maharashtra	Orissa	Uttar Pradesh	Madhya Pradesh	Jharkhand
Rajasthan	Karnataka	Uttar Pradesh	Chhattisgarh	Gujarat	Uttar Pradesh
Tamil Nadu	Andhra Pradesh	Jharkhand	Jharkhand	Haryana	Goa
Andhra Pradesh	Orissa	Karnataka	Rajasthan	Jharkhand	Karnataka
Madhya Pradesh	Goa	Andhra Pradesh	Karnataka	Karnataka	Andhra Pradesh
Gujarat	Jharkhand	Goa	Goa	Rajasthan	Madhya Pradesh
Karnataka	Gujarat	Tamil Nadu	Andhra Pradesh	Goa	Tamil Nadu
Kerala	Madhya Pradesh	Maharashtra	Gujarat	Maharashtra	Rajasthan
Uttar Pradesh	Kerala	Rajasthan	Tamil Nadu	Orissa	Gujarat
Bihar	Bihar	Gujarat	Maharashtra	Uttar Pradesh	Haryana
Punjab	Rajasthan	Haryana	Haryana	Punjab	Kerala
Goa	Punjab	Kerala	Punjab	Tamil Nadu	Punjab
Jharkhand	Uttar Pradesh	Punjab	Kerala	Kerala	West Bengal
West Bengal	West Bengal	West Bengal	West Bengal	West Bengal	Chhattisgarh

Notes: Seventeen general category states are ranked as better to shoddier based on average value of their fiscal performance in last five years for respective indicators; DBT = Outstanding debt, GFD = Gross fiscal deficit, RD = revenue deficit, PRD = Primary revenue deficit, IP = Interest payments, RR = Revenue receipts and GSDP = Gross state domestic products.
Source: RBI publication on *state finances* in different years

In general, the poor performance of KPW on revenue balance is due to the lack of revenue receipts to meet expenditure, including interest payments on past debt. Kerala, Punjab, and West Bengal also rank at the bottom on the interest payments to revenue receipts ratio (IP to RR). Between 2008-09 and 2012-13, the interest payment liability was on an average 20 per cent in Kerala and Punjab in contrast to around 30 per cent in West Bengal (the highest value in general category states). Lastly, in the review of recent fiscal performance, we now turn to the revenue deficit relative to fiscal deficit (RD to GFD) to compare states' fiscal performance on asset creation (effectiveness of expenditures). Notably, the RD to GFD shows the part of fiscal deficit that does not transform to create government assets, which may give returns in the future. It follows that borrowing to meet the revenue account gap is unproductive, and that a positive RD to GFD ratio means the government might fall into idle borrowing, which was marked in the KPW along with two other states (Haryana and Chhattisgarh) between 2008-09 and 2012-13. The comparative analysis of recent fiscal performance therefore lends credence to the fact that despite moderate dissimilarities, Kerala, Punjab, and West Bengal are three unshaken general category states in India. To understand why, the next part in this section intensively reviews their basic fiscal variables over the past three decades.

The analysis of the long term trend of the fiscal variables of KPW seems to be initiated by the position in fiscal deficit, because any change in a state's debt stock in any year is similar to the fiscal deficit in that year, since state governments lack seigniorage power. Nevertheless, the fiscal deficit (GFD) of government budget emerges as a resource gap either in revenue account or/and in capital account. If the fiscal deficit is caused by capital outlay only (called *golden rule* of deficit), it is welcome to the economy, since government borrowing for capital investment generates income and employment opportunities in the future. Therefore, the decomposed part of fiscal deficit for capital outlay may well be viewed as an active deficit, and it indicates that a state with higher capital outlay (CO) compared with anyone else is in a better position. In contrast, if the decomposed part of fiscal deficit on revenue account gap (namely RD) is relatively high, it indicates the state is in a worse position, since the fiscal deficit for revenue account gap is an idle deficit. Therefore, states with a high revenue account gap would try to reduce such deficit by incurring a primary revenue surplus (negative PRD), which would then compensate the overall resource gap in revenue account that appears as an interest payment liability (IP). To meet this target, therefore, states must generate enough own revenue (SOR), because the statutory part of state revenue in the form of central transfer is highly exogenous. We now normalise these fiscal variables by the state level output (GSDP) to study comparatively the long term fiscal shape of Kerala, Punjab, and West Bengal in contrast to general category states together (hereafter, 'General States') using latest available data from 1980-81 to 2010-11 as actual estimate, 2011-12 revised estimate and 2012-13 budget estimate.

2.1 Trend of Fiscal Deficit

The fiscal deficit relative to state output is around 3 per cent in all selected states for the initial year of study (Figure 1). This is, however, a threshold limit defined recently by the FC as acceptable. Afterward, until 1997-98, the GFD-GSDP ratio fluctuated seriously for Punjab (peak value about 7 per cent in 1987-88), moderately for Kerala and West Bengal (ranging between 4 per cent and 1 per cent), and very slowly for General States (3 per cent ± 0.5 per cent). Then, up to 2003-04, the fiscal deficit increased remarkably for all selected states (with the peak around 1999-00) and then started to decrease, except for West Bengal in 2009-10. West Bengal's fiscal deficit exceeded all other states throughout, including Kerala and Punjab after 1997-98 (with the exception of latest budget estimate year 2012-13).

Figure 1 Trend of fiscal deficit over time
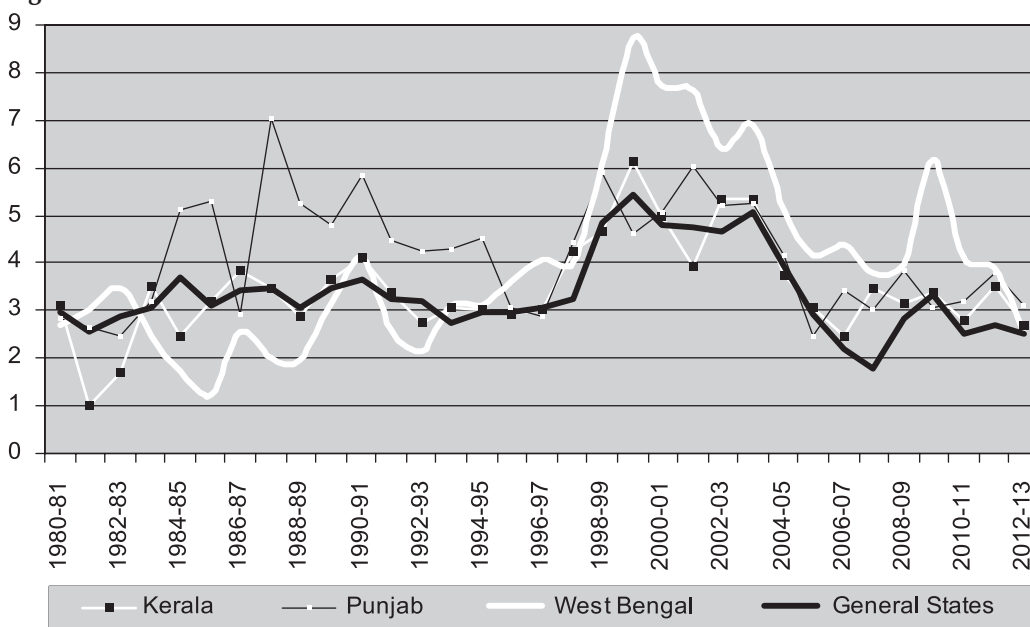
2.2 Trend of Capital Outlay

Over the past three decades, the trend of CO-GSDP ratio for General States followed almost a flat U-shape pattern. At the lowest point of this U-shape curve around 1997-98, West Bengal realised the peak value and Punjab reached the lowest level in capital outlay (Figure 2). Kerala's capital outlay declined steadily throughout the time, and since the late 1990s it was at West Bengal's level, except for the past few years. Barring an improvement in the mid-1990s, West Bengal has had shoddy capital outlay throughout. Punjab's capital

Figure 2 Trend of capital outlay over time
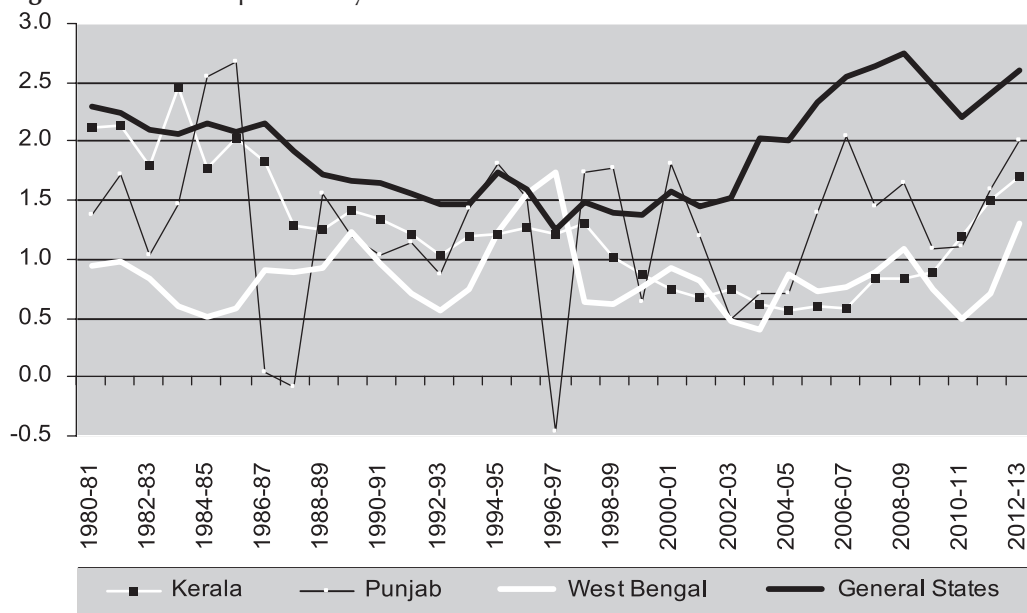
outlay fluctuated over time, and there were extreme shocks in 1987-88 and 1996-97, mainly because of the negative capital outlay on food storage and warehousing in the *economic services* under the 'development' head. Therefore, the observed lofty value of fiscal deficit between late 1990s to early 2000s (Figure 1) is not due to increased capital outlay for Kerala, Punjab, and West Bengal. However, General States revealed an upward trend of capital outlay after 1997-98. Yet again, corresponding to the capital outlay position of General States, Kerala and Punjab have performed better than West Bengal in recent years.

2.3 Trend of Revenue Deficit

A look into the revenue accounts of the state budget, which is a statement of the government's consumption responsibility and potential income in current year, shows why the financial performance of subnational governments have been attracting enormous concern in most public debates since the mid-1980s. General States together with the KPW have experienced a positive RD-GSDP ratio since the mid-1980s (Figure 3). Moreover, the revenue account deficit for the states accelerated sharply from 1997-98, when the similar acceleration for gross fiscal deficit was observed too. A comparison of Figures 1 and 3 shows the similarity in the broad trends of fiscal and revenue deficits since 1997-98, and it is an indication that the states have taken on fiscal deficit mostly to meet the revenue account gap. Of course, the decline in revenue account gap might be found since the early 2000s, but such an

improvement has moderately varied among Kerala, Punjab, and West Bengal. Unlike for General States in the recent past, the expected zero revenue deficit was never found for the KPW since latter half of the 1980s.

Figure 3 Trend of revenue deficit over time
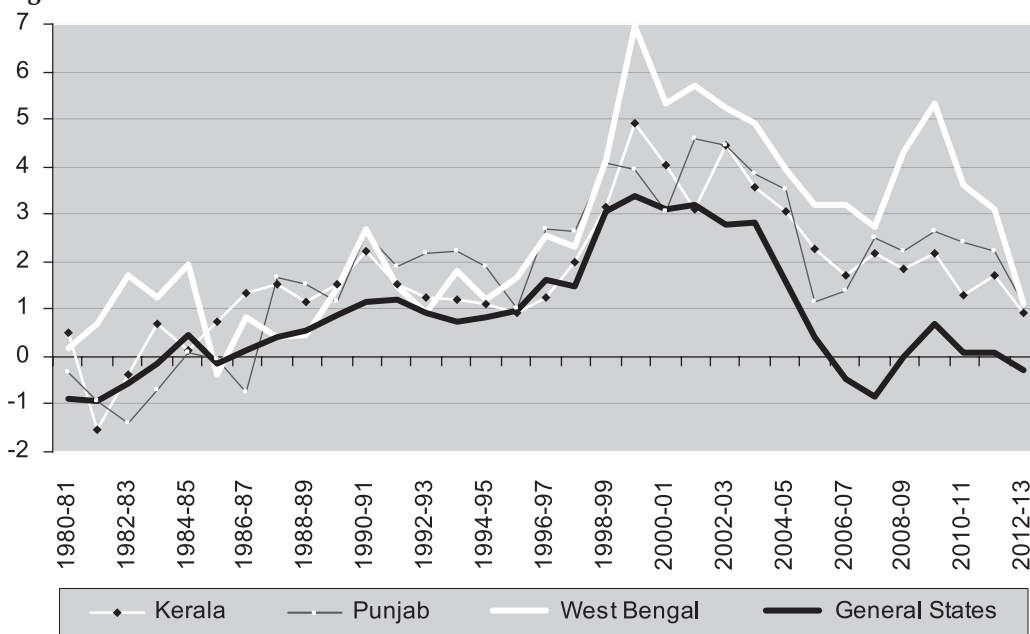
2.4 Trend of Primary Revenue Deficit

Ideally, states should generate enough primary revenue balance to service their debt, so that there would be no revenue account gap, and any fiscal deficit would occur only from the capital outlay (golden rule of deficit). To reach this *golden position*, a positive primary revenue balance therefore ought to be considered the preliminary condition, which we have found in before 1997-98 for General States, and Kerala excepting 1990-91 (see Figure 4). During this phase, a modest primary revenue deficit was observed for West Bengal in the early 1980s and both West Bengal and Punjab in the early 1990s. In the late 1990s, there was a serious primary revenue account deficit in all studied states, especially Kerala and West Bengal, and it might have boosted the RD-GSDP ratio and the resulting GFD-GSDP ratio (see the respective Figures 3 and 1). The primary revenue balance of all states recovered steadily during the early 2000s but West Bengal particularly lost ground in the late 2000s. West Bengal observed a positive primary revenue deficit in recent years. In its 2012-13 budget estimate, West Bengal projected a surplus primary revenue balance of about 2 per cent; however, it will not be easy to achieve.

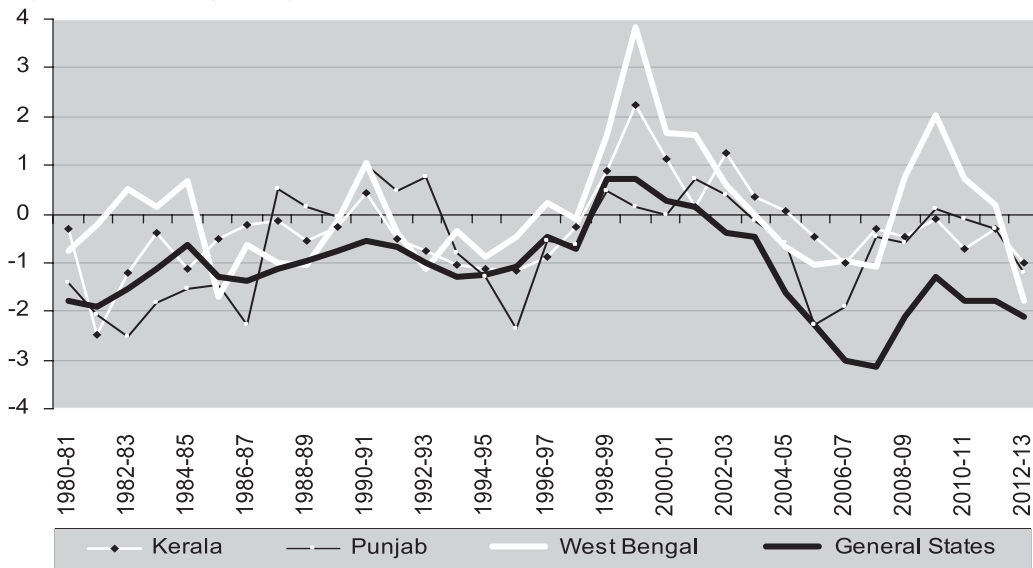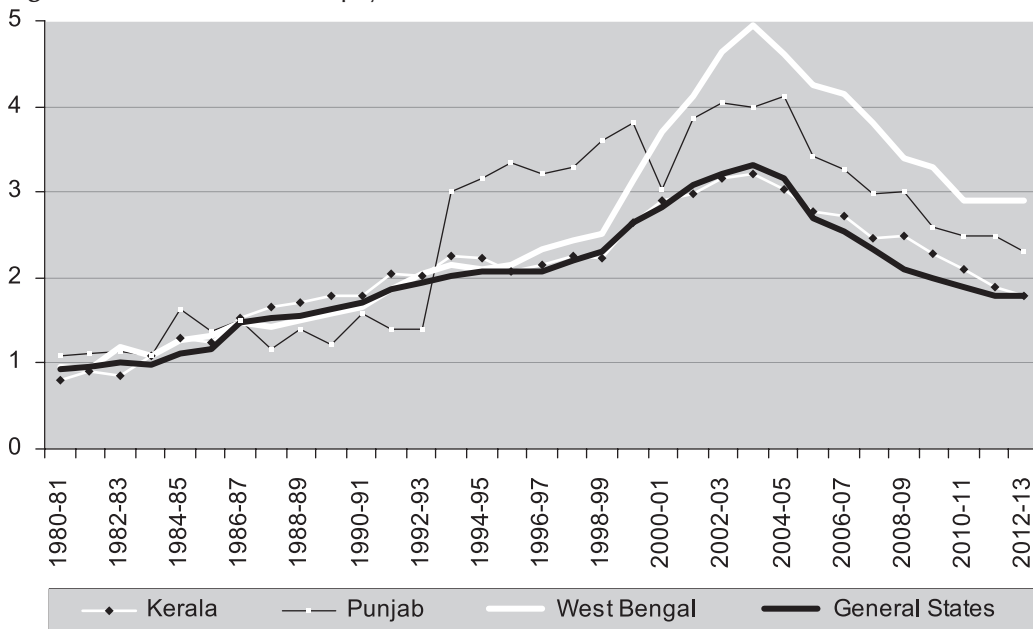**Figure 4** Trend of primary revenue deficit over time

**Figure 5** Trend of interest payment over time

11

2.5 Trend of Interest Payment

With the acceleration since late 1990s, the committed debt servicing liability rose steadily for all states until 2003-04 (Figure 5). Nevertheless, Punjab commenced a sharp rise in the IP-GSDP ratio from the early 1990s. West Bengal crossed Punjab in the early 2000s and carried on the high IP liability until recently, but Kerala followed almost the same trend as General States throughout. As per the recent decreasing trend, the debt servicing liability for Punjab lies between the highest value of West Bengal to lowest value of Kerala and General States.

2.6 Trend of State Own Revenue

Like high IP liability (Figure 5), the declining trend of own revenue (Figure 6) also exacerbated imbalances in state governments' budgetary position during the second half of the 1990s. Later on, however, the states recovered their own revenue position, except for West Bengal. The revenue performance of West Bengal in the 2000s never attained its past level during the 1980s to the early 1990s, although the OTR-GSDP ratio for this state has run on an exceptionally low level in all the time. Nevertheless, corresponding to the General States, Kerala has followed roughly the same trend, and Punjab observed moderately better revenue performance (especially during the 2000s).

Figure 6 Trend of state own revenue over time
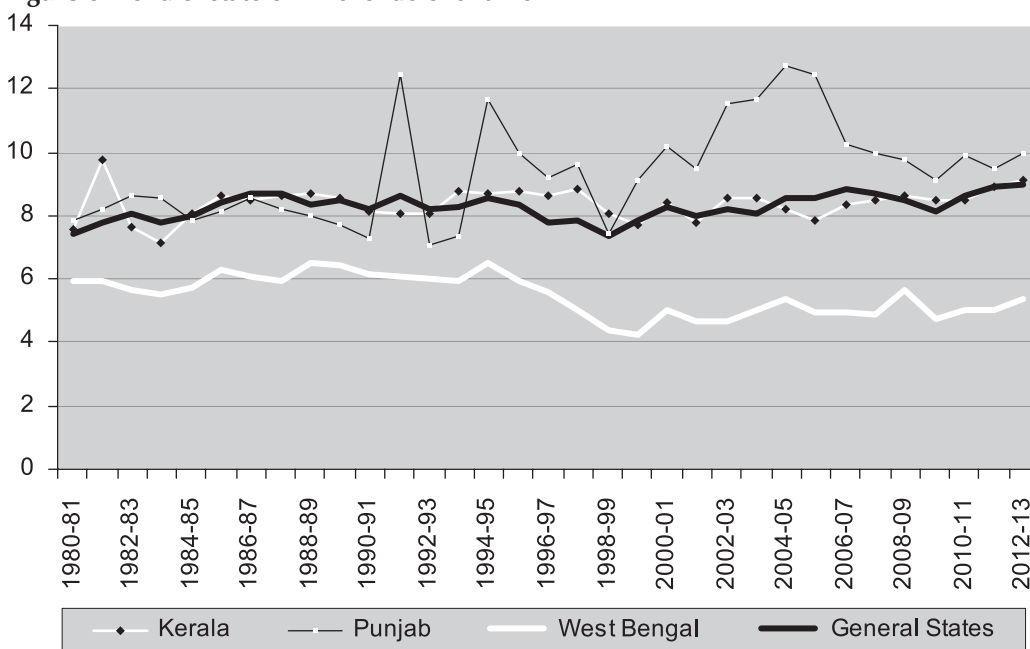
So far, the comparison of long term trends of financial variables seems to suggest that there is a moderate dissimilarity among Kerala, Punjab, and West Bengal, though they are recently in fiscal trouble, especially on the revenue account position. In particular, the high deficit, low capital outlay, and poor collection of own revenue over the years leads to West Bengal being 'fiscally challenged'. Since the extent of fiscal problems differs from Bengal to Punjab and Kerala, it seems to have different implications for their long run fiscal stance. In this regard, the literature emphasises a steady level of government debt over time because more stock of outstanding debt eventually fuels IP liabilities and, consequently, the debt-deficit spirals (Chakraborty 2002). As mentioned early on, the government's long run debt-deficit behaviour is fairly a question of stability and sustainability in the fiscal position. The following section deals with this issue.

3 STABILITY AND SUSTAINABILITY OF STATE FISCAL HEALTH

Many studies have examined the impacts of government debt-deficit behaviour on the economy. There is still an important theoretical debate on financing government expenditure by incurring fiscal deficit.[2] In the context of the Indian economy, Chakraborty (2002) and others observed that the increase in fiscal deficit via public borrowing does not necessarily raise the rate of interest to crowd out private investment. Rangarajan and Srivastava (2005) found an adverse effect of the large primary deficit on growth of output in recent years. They are also of the view that while the FRBM defines 'deficit target', it should also be considered in conjunction with a targeted level of debt stock (p. 2931). To decide on the long run fiscal stance, the government's debt and deficit behaviours should be considered simultaneously. As argued earlier, in public finance literature, the long run debt-deficit behaviour of a government involves two integrated issues: namely stability and sustainability of fiscal position. This study analyses each of them as follows.

---

[2] There are three views on the effect of expansionary fiscal policy by incurring fiscal deficit to raise government expenditure. Keynesian economists suggest that the budget deficit in multiplier effect positively impacts macroeconomic activity. Within the framework of endogenous growth models, budget deficits can affect long term growth positively if the deficits are used to finance growth-enhancing expenditure such as developmental expenditures on public infrastructure, education, health, etc. (Barro 1990; Lucas 1988; Romer 1990). Contrary to the positive view, neoclassical economists argue that budget deficits have detrimental effects on long-term economic growth by the competition between public and private investments. At last, the Ricardian equivalence perspective demonstrated by Barro (1974) argues that the variation in the budget deficit is neutral to economic growth. These theoretical debates may well be recognised in the course of the IS-LM framework, such that any increase in government expenditure causes the IS schedule to shift up, which has then two effects with the given LM curve: rise in level of output as well as rate of interest. Nevertheless, the increase in the rate of interest reduces the private level of savings and, hence, full multiplier does not operate owing to the crowding out effect. Of course, the result would be relied on the position of economy as initial horizontal part of LM (full effective fiscal policy), ending vertical LM part (ineffective fiscal policy) or in between the two. Again, exogenous factors might shift the LM schedule, and hence the final effect would become more inconclusive

3.1 Issue of Stability

In the context of fiscal stability, debt dynamics relative to output (DBT to GDP or GSDP at national-/subnational-level) has two factors: (1) deficit position of government and (2) comparative growth rate of economy against the effective interest rate on outstanding past debt (Rajaraman et al. 2005; TwFC 2004). At the subnational level, fiscal stability in terms of debt may be attained as long as the DBT-GSDP ratio follows a steady state path over time. To understand this issue, consider the state government budget constraint, which does not allow any seigniorage. For any period t, the subnational government budget identity is $G_t + r_t B_{t-1} - R_t = B_t - B_{t-1}$, where G is government spending on goods and services (including transfer payment but excluding interest liability), R is government revenue, B is outstanding debt and r is rate of interest on past debt. Now, since $G_t - R_t = P_t$ is primary deficit, the above budget equation may be rearranged to:

either $B_t - B_{t-1} = P_t + r_t B_{t-1}$ .... (1)

or $B_t = P_t + (1+r_t)B_{t-1}$ .... (2)

Normalising now any one of the above equations by GSDP (Y), where $Y_t = (1+g_t) Y_{t-1}$ and g_t = growth rate of output Y_t, it becomes:

$$b_t = p_t + \left(\frac{1+r_t}{1+g_t} \right) b_{t-1} \quad \text{... (3)}$$

Equation (3) simply implies that the outstanding public debt is an accumulated sum of primary deficit and adjusted past stock of debt with the ratio of interest rate to output growth at current period. This relation follows the change in current debt over the past level as:

$$b_t - b_{t-1} = p_t - \left(\frac{g_t - r_t}{1+g_t} \right) b_{t-1} \quad \text{... (4)}$$

Considering the determinants of debt dynamics, equation (4) splits the change of debt over time into two factors: (i) primary deficit and (ii) gap between growth and interest. Nevertheless, following this decomposition measure, the FC has estimated the contribution of primary deficit and that of the differential between growth and interest to discuss the rise in debt stock of India (TwFC 2004: 65). It is however clear from equation (4) that any increase in debt stock would be the outcome of accumulated primary deficit only if growth rate is equal to interest rate. As long as the rate of interest exceeds growth of output, it increases debt stock above the level of primary deficit. Now, the DBT-GSDP ratio ($b_t = B_t/Y_t$) is to be stabilised over time, if it follows a steady state value (that is, $\Delta b_t = b_t - b_{t-1} = 0$). From equation (4), we therefore obtain the debt-stabilising primary deficit as:

$$p_t^* = \frac{g_t - r_t}{1 + g_t} \; b_{t-1} \; \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots \quad (5)$$

Clearly, the debt stock will remain unchanged over the past level as long as the actual primary deficit is equal to its debt-stabilising level, that is $p_t = p_t^*$. In the canonical framework of Domar (1944), however, both rate of interest and growth of output are assumed exogenous. Rangarajan and Srivastava (2005) have considered the long run constancy of the nominal growth rate and effective interest rate in their basic formulation of canonical model (p. 2924).[3] Nevertheless, as discussed earlier (in note 2) there is an inconclusive theoretical view about the validity of this assumption. It is indeed useful to recognise that g_t and r_t are not independent because government borrowing for investment expenditure can increase the rate of growth as well as put pressure on the interest rate by competing with the private sector.

The movement of growth vs interest rates as well as actual vs stable primary deficits, and the consequential impact on outstanding debt over time are portrayed respectively in Figures 7–10 for Kerala, Punjab, West Bengal, and General States. In these figures, the observed high-flying debt stock of subnational states between the late 1990s and early 2000s seems to be immediately identified by the higher value of actual primary deficit from its stability level, because the rate of interest exceeds growth of output and hence increases debt stock above the level of primary deficit. A similar analysis is also valid in other periods, although little effect on the debt stock has been observed, owing to the interaction between decomposing factors, namely growth-interest gap and level of primary deficit. For instance, Kerala in 1991-92 observed the highest positive gap of growth vs interest (g – r), which in turn led to move up the stability level of primary deficit from its actual value and hence debt stock reduced by two percentage points in size (Figure 7).

In the same year, Punjab also attained its highest positive (g – r) gap and hence the resultant stability point lifted up and debt stock declined (Figure 8). West Bengal achieved the highest positive (g – r) in 1987-88 (Figure 9) and General State in 1993-94 (Figure 10), and they experienced the same things on stability level as well as debt stock. Further, Punjab in the recent phase and West Bengal in the pre-1997-98 phase observed some primary deficits in excess of the stability points. Of course, the stability performance of Punjab in recent phase showed a disheartening financial health for the state.

---

[3] In the literature, this canonical model is also used to determine the fiscal sustainability with a few added restrictions. Besides constancy of the Domar gap ($g_t - r_t$), fiscal sustainability in original canonical framework strictly assumes that the deficit level is also constant over time. Considering the canonical assumptions, there is however different formulation on the fiscal sustainability, such as concerning debt and deficit, interest payment and revenue receipt, etc. For details, see TwFC (2004)

Figure 7 Growth vs interest rates and actual vs stable primary deficits, and the corresponding debt for Kerala
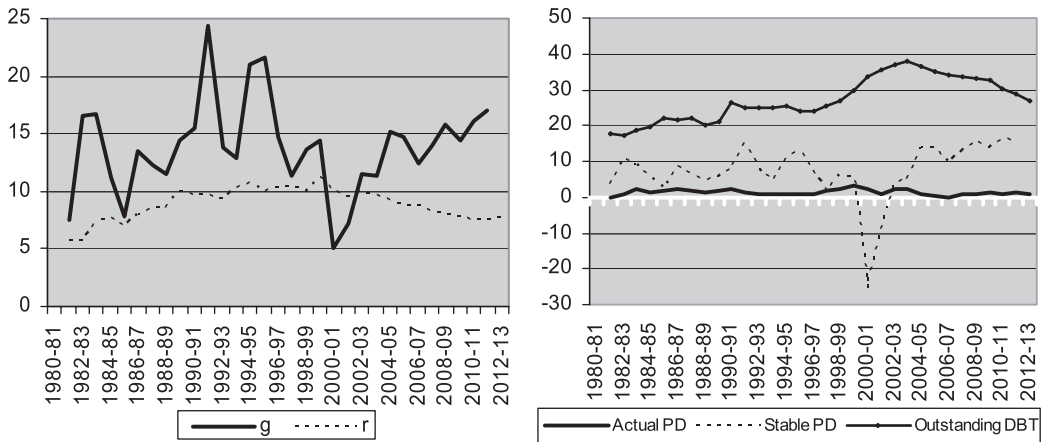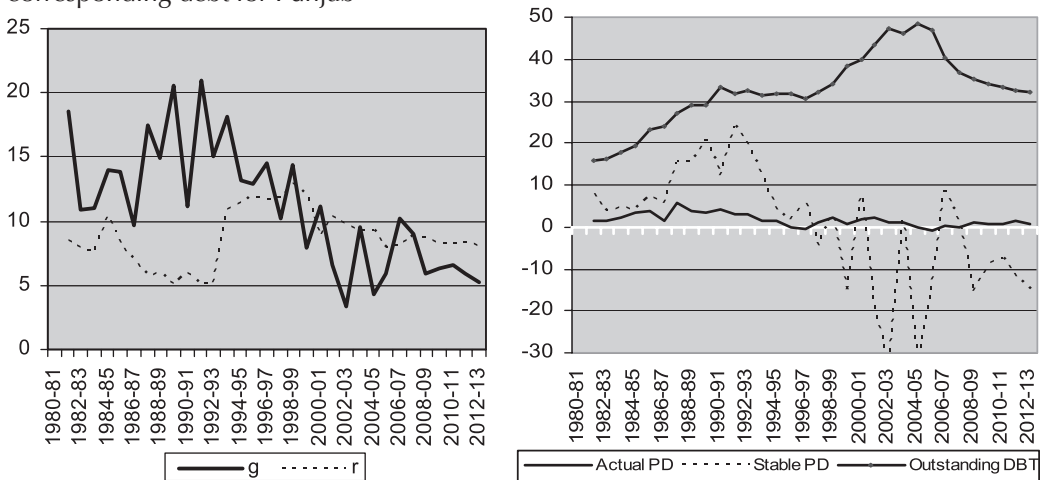

Figure 8 Growth vs interest rates and actual vs stable primary deficits, and the corresponding debt for Punjab

The canonical debt stability model seems to well explain the debt dynamics of subnational states, but some intricacies have occurred because of the basic formulation of the Domar gap (g – r). If two states experience nearly the same level of output growth but different rates of interest, the state with a higher rate of interest and larger stock of past debt may observe a similar stability implication like the state with a low interest rate and a low stock of debt. Moreover, in the canonical framework, a steady state level is to be attained if the government kept all its fiscal variables (level of deficit, stock of debt, rate of interest, and growth of output) not larger than the long run average value (Mendoza & Oviedo 2009) that

in turn leads to a limited fiscal space for the government. Yet again, there is no theoretical ground for designing any particular constant value of debt stock as superior or preferable, and hence a bound on the debt stock should be considered by its revenue raising capacity (Rajaraman et al. 2005). That means, the government is a solvent one, and its positive net worth can service the debt. In public finance literature, this solvency condition is customarily tested through the government's intertemporal budget constraint. The government is then said to be fiscally sustainable as soon as its solvency is found in the long run.

Figure 9 Growth vs interest rates and actual vs stable primary deficits, and the corresponding debt for West Bengal
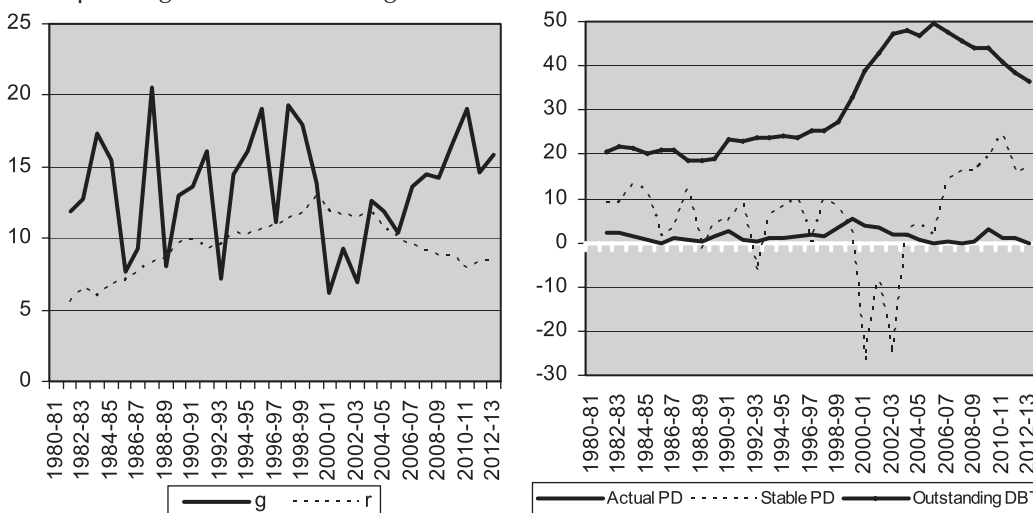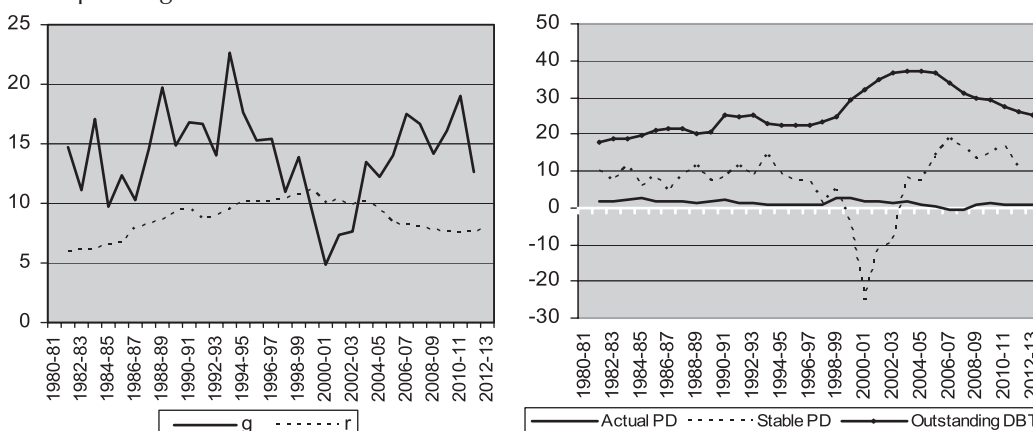

Figure 10 Growth vs interest rates and actual vs stable primary deficits, and the corresponding debt for General States

17

3.2 Issue of Sustainability

The conditions of sustainable fiscal health for a government in intertemporal formation may be started from the budget constraint specified in equation (2). Since $S_t = R_t - G_t = -P_t$ is primary surplus, and there are matching budget constraints for the periods t+1, t+2, etc., by solving the equation (2) forward with output normalisation term leads to following intertemporal budget constraint (Landolfo 2008; MacDonald 1992; Quintos 1995; Uctum et al. 2006):

$$b_t = \sum_{j=1}^{n}\prod_{i=1}^{n}(1+r_{t+i})^{-1}s_{t+j} + \prod_{i=1}^{n}(1+r_{t+i})^{-1}b_{t+n} \dots\dots\dots\dots\dots\dots\dots\dots\dots (6)$$

Now, the necessary and sufficient condition for sustainability (or government solvency) implies that at any period t, the discounted value of debt stock for t + n future periods would be vanished as long as n goes to infinity: $\lim_{n\to\alpha}\prod_{i=1}^{n}(1+r_{t+i})^{-1}b_{t+n} = 0.$

This is called the transversality condition, which implicitly rules out the Ponzi scheme. If the government solvency condition holds, equation (6) becomes:

$$b_t = \sum_{j=1}^{n}\prod_{i=1}^{n}(1+r_{t+i})^{-1}s_{t+j} \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots (7)$$

Equation (7) implies that the outstanding debt equals the present discounted value of future surpluses if the government arrives at a solvency point. This algebraic estimation of the long run equilibrium relationship involves a formal econometric test of cointegration between the time series b (debt) and s (surplus). The long run equilibrium theory in the literature on econometrics concerning such time series, which are usually found non-stationary in the real world, requires stationarity in the combination of variables (Enders 1994: 357). In the contemporary literature on public finance, this is effectively a test of government financial sustainability with extensive applications worldwide.[4] Hence,

---

[4] In empirical literature, researchers have frequently proceeded with equation (7) by considering debt and deficit, which are basically the expected realisations of government revenue (R) and spending (G). To recognise all the realisations of R and G, Hakkio and Rush (1991) suggested an alternative framework by enacting the validity of transversality condition. Their laborious algebraic manipulations with the accounting identity of intertemporal budget constraint in equation (6) offers $\dot{G}_t = a + R_t + \lim_{k\to\alpha}(1+r)^k B_{t+j} + u_t$, where $r_t = r \ \forall \ t$.
This version of intertemporal budget constraint considers government expenditure ($\dot{G}_t$) as including interest payment on past debt and the interest rate is unconditional mean of interest rate r_t in real term (Haug 1995). Now, allowing for sustainability, they rearranged the budget identity into a cointegrating relation as $R_t = \lambda + \delta \dot{G}_t + \varepsilon_t$. For contemporary studies worldwide on fiscal sustainability using intertemporal budget, see Bajo-Rubio et al. 2010; Darrat 1998; Hakkio and Rush 1991; Jha and Sharma 2004; MacDonald 1992; Uctum et al. 2006; etc

the sustainability in government fiscal stance for any state under our study indicates a statistical cointegration in its time series debt and primary balance.[5]

Notably, in the conventional two-stage unit root tests to detect long run equilibrium using the cointegrating relation between debt and deficit series considers the test of stationarity of each individual series in first stage. Among the different forms of ADF unit root test, the best fitted models (Table 2) reveal that the debt series attained the stationarity after differentiating twice and deficit series as I(1).

Table 2 Results of ADF unit root test

State	Series	Best fitted model	Lag length	DW-stat	τ-stat	5 % critical	Level of stationarity
Kerala	Debt (b_t)	ADF (α, t)	1	2.0525	-5.4223	-3.5731	I(2)
	Deficit (s_t)	ADF (α)	1	2.0357	-4.3787	-2.9627	I(1)
Punjab	Debt (b_t)	ADF (α, t)	1	1.9212	-5.3863	-3.5731	I(2)
	Deficit (s_t)	ADF (α)	2	1.9918	-2.9718	-2.9665	I(1)
West Bengal	Debt (b_t)	ADF (α, t)	1	2.0601	-5.1774	-3.5731	I(2)
	Deficit (s_t)	ADF (α)	2	1.9913	-3.3283	-2.9665	I(1)
General State	Debt (b_t)	ADF (α, t)	1	1.9940	-4.4387	-3.5731	I(2)
	Deficit (s_t)	ADF (α)	1	2.0204	-6.3166	-2.9627	I(1)

Notes: ADF (α, t) stands for augmented Dickey-Fuller model with drift (α) and deterministic trend (t); ADF lag length is selected on the Akaike/Schwarz criterion; DW-stat approaches to 2 means no autocorrelation; test statistic τ is compared with the MacKinnon critical value at 5 % level for null hypothesis of unit roots.

---

[5] The formal inquiry of cointegration between time series variables like **b** and **s** in equation (7) is usually carried out by two successive tests for unit root(s). The first determines the number of unit root(s) for each individual series of **b** and **s**. The next stage detects unit root(s) in error series estimated from the cointegrating relation between **b** and **s** (Hamilton 1994). Usually, the second unit root test is performed as long as the cointegrating variables **b** and **s** are contained the same number of unit root(s) in first stage, which means the variables are integrated in same order. The long run equilibrium then attains if the error series (û) from the linear combination of **b** and **s** is found stationary (no unit root). The augmented version of Dickey-Fuller test for unit root at the first stage and Engle-Granger cointegration test for error unit root at the final stage are usually applied in the literature. A general form of unit root test considers the time series þ as

$$\Delta þ_t = \alpha + \beta\, þ_{t-1} + \gamma t + \sum_{j=1}^{n} \delta_j \Delta þ_{t-j+1} + \varepsilon_t.$$

Here, Δ is the difference operator (that means $\Delta þ_t = þ_t - þ_{t-1}$ and so on), **t** is deterministic trend, and **n** is number of autoregressive terms (which are selected by the diagnostic checking to control autocorrelation). The null hypothesis of unit root is tested by estimating t-value for $\hat{\beta}$ and compares with the theoretical τ distribution provided by Dickey and Fuller (1979) for ADF test and Engle and Granger (1987) for AEG test. Notably, the residual based AEG cointegration test needs to modify toward Haldrup (1994) cointegration test if the time series variables appear as I(1) and I(2), but there seems to be a possibility that the system would not be *fully cointegrated* as I(0) (Maddala & Kim 1998: 349)

Nevertheless, the double unit roots I(2) in time series data, which are often found for the economic variables in nominal form (Engsted et al. 1997; Haldrup 1994; Shin & Kim 1999), such as in our present debt series, lead to an incompatibility of standard residual-based unit root test in the second stage. There are, however, various techniques in contemporary econometrics literature to analyse the systems of I(2, 2) or I(2, 1) cointegrating variables. A detailed discussion on the single equation I(2, 2), I(2, 1) and I(2, 0) cointegration models may well be found in Haldrup (1994). When we deal with the I(2) and I(1) variables, several possibilities may exist: the linear combinations of I(2, 1) variables, that is to say the error unit root, can be I(0) indicating a full or perfect cointegration, I(2) for no-cointegration and I(1) if imperfect or no full-cointegration. Therefore, a state government would arrive at long run fiscal equilibrium quickly as long as full-cointegration is found between the debt and deficit series, since a I(2, 1) cointegrating system with I(0) form of error stationary implies a super consistency of the model (Maddala & Kim 1998).

Table 3 Results of Haldrup cointegration test

	West Bengal	**Punjab**	**Kerala**	**General State**
τ-stat in level	– 2.8544	– 2.2887	– 1.7972	– 2.5817
τ-stat in 1st difference	– 1.8199	– 4.1986**	– 4.9624*	– 4.2977*
τ-stat in 2nd difference	– 4.9366*	–	–	–
Critical value (5 %)	– 4.21	– 4.21	– 4.21	– 4.21
Critical value (10 %)	– 3.79	– 3.79	– 3.79	– 3.79
Cointegration results	No-cointegration	Single or partial cointegration	Single or partial cointegration	Single or partial cointegration
LR equilibrium status	Inconsistent	Consistent	Consistent	Consistent

Notes: * and ** respectively indicate rejection of null hypothesis no-cointegration at 5 % and 10 % levels; Haldrup (1994) residual-based unit root test does not consider drift and trend since they appear in the initial cointegrating regression.

The residual-based Haldrup test results of our studied state governments concerning their debt-deficit cointegrating regressions are portrayed in Table 3. None of the states has accomplished super consistency for cointegration in the debt-deficit series. However, except for West Bengal, they attained partial cointegration between debt and deficit, indicating an imperfect equilibrium as the system slowly restores long run sustainability. West Bengal is far away from long run equilibrium in the debt-deficit position; its future surpluses are not enough to service the debt. The formal time series test results for the fiscal sustainability of

Kerala, Punjab, and West Bengal are also consistent with their long run trend of basic fiscal variables, as reviewed earlier. Given that the extent of fiscal problems differs from West Bengal to Punjab and Kerala, it has been implemented differently in their long run fiscal sustainability. The unsustainable fiscal health for West Bengal seems to be justified by its high deficits, low capital outlay, and low collection of own revenue over long periods.

4 CONCLUSION

The study compares the fiscal stance for Kerala, Punjab, and West Bengal, which the Government of India recently declared financially unhealthy. We review their fiscal shape at the level of general category states as a whole and assess their financial stability and sustainability on the debt-deficit behaviours over time. Our intensive reviews on recent performance and long term trend of basic fiscal variables (such as deficits in the government budget, stock of outstanding debt, pattern of expenditures, etc.) help identify the relative financial health across KPW. The overview of fiscal performance shows that KPW are fiscally unhealthy general category states, especially on the revenue account position, and that there is a moderate dissimilarity between West Bengal to Punjab and Kerala. West Bengal has had low capital outlay and low collection of own revenue since the 1980s, and its IP liabilities and deficit levels have exceeded all other states from the late 1990s. During the late 1990s to early 2000s, however, a sharp rise in the revenue account gap caused fiscal deficit to grow steadily and hence a high-flying debt stock in all the states, including KPW. This high-flying debt stock of subnational states emerged as a higher value of actual primary deficit from its stability level. Since the rate of interest exceeded the growth of output during this period, it increased debt stock above the level of primary deficit. In other periods, however, a diminutive effect on the debt stock is observed because of the interaction between the growth-interest gap and primary deficit level. But Punjab in the recent phase and West Bengal from the 1980s to the early 1990s phase often observed some primary deficits in excess of their stability points, though Punjab's recent stability performance showed disheartening financial health.

The use of the stability approach to explain the debt dynamics of subnational states in the canonical framework leads to some intricacies, especially on the basic formulation of the growth-interest gap and the long run constancy assumption of basic fiscal variables that limit the government's room to deal with short run dynamics. Therefore, our sustainability analysis shifted the paradigm towards the intertemporal formulation of the government budget, which links the short run dynamics of debt and primary balance with the long run solvency condition using the present value of future surpluses. The algebraic estimation of

this long run equilibrium relationship involves a formal econometric test of cointegration between the time series of debt and deficit. Except West Bengal, states attained partial cointegration between debt and deficit, thereby indicating an imperfect equilibrium because the system restores long run sustainability slowly. West Bengal is far from long run equilibrium since its debt and deficit are not cointegrated.

Therefore, the study suggests that while a sound adjustment in fiscal position, especially on the revenue account, is essential for all states, West Bengal needs special attention to reach a long run equilibrium path. To improve the revenue balance, states should cut non-interest outlays and IP liabilities and look for unexplored sources to augment revenues. A focus on primary balance is necessary to stabilise debt stock. Similarly, a robust fiscal reform programme is required to cope with the unsustainable debt dynamics and help states achieve long run equilibrium quickly.

REFERENCES

Bajo-Rubio, O., C. Díaz-Roldán and V. Esteve (2010): On the sustainability of government deficits: Some long-term evidence for Spain, 1850-2000, *Journal of Applied Economics* 13(2): 263-281.

Barro, R.J. (1974): Are Government Bonds Net Wealth? *Journal of Political Economy* 82(6), 1095-1117.

Barro, R.J. (1990): Government Spending in a Simple Model of Endogenous Growth, *Journal of Political Economy* 98(5): S103-S126.

Chakraborty, L.S. (2002): Fiscal Deficit and Rate of Interest: An Econometric Analysis of the Deregulated Financial Regime, *Economic and Political Weekly* 37(19): 1831-1838.

Darrat, A.F. (1998): Tax and Spend, or Spend and Tax? An Inquiry into the Turkish Budgetary Process, *Southern Economic Journal* 64(4): 940-956.

Domar, E. (1944): The Burden of Public Debt and National Income, *American Economic Review* 34(4): 798-827.

Enders, W. (1994): *Applied Econometric Time Series*, John Wiley, NJ.

Engsted, T., J. Gonzalo and N. Haldrup (1997): Testing for Multicointegration, *Economics Letters* 56(3): 259-266.

Hakkio, C.S. and M. Rush (1991): Is the budget deficit "too large?", *Economic Inequality* 29(3): 429-445.

Haldrup, N. (1994): The Asymptotics of Single-Equation Cointegration Regressions with I(1) and 1(2) Variables, *Journal of Econometrics* 63(1): 153-181.

Hamilton, J.D. (1994): *Time Series Analysis*, Princeton University Press, NJ.

Hamilton, J.D. and M.A. Flavin (1986): On the Limitations of Government Borrowing: A Framework for Empirical Testing, *American Economic Review* 76(4): 808-819.

Haug, A.A. (1995): Has federal budget deficit policy changed in recent years? *Economic Inequality* 33(1): 104-118.

Jha, R. and A. Sharma (2004): Structural Breaks, Unit Roots, and Cointegration: A Further Test of the Sustainability of the Indian Fiscal Deficit, *Public Finance Review* 32(2): 196-219.

Kurian, N.J. (1999): State Government Finances: A Survey of Recent Trends, *Economic and Political Weekly* 34(19): 1115- 1125.

Landolfo, L. (2008): Assessing the Sustainability of Fiscal Policies: Empirical Evidence from the Euro Area and the United States, *Journal of Applied Economics* 11(2): 305-326.

Lucas, R.E. (1988): On the Mechanics of Economic Development, *Journal of Monetary Economics* 22(1): 3-42.

MacDonald, R. (1992): Some tests of the government's intertemporal budget constraint using US data, *Applied Economics* 24(12): 1287-1292.

Maddala, G.S. and I.M. Kim (1998): *Unit Roots, Cointegration, and Structural Change*, Cambridge University Press, Cambridge.

Mendoza, E.G. and P.M. Oviedo (2009): Public Debt, Fiscal Solvency and Macroeconomic Uncertainty in Latin America: The Cases of Brazil, Colombia, Costa Rica and Mexico, *Economía Mexicana* 18(2): 133-173.

Quintos, C.E. (1995): Sustainability of the deficit process with structural shifts, *Journal of Business & Economic Statistics* 13(4): 409-417.

Rajaraman, I., S. Bhide and R.K. Pattnaik (2005): A study of debt sustainability at state level in India, *RBI Bulletin* 59, Reserve Bank of India, Mumbai.

Rangarajan, C. and D.K. Srivastava (2005): Fiscal Deficits and Government Debt: Implications for Growth and Stabilisation, *Economic and Political Weekly* 40(27): 2919-2934.

Romer, P.M. (1990): Endogenous Technological Change, *Journal of Political Economy* 98(5): S71-S102.

RBI (2007): *Manual on Financial and Banking Statistics* (Chapter 8: Fiscal Sector Statistics), Reserve Bank of India, Mumbai.

RBI (2010): *Handbook of Statistics on State Government Finances*, Reserve Bank of India, Mumbai.

RBI (2013): *State Finances: A Study of Budgets of 2012-13*, Reserve Bank of India, Mumbai.

Shin, D.W. and H.J. Kim (1999): Semiparametric Tests for Double unit roots based on Symmetric Estimators, *Journal of Business & Economic Statistics* 17(1): 67-73.

Times of India (2012): Government mulls cash bailout for West Bengal, Punjab and Kerala. *Times of India*, Jun 9, 2012. URL: http://articles.timesofindia.indiatimes.com/2012-06-09/india/32139909_1_debt-relief-moratorium-revenue-deficit.

TwFC (2004): *Report of the Twelfth Finance Commission*, Government of India, New Delhi.

Uctum, M., T. Thurston and R. Uctum (2006): Public Debt, the Unit Root Hypothesis and Structural Breaks: A Multi-Country Analysis. *Economica* 73(289): 129-156.

RECENT WORKING PAPERS

Title	Author (s) Name	Paper No.
Carbon Taxes vs Productivity Shocks: A comparative analysis of the costs in a CGE framework for India	Basanta K. Pradhan Joydeep Ghosh	E/317/2012
Food Price Inflation in India: Causes and Cures	Pradeep Agrawal Durairaj Kumarasamy	E/318/2012
India's Petroleum Demand: Empirical Estimations and Projections for the Future	Pradeep Agrawal	E/319/2012
Food Security, Productivity, and Gender Inequality	Bina Agarwal	E/320/2012
Productivity and Efficiency Impacts of Zero Tillage Wheat in Northwest Indo-Gangetic Plains	Prakashan Chellattan Veettil Vijesh V. Krishna	E/321/2013
Gender Gap in Life Expectancy in India, 1970–2006	Vladimir Canudas-Romo Nandita Saikia	E/322/2013
Noah Revisits Biodiversity Protection Prioritisation	David Martin	E/323/2013
Biodiversity Prioritisation and Gender	David Martin	E/324/2013
Cash vs In-Kind Transfers: Indian Data Meets Theory	Reetika Khera	E/325/2013
A Social Accounting Matrix for India 2007-08	Basanta K. Pradhan M.R. Saluja Akhilesh K. Sharma	E/326/2013
Democratic Politics and Legal Rights: Employment guarantee and food security in India	Reetika Khera	E/327/2013
Does Exchange Rate Intervention Trigger Volatility?	A Vadivel M Ramachandran	E/328/2013