

Subnational level fiscal health in India: stability and sustainability implications

Nimai Das

Received: 13 May 2014 / Accepted: 23 December 2014 / Published online: 6 January 2015
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Abstract Fiscal health of subnational governments is a priority area of concern in the contemporary policy debate in India. The central government has recently announced that Kerala, Punjab and West Bengal are fiscally unsound at the level of general category states. The study reviews this projection by recent and long-term trends of basic fiscal variables, and then assesses their financial stability and sustainability along the debt–deficit spiral over time. We found that a sharp rise in the revenue account gap caused fiscal deficit to grow steadily and hence a high-flying outstanding debt in all states during late 1990s to early 2000s. This enormous stock of debt emerged as a higher deviation 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. Furthermore, none of the states accomplished fiscal sustainability fully. Excepting West Bengal, they attained partial sustainability as their debt–deficit system slowly restores the 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 a special attention to achieve the equilibrium in long run.

Keywords Indian state · Government solvency · Long run equilibrium · Budgetary deficit · Public debt · Fiscal policy

JEL Classification C22 · E62 · H72 · H74

N. Das (✉)

Institute of Economic Growth, University of Delhi (North Campus), New Delhi 110007, India
e-mail: nimai_econ@rediffmail.com; nimai.das@phfi.org

1 Introduction

Perilous fiscal health of subnational level governments is a priority area of concern in the literature on public finance as well as 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 the 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 expenditures (TwFC 2004). This might have sharply raised government indebtedness, which in turn adversely affected growth in recent years (Rangarajan and 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. This study employs the concept of fiscal stability using debt dynamics in Domar (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 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 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 and Oviedo 2009). Nearly all formal statistical tests of fiscal sustainability have their roots in Hamilton and Flavin (1986) analysis of intertemporal budget constraint, which serves to link the short run dynamics of debt and primary balance with the government's long run solvency condition. The government is then 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 states 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 in Sect. 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 (Sect. 3). The final Sect. 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. States presently spend around 60 % of the combined expenditure by centre and states. But their shaky fiscal health overtime has own focus in most public debates. Since the latter half of 1980s, subnational governments have experienced financial imbalance due to emergent non-development expenditures on administrative services, salaries, pensions and interest payments as well as sluggish own revenue growth and shrinkage of central transfers; for some major states, the entire revenue became less than their committed expenditure, particularly after implementing pay revision recommended by the Sixth Pay Commission (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 have performed better while enacting subnational level fiscal responsibility legislation until global crisis hit the economy in early 2008–2009, but some states (such as KPW) missed their target of eliminating entire revenue deficit and cutting the fiscal deficit to 3 % of 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 2010, and a year 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 recent fiscal performance of 17 general

Table 1 Ranking of major states as per the selected fiscal parameters in last 5 years

GFD–GSDP	DBT–GSDP	RD–GSDP	PRD–GSDP	IP–RR	RD–GFD
Orissa (0.4)	Chattisgarh (14.4)	Madhya Pradesh (–2.4)	Madhya Pradesh (–4.4)	Chattisgarh (7.9)	Orissa (–535.5)
Chattisgarh (1.0)	Haryana (18.3)	Chattisgarh (–2.2)	Bihar (–4.0)	Andhra Pradesh (8.0)	Chattisgarh (–300.8)
Maharashtra (1.9)	Tamil Nadu (21.0)	Bihar (–1.7)	Orissa (–3.7)	Bihar (9.4)	Madhya Pradesh (–108.7)
Rajasthan (2.3)	Maharashtra (21.8)	Orissa (–1.7)	Uttar Pradesh (–3.4)	Madhya Pradesh (9.9)	Bihar (–94.1)
Madhya Pradesh (2.4)	Karnataka (22.8)	Karnataka (–0.9)	Chattisgarh (–3.3)	Jharkhand (10.4)	Jharkhand (–73.6)
Tamil Nadu (2.4)	Andhra Pradesh (24.4)	Uttar Pradesh (–0.9)	Jharkhand (–2.6)	Karnataka (10.9)	Uttar Pradesh (–27.7)
Haryana (2.4)	Orissa (24.8)	Jharkhand (–0.8)	Goa (–2.6)	Haryana (12.0)	Goa (–26.8)
Andhra Pradesh (2.6)	Jharkhand (24.8)	Goa (–0.4)	Rajasthan (–2.4)	Orissa (12.7)	Karnataka (–23.4)
Gujarat (2.6)	Gujarat (27.0)	Andhra Pradesh (–0.3)	Karnataka (–2.4)	Goa (13.1)	Rajasthan (–13.4)
Karnataka (2.8)	Madhya Pradesh (28.3)	Tamil Nadu (0.0)	Andhra Pradesh (–2.2)	Rajasthan (13.3)	Andhra Pradesh (–13.2)
Uttar Pradesh (3.0)	Goa (28.3)	Rajasthan (0.1)	Gujarat (–1.8)	Maharashtra (13.5)	Maharashtra (1.0)
Punjab (3.2)	Bihar (30.6)	Maharashtra (0.1)	Tamil Nadu (–1.5)	Gujarat (13.9)	Tamil Nadu (3.8)
Bihar (3.2)	Rajasthan (30.8)	Gujarat (0.2)	Maharashtra (–1.5)	Uttar Pradesh (15.3)	Gujarat (6.0)
Kerala (3.3)	Kerala (31.1)	Haryana (0.6)	Haryana (–0.8)	Tamil Nadu (15.9)	Haryana (34.2)
Goa (3.6)	Punjab (33.3)	Kerala (1.8)	Punjab (–0.4)	Kerala (19.6)	Kerala (52.5)
Jharkhand (3.7)	Uttar Pradesh (38.6)	Punjab (2.2)	Kerala (–0.4)	Punjab (20.0)	Punjab (69.5)
West Bengal (4.2)	West Bengal (41.3)	West Bengal (3.4)	West Bengal (0.2)	West Bengal (29.9)	West Bengal (85.9)

Seventeen general category states are ranked as better to shoddier based on average value of their fiscal performance during 2008–2009 to 2012–2013 for the respective indicators (values are presented in the parentheses); *DBT*, outstanding debt; *GFD*, gross fiscal deficit; *RD*, revenue deficit; *PRD*, primary revenue deficit; *IP*, interest payments; *RR*, revenue receipts; *GSDP*, gross state domestic product

Source Reserve Bank of India publication on *State Finances—A Study of Budgets* in different years

category states during 2008–2009 to 2012–2013.¹ The states are ranked on their average score of these past 5 years for the selected fiscal indicators: debt stock, deficits position, interest burden and extent of idle expenditure. Nevertheless, the review of governments' financial health may well be started by assessing the overall resource gap in their public budget.² The fiscal deficit relative to state domestic product (GFD–GSDP) is found smallest for Orissa and largest for West Bengal. Kerala and Punjab rank 14th and 12th among the 17 general states. The debt-to-output position (DBT–GSDP) is found lowest for Chhattisgarh and highest for West Bengal. Kerala is just stood before of Punjab, which ranks among the bottom three. However, perhaps the most important indicator of fiscal health is revenue deficit (RD–GSDP). In addition, the primary deficit on revenue account (PRD–GSDP) might show the true resource gap in government budget. Because the primary revenue balance does not consider interest payment liability 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 of 3.4 % among all general category states along with a positive primary revenue deficit.

In general, the poor performance of KPW on revenue balance is due to the lack of revenue receipts to meet expenditures, including interest payment on past debt. These three states also rank at the bottom on the interest payments to revenue receipts ratio (IP–RR). During 2008–2009 to 2012–2013, the interest payment liability was on an average 20 % in Kerala and Punjab in contrast to around 30 % 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 to fiscal deficit (RD–GFD) to compare states' fiscal performance on the creation of government assets (effectiveness of expenditures). Notably, the RD–GFD shows the part of fiscal deficit that does not transform to create assets, which may give future returns to the government. It follows that the borrowing to meet the revenue account gap is

¹ Indian government however taken some measures in this period to counter the effects of global meltdown on the economy due to Lehman Brothers crisis, and that resulted in a shortfall of revenues and substantial increases in government expenditures, leading to a temporary deviation in 2008–2009 and 2009–2010 from the fiscal consolidation path mandated under FRBM. This increase in public expenditure indeed helped compensate the effect of monetary tightening and push up domestic demand when exports suffered a huge collapse (Kumar and Soumya 2010).

² 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 expenditures deal with current expenditure needs for government functioning. On the other hand, capital receipts cover receipts as capital in nature and capital expenditures comprise spendings that are usually met from the borrowed funds to increase or construct permanent assets. Although all financial statements of the government are documented annually in the budget, the budgetary heads are broadly classified into revenue and capital accounts (RBI 2007). The overall resource gap between receipts and expenditures 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.

unproductive (idle-borrowing), because it cannot generate potential to service the debt. So, a positive RD–GFD means the government might fall into this idle-borrowing, which we found for the KPW along with few other states (Maharashtra, Tamil Nadu, Gujarat and Haryana) in last 5 years. The comparative analysis of recent fiscal performance therefore lends credence to the fact that despite moderate dissimilarities, the KPW are three unshaken general category states in India. To understand why, the next part in this section intensively reviews their basic fiscal variables in reformulated term over the past three decades.

The analysis of the long-term trend of fiscal variables of KPW seems to be initiated by their relative position in fiscal deficit, because any change in a state's debt stock in a year is similar to the fiscal deficit in that year since the state governments lack seigniorage power. Nevertheless, the gross 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 (CO) only (called golden rule of deficit), it is welcome to the economy, because government borrowing for capital investment generates income and employment opportunities in the future. Therefore, the decomposed part of fiscal deficit for CO may well be viewed as an active-deficit, and it indicates that a state with higher 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, the states with 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.³ We now normalise these fiscal variables by the state level output (GSDP) to study comparatively the long-term fiscal shape of KPW in contrast to general category states (hereafter 'General States') using latest available data from 1980–1981 to 2011–2012 as actual estimate and 2012–2013 revised estimate.

2.1 Trend of fiscal deficit

The fiscal deficit relative to state output is around 3 % in all selected states for the initial year of study (Fig. 1). This is however a threshold limit defined recently by the FC as acceptable. Afterward, until 1997–1998, the GFD–GSDP ratio fluctuated seriously for Punjab (peak value about 7 % in 1987–1988), moderately for Kerala and West Bengal (ranging between 4 and 1 %), and very slowly for General States

³ Indian federal transfer of resources from centre to states is rooted through three channels. The regional states have very less influence on central transfers by the Finance Commission and Planning Commission. Excepting the third channel of Ministerial Transfer on centrally sponsored schemes, federal devolution of resources are essentially the formula-based design with respect to states' structural and fiscal parameters. The measure of federal financial devolution is indeed a debatable area in literature, and beyond the scope of this paper. Notably, the subnational level FRBM is enacted for improving the states' fiscal stance, and a performance base transfer is included to design the resource devolution since 11th Finance Commission.

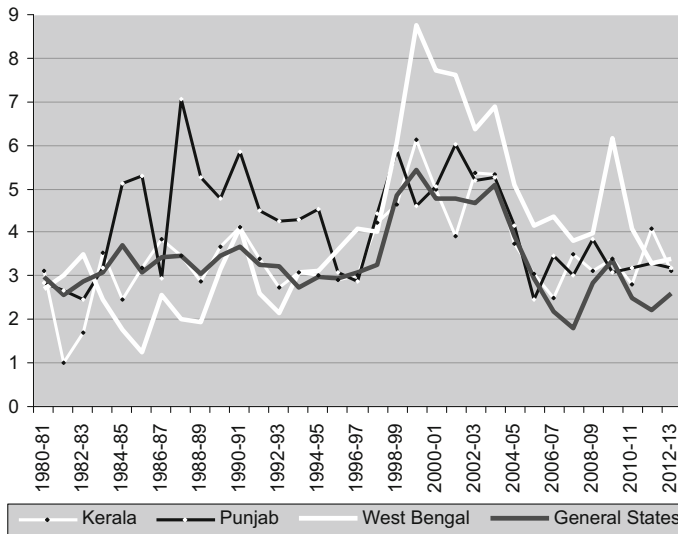


Fig. 1 Trend of fiscal deficit over the last three decades

(3 ± 0.5 %). Then, up to 2003–2004, the fiscal deficit increased remarkably for all selected states (with the peak around 1999–2000) and then started to decrease as a result of implementing FRBM, except for West Bengal in 2009–2010. The fiscal deficit of West Bengal exceeded all other states throughout, including Kerala and Punjab after 1997–1998 (with the exception of last 2 years).

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 1997–1998, West Bengal realised the peak value and Punjab reached the lowest level in CO (Fig. 2). Kerala’s CO declined steadily throughout the time, and since the late 1990s it was at the level of West Bengal, except for the recent few years. Barring an improvement in the mid-1990s, West Bengal has had shoddy CO throughout. The CO of Punjab fluctuated over time, and there were extreme shocks in 1987–1988 and 1996–1997, mainly because of the negative CO on ‘food storage and warehousing’ in the *economic services* under developmental head. Therefore, the observed lofty value of fiscal deficit between late 1990s and early 2000s (Fig. 1) is not due to increased CO for KPW. However, General States revealed an upward trend of CO after 1997–1998. Yet again, corresponding to the CO 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 account of state budget, which is essentially a statement of the government’s consumption responsibilities and income potentials in current

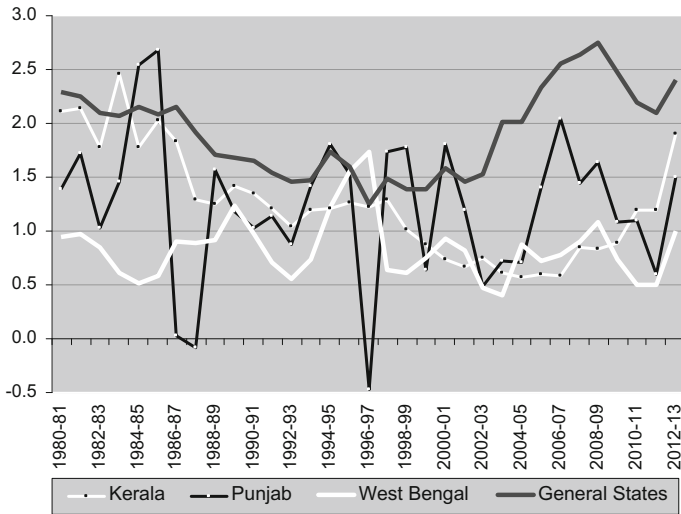


Fig. 2 Trend of capital outlay over the last three decades

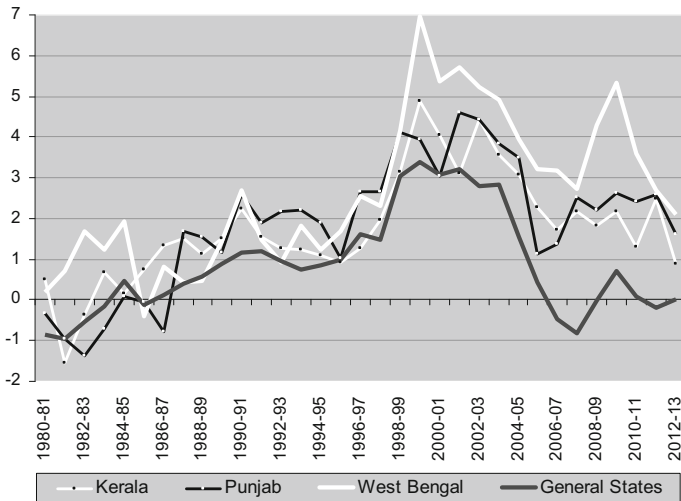


Fig. 3 Trend of revenue deficit over the last three decades

year, shows why the financial performance of subnational governments have been attracting enormous concern in most public debates since the late 1980s. Figure 3 clearly shows that the General States together with KPW have started to experience a positive RD–GSDP ratio from the mid-1980s. Moreover, the revenue account deficit for the states accelerated sharply from 1997–1998, when the similar acceleration for GFD was observed too. A comparison of Figs. 1 and 3 confirms the similarity in the broad trends of fiscal and revenue deficits since 1997–1998, and it is an indication that the states have carried on fiscal deficit mostly to meet the

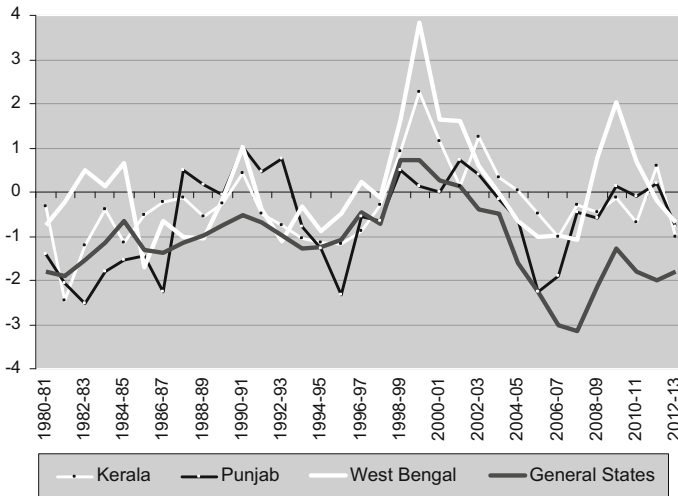


Fig. 4 Trend of primary revenue deficit over the last three decades

revenue account gap. Of course, a decline in the revenue account gap might be found since early 2000s, but such an improvement has moderately varied among KPW. 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.

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 CO (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 1997–1998 for General States, and Kerala excepting 1990–1991 (see Fig. 4). During this phase, a modest primary revenue deficit was observed for West Bengal in early 1980s and both West Bengal and Punjab in 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 Figs. 1, 3). The primary revenue balance of all states recovered steadily during 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 2012–2013 revised estimate, West Bengal projected a surplus primary revenue balance around 1 % of state output, though it will not be easy to achieve.

2.5 Trend of interest payment

With the acceleration since late 1990s, the committed debt servicing liability rose steadily for all states until 2003–2004 (Fig. 5). Nevertheless, Punjab commenced a

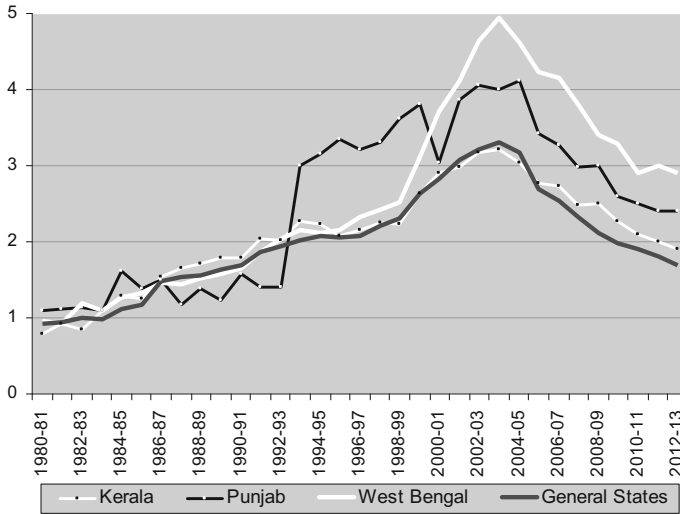


Fig. 5 Trend of interest payment over the last three decades

sharp rise in the IP–GSDP ratio from early 1990s. West Bengal crossed Punjab in early 2000s and carried on the high interest payment 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 interest payment liability (Fig. 5), the declining trend of own revenue (Fig. 6) also exacerbated imbalances in state governments' budgetary position during 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 2000s never attained its past level during 1980s and 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).

So far, the comparison of long term trends of financial variables seems to suggest that there is a moderate dissimilarity among KPW, 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 interest payment liabilities, and consequently the debt–deficit spirals (Chakraborty 2002). As

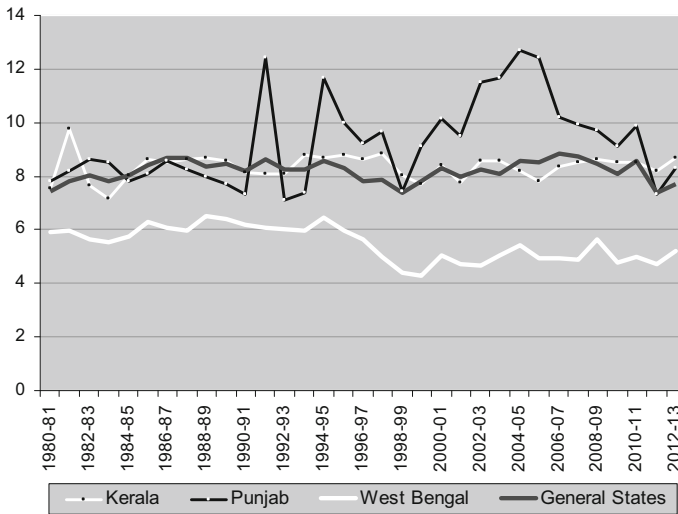


Fig. 6 Trend of state own revenue over the last three decades

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 (Hallett 2008). In the literature, there are three important views regarding 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 expenditures such as developmental expenditure 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 investment–saving (IS) schedule to shift up, which has then two effects with the given liquidity–preference–money–supply (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.

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 be considered too in conjunction with a targeted level of debt stock (p. 2931). To decide on the long run fiscal stance, therefore, the government’s debt and deficit behaviours should be judged simultaneously. As argued earlier, in public finance literature, the long run debt–deficit behaviour of a government involves two integrated issues, namely fiscal stability and sustainability. This study analyses each of them as follows by considering the time series of debt–deficit over past three decades.

3.1 Issue of stability

In the context of fiscal stability, debt dynamics relative to output (DBT–GDP/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

$$B_t - B_{t-1} = P_t + r_t B_{t-1} \quad (1)$$

or

$$B_t = P_t + (1 + r_t) B_{t-1} \quad (2)$$

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

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

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 past level as:

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

Considering the determinants of debt dynamics, Eq. (4) splits the change of debt over time into two factors: (1) primary deficit and (2) 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 Eq. (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. Therefore, in debt dynamics, the basic rule is that the debt ratio will rise if there is a primary deficit and if the interest rate exceeds growth rate. So as to reduce the stock of debt, there must either be a primary surplus or economy should grow faster than the rate of interest, or both. If one condition holds, it must be large enough to outweigh the adverse effect of other. 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 Eq. (4), we therefore obtain the debt-stabilising primary deficit as:

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

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 this 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). 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. (TwFC 2004). Nevertheless, 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 versus interest rates as well as actual versus stable primary deficits, and the consequential impact on outstanding debt over past three decades are portrayed respectively in Figs. 7, 8, 9 and 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

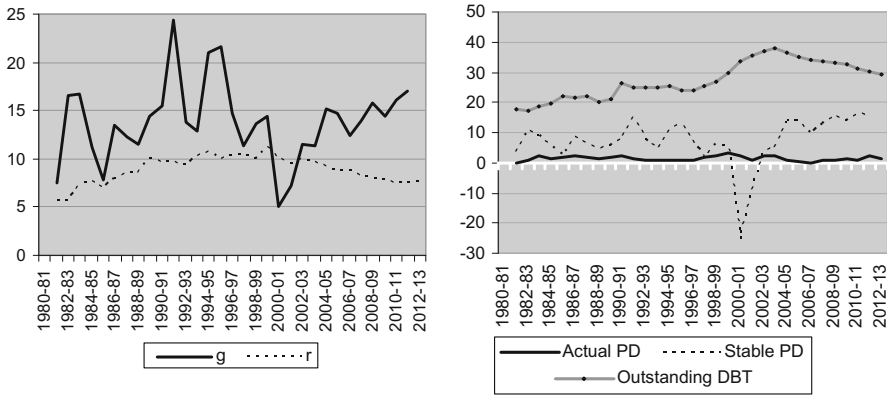


Fig. 7 Growth versus interest rates and actual versus stable primary deficits, and the corresponding debt stock over the last three decades for Kerala

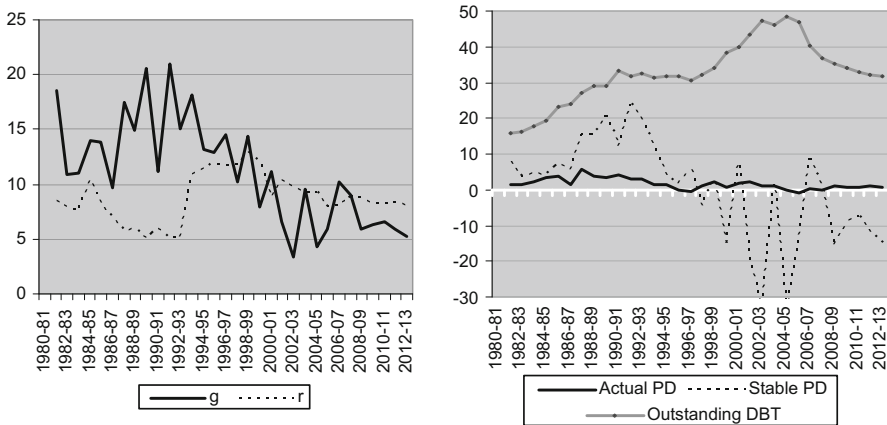


Fig. 8 Growth versus interest rates and actual versus stable primary deficits, and the corresponding debt stock over the last three decades for Punjab

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 1991–1992 observed the highest positive gap of growth versus interest ($g-r$), which in turn led to move up the stability level of primary deficit from its actual value and hence the debt stock reduced by 2 % points in size (Fig. 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 (Fig. 8). West Bengal achieved the highest positive ($g-r$) in 1987–1988 (Fig. 9) and General State in 1993–1994 (Fig. 10), and they experienced the same things on stability

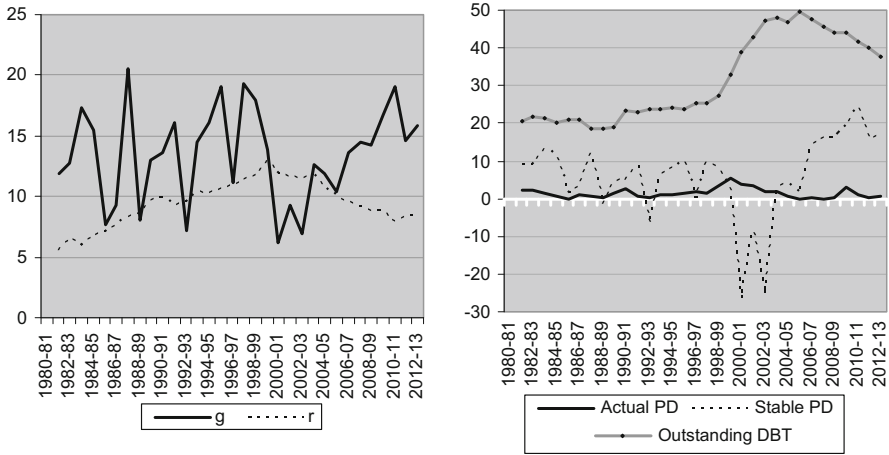


Fig. 9 Growth versus interest rates and actual versus stable primary deficits, and the corresponding debt stock over the last three decades for West Bengal

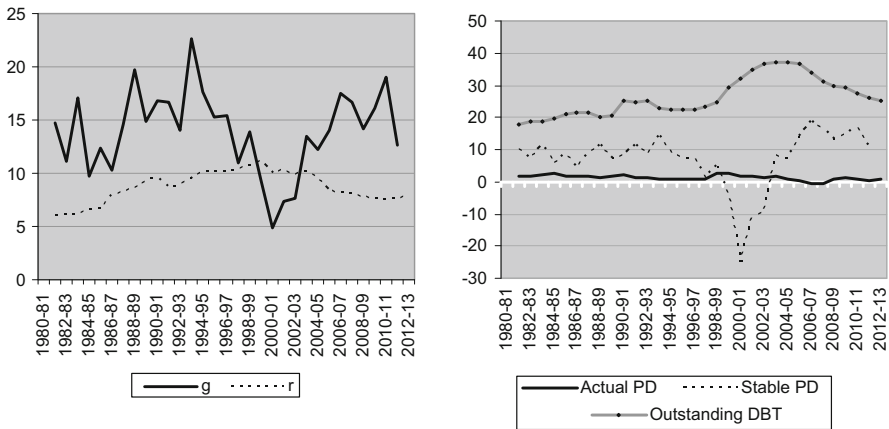


Fig. 10 Growth versus interest rates and actual versus stable primary deficits, and the corresponding debt stock over the last three decades for General States

level as well as debt stock. Further, Punjab in the recent phase and West Bengal in the pre-1997–1998 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.

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 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 and 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.

3.2 Issue of sustainability

The formulation of sustainable fiscal health for a government in intertemporal sense may well be started with the budget constraint specified in Eq. (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 Eq. (2) forward with output normalisation term leads to following intertemporal budget constraint (Landolfo 2008; MacDonald 1992; Quintos 1995; Uctum et al. 2006):

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

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: $\lim_{n \rightarrow \infty} \prod_{i=1}^n (1 + r_{t+i})^{-1} b_{t+n} = 0$. This is called the transversality condition, which implicitly rules out the Ponzi scheme. If the government solvency condition holds, Eq. (6) becomes:

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

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 stock) and s (primary surplus). The long run equilibrium theory in econometrics literature 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 (Bajo-Rubio et al. 2010; Brissimis et al. 2012; Darrat 1998; Hakkio and Rush 1991; Jha and Sharma

2004; MacDonald 1992; Uctum et al. 2006; etc.).⁴ Hence, the sustainability in government fiscal stance for any state under our study indicates a statistical cointegration in its time series—debt and primary balance.

The formal inquiry of cointegration between time series variables like \mathbf{b} and \mathbf{s} in Eq. (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 \mathbf{b} and \mathbf{s} . The next stage detects unit root(s) in error series estimated from the cointegrating relation between \mathbf{b} and \mathbf{s} (Hamilton 1994). Usually, the second unit root test is performed as long as the cointegrating variables \mathbf{b} and \mathbf{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 (\hat{u}) from the linear combination of \mathbf{b} and \mathbf{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.⁵ A general form of unit root test considers the time series \mathbf{p} as $\Delta \mathbf{p}_t = \alpha + \beta \mathbf{p}_{t-1} + \gamma \mathbf{t} + \sum_{j=1}^n \delta_j \Delta \mathbf{p}_{t-j+1} + \varepsilon_t$. Here, Δ is the difference operator (that means $\Delta \mathbf{p}_t = \mathbf{p}_t - \mathbf{p}_{t-1}$ and so on), \mathbf{t} is deterministic trend, and \mathbf{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 and Kim 1998: 349).⁶

Notably, in the conventional two-stage unit root tests to detect long run equilibrium using the cointegrating relation between debt and deficit series over past three decades 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)

⁴ In empirical literature, researchers have frequently proceeded with Eq. (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 Eq. (6) offers $\hat{G}_t = a + R_t + \lim_{k \rightarrow \infty} (1+r)^k B_{t+k} + u_t$, where $r_t = r \forall t$. This version of intertemporal budget constraint considers government expenditure (\hat{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 $R_t = \lambda + \delta \hat{G}_t + \varepsilon_t$.

⁵ There are some advanced techniques available in the literature such as Zivot and Andrews (1992) test for unit root in the presence of structural break in data, and Gregory and Hansen (1990) cointegration test with single break or Bai and Perron (1998) test with multiple breaks. A further stage of test namely the error correction modelling may also be used to identify the causality between government revenue and expenditure with redefined Eq. (7). These are however beyond the scope of this study, but the reader may consult with this methodologies for further analysis.

⁶ In literature, though a more powerful test namely the *bound testing procedure* (ARDL cointegration) is available but it deals merely with the I(1) variables. For details, see Pesaran and Shin (1999).

Table 2 Results of ADF unit root test

State	Series	Best fitted model	Lag length	DW-stat	τ -stat	Critical value (5 %)	Level of stationarity
Kerala	Debt (b_t)	ADF (α, t)	1	2.0505	-5.4234	-3.5731	I(2)
	Deficit (s_t)	ADF (α)	1	2.0337	-4.3769	-2.9627	I(1)
Punjab	Debt (b_t)	ADF (α, t)	1	1.9217	-5.3824	-3.5731	I(2)
	Deficit (s_t)	ADF (α)	2	1.9218	-2.9745	-2.9665	I(1)
West Bengal	Debt (b_t)	ADF (α, t)	1	2.0606	-5.1783	-3.5731	I(2)
	Deficit (s_t)	ADF (α)	2	1.9918	-3.3251	-2.9665	I(1)
General State	Debt (b_t)	ADF (α, t)	1	1.9936	-4.3492	-3.5731	I(2)
	Deficit (s_t)	ADF (α)	1	2.0212	-6.4231	-2.9627	I(1)

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 root

reveal that the debt series attained stationarity after differentiating twice and deficit series as I(1).

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 and 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 modellings 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 and Kim 1998).

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 KPW are also consistent with their long-term 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 implemented differently in their long run fiscal sustainability. The unsustainable fiscal health for West Bengal seems to be justified by its high deficits, low CO and low collection of own revenue over long periods.

Table 3 Results of Haldrup cointegration test

	West Bengal	Punjab	Kerala	General State
τ -stat in level	-2.8321	-2.2178	-1.7972	-2.5817
τ -stat in 1st difference	-1.8017	-4.1582 ^b	-4.6624 ^a	-4.4787 ^a
τ -stat in 2nd difference	-4.9307 ^a	-	-	-
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

^{a,b} 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

4 Conclusions

The study compares the fiscal stance for KPW, 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 (like various 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 in the country, especially on revenue account position, and that there is a moderate dissimilarity between West Bengal and Punjab and Kerala. West Bengal has had low CO and low collection of own revenue since 1980s, and its interest payment liabilities and deficit levels have exceeded all other states from the late 1990s. During 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 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 growth-interest gap and primary deficit level. But, Punjab in the recent phase and West Bengal from the 1980s to 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 debt dynamics of subnational states in canonical framework leads to some intricacies, especially on the basic formulation of growth-interest gap and long run constancy assumption of the basic fiscal variables that limit the government's room to deal with short run dynamics. Therefore, our sustainability analysis shifted the paradigm towards intertemporal formulation of the government budget, which links the short run dynamics of debt

and primary balance with the long run solvency condition using present value of the 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 interest payment 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 program is required to cope with the unsustainable debt dynamics and help states achieve long run equilibrium quickly.

Acknowledgments The author would like to thank TTI Endowment at the Institute of Economic Growth, New Delhi and RBI-CTRFPF Endowment at the Centre for Studies in Social Sciences, Calcutta for funding this research. Thanks are also due to Sugata Marjit, Manoj Panda, Indrani Gupta, Sabyasachi Kar, Pravakar Sahoo, and seminar participants at IEG for helpful suggestions. Special thanks to Ritwik Sasmal for research help, Surit Das for editorial assistance, and the anonymous reviewers and editor of Economic Change and Restructuring for valuable comments on earlier draft of the article. The views in this article are personal and not those of the IEG and CSSSC where the author was affiliated.

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