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**DEBT SUSTAINABILITY OF STATE FINANCES  
OF UTTAR PRADESH GOVERNMENT**

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### ***Abstract***

Serious deterioration in government fiscal finances in the late 1990s and early 2000s asked for prudent fiscal management. The fiscal deterioration of 1990s and 2000s led to elevated levels of debt liabilities at both the national and sub-national level. Uttar Pradesh (UP) fiscal position during 1990s and 2000s was one of the most vulnerable. Fiscal and revenue deficit and debt levels were appallingly high creating unmanageable pressure on fiscal finances. The UP government has enacted its FRBMA in 2004 with the aim to arrest rising deficits and debt which mandated reduction in deficit and debt levels within a limit in a given time frame. The sustainability analysis has been made in the current study to capture the effect of reforms on debt position and to assess sustainability of debts in pre and post FRBMA years. Our analysis suggests improvement in all debt and deficit indicators in post 2004-05 years. Debt analysis also confirms sustainable fiscal health ( $\tau = -4.533$ ;  $p < 0.05$ ; with constant and trend) during post-FRBMA years. The policy implication of the finding is that UP government need to stick with fiscal rules policy.

***Key Words: Debt Sustainability, Sub-national Government, State Finances, FRBM Act, Uttar Pradesh.***

***JEL Classification: H62, H63, H72.***

## I- Introduction

*“The history of crisis modeling in international macroeconomics reveals that each successive wave of crises exposes possibilities for crisis that were overlooked in earlier analysis.”*

*P. Krugman, (2006, 26)*

With the growing literature on public economics, the debate on *pros and cons* of fiscal debts is also growing. It is argued that debts, particularly, fiscal debts are not undesirable, especially, in developing countries like India where revenue resources are seriously constrained. There is general consensus among the researchers that there is need to contain debt within manageable limits (e.g. Maastricht Treaty 1991) rather than eliminating it at any economic cost. Rangarajan and Subbarao (2007) argued *‘It must be acknowledged upfront that fiscal deficits are not bad per se. In fact, they may be necessary, even desirable in some situations. The issues, therefore, are not whether or not there should be fiscal deficit, but its appropriate level.’* Endorsing the philosophy of manageable level of debts, there are several studies focusing on finding manageable or, particularly, sustainable level of debt at national and sub-national level.

One distinct feature that has emerged from the recent literature is that the sustainability of sub-national government (SNG) debts is equally important with sustainability of national government debt. The debt sustainability of SNGs is more crucial, especially, in a political setup like India. Conuto and Liu (2010) stated three main factors for this escalating importance of SNG debt sustainability. First, in the process of decentralization, sub-national governments are increasingly entrusted with large expenditure responsibilities with limited freedom to raise revenue through user charges or market borrowings. Secondly, state governments are in immense pressure of supplying quality social and economic infrastructure elevated from rapid urbanisation and catching up by the states in overall development. This has obligated the sub-national governments to undertake large borrowings. As debt servicing cost as well as benefits derived from the using infrastructure is spread across the generations, thus, the inter-generational equity issue comes into the picture. Lastly, they stated that private capital has become an important source of sub-national finances and often compete with bank loans. Therefore, they are increasingly influencing the market interest rate. It is, therefore, sub-national public debt sustainability is equally important with national debt sustainability.

In the Indian context, the fiscal health, both at the Centre and in the states, had weakened progressively since the mid-90s. The combined fiscal deficit of the Centre and the states which was 9.3 percent of GDP in the 1990-91 declined to 6.3 percent in 1996-97 before returning to 9.0 percent in 1998-99 mainly owing to the impact of the Fifth Pay Commission award. The impact of year-on-year deficits shows up in the stock of debt and interest payment indicators. The debt-GDP ratio of the Center and states combined had increased from 64.9 percent in 1990-91 to 79.5 percent in 2005-06. Likewise, during the same period the ratio of interest payments to GDP had increased from 4.4 to 5.8 percent reflecting both higher debt stock as well as higher average interest rate (Singh 2004; Rangarajan and Subbarao 2007).

In Uttar Pradesh (UP) too all the major fiscal indicators showed a continuous worsening of the situation in the state during nineties. The burden of interest payment steadily increased and accounted for one-fourth of the revenue expenditure by 2001-02. The State was able to finance only 40 percent of its total expenditure from its own tax and non-tax revenue receipts, rest being financed by central transfers and borrowings. Fiscal deficit remained at an unduly high and unsustainable level during the nineties. Revenue deficit, which was around 1.5 percent of GSDP in the early 1990s, jumped to 5.1 percent level in 1998-99. Similarly, fiscal deficit increased from 4.4 per cent of GSDP to around 6.8 percent during the same period. As a result of the continued fiscal deterioration of the government the state slowly caught into a debt trap (Kripa Shankar 2001 and 2002; Singh 1999 and 2000). The ratio of debt to GSDP in UP went up from 32.4 per cent in beginning of the decade to around 40 per cent by the end of the decade. In other words, the government was falling into a debt trap and was not in a position to service its debt from its own borrowing. The debt levels had clearly become unsustainable.

The unsustainable fiscal health both at the center and sub-national levels necessitated a need for positive policy interventions. Following the philosophy of growth inductive fiscal management and to reduce stock of debt, Indian government has adopted fiscal rules strategy by enacting long awaited Fiscal Responsibility and Budget Management Act (FRBMA) in 2003 for prudent fiscal management. This act mandated the Central government to curtail its deficits and debts within prescribed limits. SNGs were also incentivised to adopt their own FRBMAs. The different Finance Commissions have offered various incentives *viz.* Debt Swap Scheme (DSS) and Debt Consolidation and Relief Facility (DCRF) to the SNGs which were linked to their adoption of

FRBMA and fiscal performance. Acting in the response, the government of Uttar Pradesh has passed *Fiscal Responsibility and Budget Management Act in February 2004*. It emphasizes the need for achieving revenue surplus, attenuation in fiscal deficit and prudent management of debt. It envisioned limit on fiscal and revenue deficits as well as on government guarantees.

Against this background the current study aims to study the fiscal performance of the state during 1993-94 to 2013-14 and to assess the sustainability of debt position of the Uttar Pradesh government for the same period, especially, in the light of state's FRBMA. It also attempts to look at whether fiscal rules policy (FRBMA) has been successful in reducing debt and deficit levels. The rest of the study is organised in the following manner. Section two presents a brief review of recent studies on state finances and debt sustainability. In the third and fourth section data and methodology has been discussed. In the fifth section, trends of state's key fiscal indicators and emerging trends have been analysed. Section six gives an overview of trends of outstanding debt and interest burden of the state government. In the next section, different measures to assess sustainability are discussed followed by empirical testing and elucidation of results. The eighth section concludes the paper with policy implications.

## **Review of Literature**

Sustainability is a term that has been frequently used in the scholastic literature but with different connotations under different circumstances (Balassone and Franco 2000, Chalk and Hemming 2000). This framework was first developed by Domar (1944) *which states that a necessary condition for sustainability is that growth rate of income must exceed the interest rate*. Subsequently, Buitier (1985) suggests a sustainable policy as one which is capable of keeping the ratio of public sector net worth to output at its current level. Broadly, sustainable level of debt refers to the level which can be serviced through future revenue without hampering the efficiency and solvency of the government.

In the context of India, the analysis of debt sustainability assumed critical importance during the late 1980s, when sharp fiscal deterioration took place both at national as well as sub-national levels. However, most of the studies on debt sustainability in the Indian perspective have tended to be confined to the Central government finances or to state finances at consolidated level *viz.* Seshan (1987), Buitier and Patel (1992), Pattnaik (1996), RBI (1999, 2001, 2002 & 2013),

Pattnaik, Prakash, & Misra (2004), Jha and Sharma (2004), Rangarajan and Srivastava (2005) and Sucharita (2012). Some attempts have been made by scholars to study public debt sustainability at sub-national level. Prasad, Goyal and Prakash (2003) were one of the initial authors focusing on the debt sustainability of the Indian states. They warned about the pace of debt rise and argued the policy responses would only reduce debt by 1-2 percent only. In a report submitted to the Twelfth Finance Commission by the Dholakia, Mohan and Karan (2004) addressed two main issues: first, defining sub-national debt to bring comparability across the SNGs and second, state-wise assessment of debt sustainability. Taking debt/GSDP ratio and debt/states own revenue ratio, they found yawning deterioration in SNGs debt position. Decomposing fiscal deficit into growth and fiscal behaviour components, they further said that fiscal stance adopted by the SNGs was highly unsustainable.

Similar findings were reported by Rajaraman, Bhide and Pattnaik (2005). They noted a steep rise in debt/GSDP ratio of SNGs during 1992-2002. Uttar Pradesh was ranked among the group of second category states having high unsustainable levels of debt. Unsustainable levels of debt were also reported in Odisha, Punjab and Tamilnadu during the 1990s and 2000s (Rath 2005; Sawhney 2005; Ianchovichina, Liu and Nagarajan 2006). In a detailed study, Das (2013) assessed debt sustainability of Kerla, Punjab and West Bengal. He found fiscal performance of these states fiscally unhealthy, especially, on the revenue account. Except West Bengal, Kerala and Punjab attained partial co-integration between debt and deficit which indicated an imperfect equilibrium due to slow convergence towards long run equilibrium. However, West Bengal fiscal health found to be highly unsustainable with no sign of convergence as no co-integration was found in the case of West Bengal. The study pressed for robust fiscal reform programme to correct highly unsustainable debt dynamics and to achieve long run equilibrium quickly.

Nevertheless, it is clear that SNGs have had tough time regarding state finances during late nineties and early of 2000s. However, assessing debt sustainability at sub-national level is a very complex task. Inability to use seigniorage finance, legal constraints to employ new taxes to raise revenue, lesser control over cost of borrowing and returns and dependence on central transfers pose some peculiar set of problems in assessing SNGs debt sustainability. SNGs also differ in their fiscal strategies, resource requirements, and level of development necessitating for tailor made fiscal reforms for each SNG. It is evident that though, some efforts have been made

to capture debt sustainability at the sub-national level, yet, state specific detailed studies, by and large, are absent. While the issue of debt sustainability is a concern across all the states, their heterogeneity in terms of size, level of income and their financial position measured by various fiscal indicators and ability to raise resource on their own calls for varied policy initiatives (Rajaraman, Bhide and Pattnaik 2005). However, UP remains less researched state from the perspective of debt sustainability analysis. This study is an attempt to fill this void.

## **Data**

The data for the current study is taken from the reports *Handbook of Statistics on State Government Finances – 2010*, *State Finances: A Study of Budgets* for various years published by Reserve Bank of India (RBI) and Finance Accounts of UP government. The gross state domestic product (GSDP) data is recorded from the UP Government's *Rajya Aay Anuman (State Income Estimates) Reports* and Budget Documents. Estimates of fiscal indicators for the years 2013-14 are revised estimates respectively. GSDP estimates for the years 2011-12, 2012-13 and 2013-14 are revised, provisional and quick advance estimates respectively. Gretl software has been used for the graph building and econometric analysis.

## **Method**

Different approaches have been used to assess sustainability in different studies. Mainly three approaches are very common *viz.* Domar debt sustainability condition, sustainability indicators analysis and budget constraint approach (Buiter and Patel 1992; Khundrakpam 1998; RBI 1999, 2001, 2002 & 2013; Pattnaik, Prakash, & Misra 2004; Rangarajan and Srivastava 2005; Sucharita 2012; Das 2013). Domar debt sustainability condition says that growth of income must exceed interest rate on outstanding debt, whereas, sustainability indicators analysis measures sustainability taking different revenue and capital account parameters into account. On the other hand, budget constraint approach looks at the sufficiency of future surpluses to meet out the current stock of debt. Some other methods like tax gap approach developed by Blanchard (1990) and Chouraqui *et al* (1990) was used by Pattnaik (1996), model based approach by RBI (2013) and Pattnaik, Prakash, & Misra (2004). In this study debt sustainability of UP government has been assessed by applying three commonly used approaches *viz.* Domar sustainability condition,

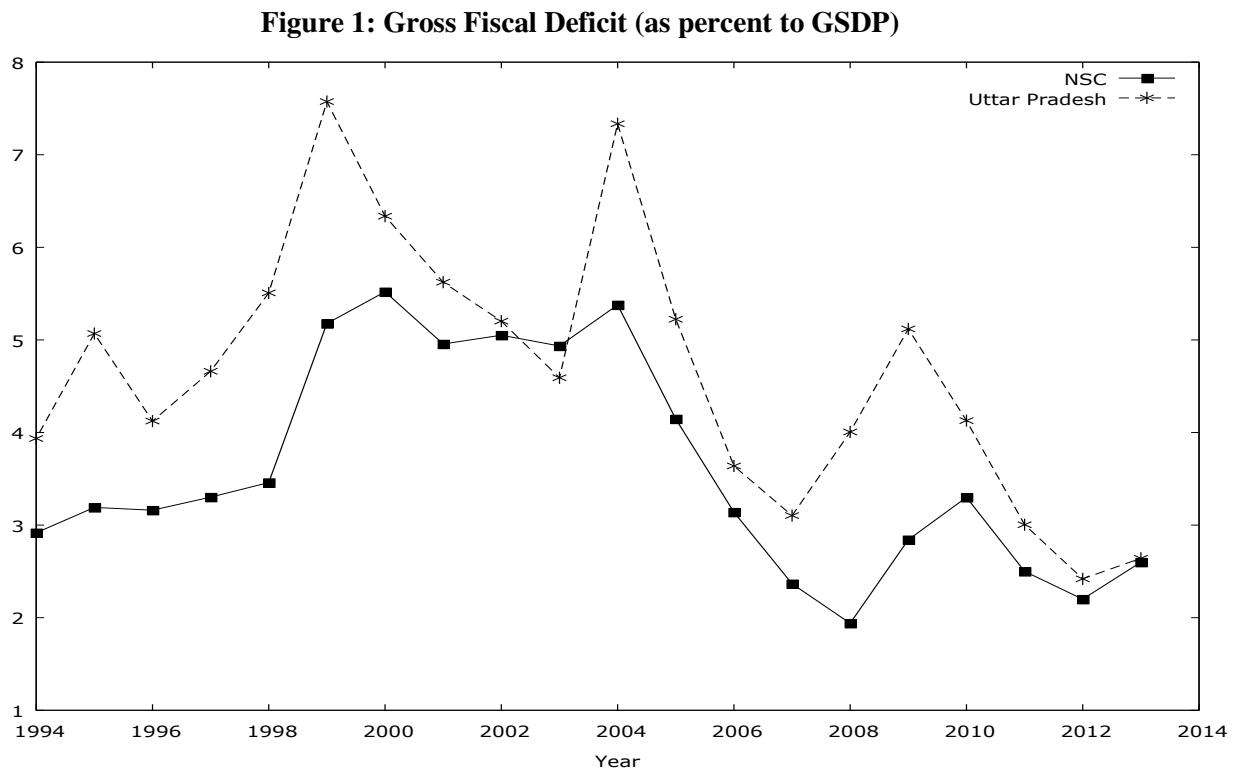


sustainability indicators analysis and budget constraints approach using Augmented Dickey Fuller unit root test and co-integration analysis.

## State of Fiscal Health

### (a) Gross Fiscal Deficit (GFD)

At the beginning of the nineties gross fiscal deficit for non-special category (NSC) states was below 3 percent and in the case of UP, it was about 4 percent. However, after 1994 there has been rise in GFD in both UP and NSC states but degree of fluctuation is much higher in the case of Uttar Pradesh than NSC states. There was an unanticipated turnaround in the state's finances after the introduction of fiscal rules based budget policy. GFD fell during the period 2004-05 and 2006-07 indicating State's commitment to consolidate its fiscal health as mandated by FRBM Act. Nonetheless, divergence from the consolidation path can be seen during 2007-10 mainly due to Sixth Pay Commission award.

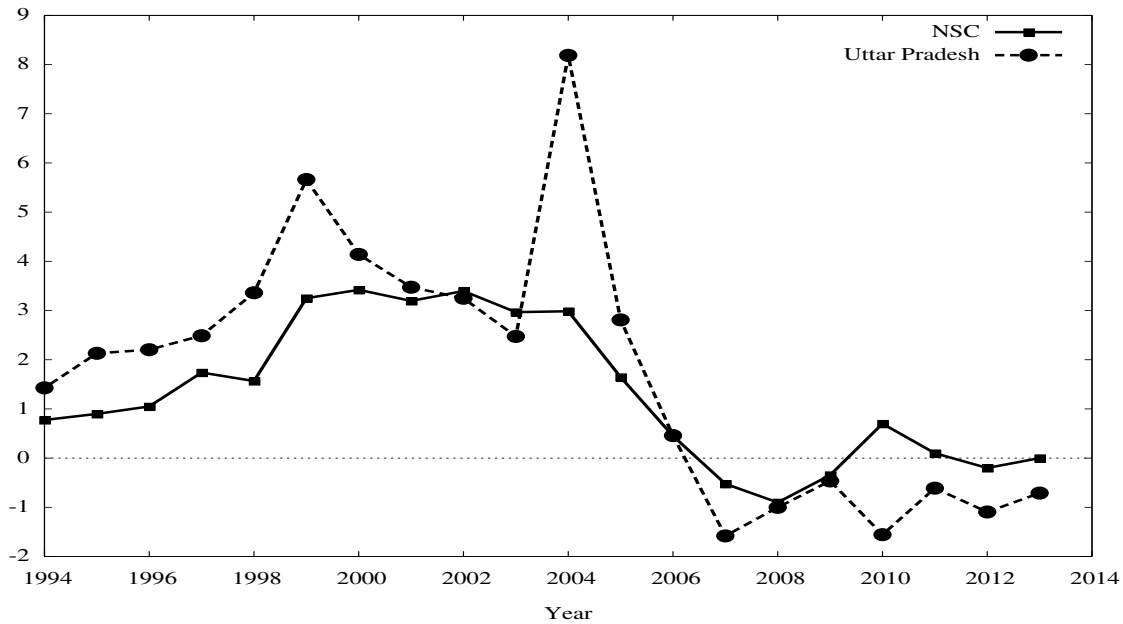


Now, when the economy is on the recovery mode, fiscal deficit is declining and it is already below 3 percent of GSDP as against the target of 3 percent in the year 2014-15 as per revised dates.

**(b) Trends of Revenue Deficit**

On revenue account, the UP government has performed well, revenue deficit turned into revenue surplus and the state government managed to maintain it throughout the period starting from the fiscal year 2006-07. Moreover, NSC states together with UP have experienced revenue deficit since the mid-1990s. The revenue deficit for UP accelerated sharply from 1995-96, when the similar acceleration for GFD was found too. A comparison of GFD and revenue deficit shows the similarity in the broad trends since 1993-94. The decline in revenue deficit is visible from 2004-05 onwards. However, fall in revenue deficit was steeper in the case of UP as compared to NSC states. This turnaround can be attributed to both receipts as well as expenditure side. While receipts have recorded rapid growth and it increases by 5 percentage points approx. during 2004-05 to 2011-12, expenditures have shown moderate increase of about 1 percent only during the same period.

**Figure 2: Revenue Deficit (as percent to GSDP)**

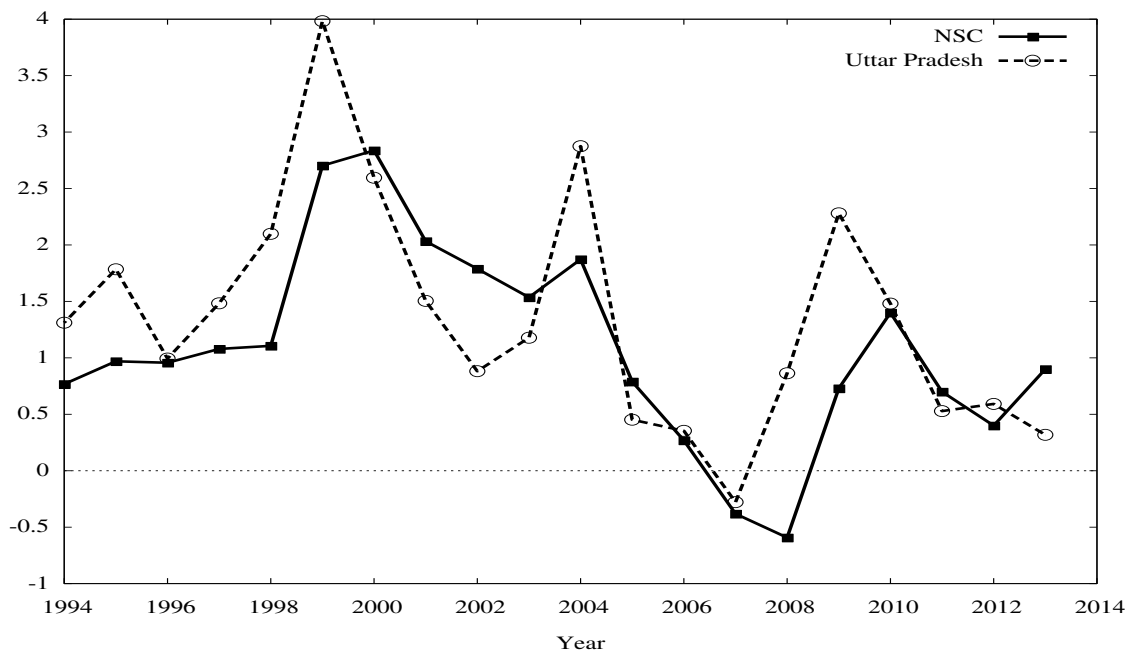


A sharp rise in revenue deficit in 2003-04 was due to inclusion of a state loan given to the UP State Electricity Council of an amount of Rs. 12,227.40 crores which has been debited to the discount account. Excluding this loan, revenue deficit could have been to 2.78 percent of GSDP only.

### (c) Trends of Primary Deficit

Primary deficit is the result of shortfall of the current year's revenue to total expenditure. It shows the extent of current expenditure which government is unable to meet from its current revenue, therefore, controllable to some extent. Preferably, state government should generate enough primary revenue to service their debt, so that there would be no deficit and fiscal deficit will be comprised of the capital outlay only (also known as golden rule of deficit<sup>1</sup>) (for detail see Balassone, F. & D. Franco, 2000).

**Figure 3: Primary Deficit (as percent to GSDP)**



Thus, zero primary deficit is the primary condition for achieving golden rule. Except 2006-07 and 2007-08, primary deficit has been recorded for UP and NSC states. During the nineties, there

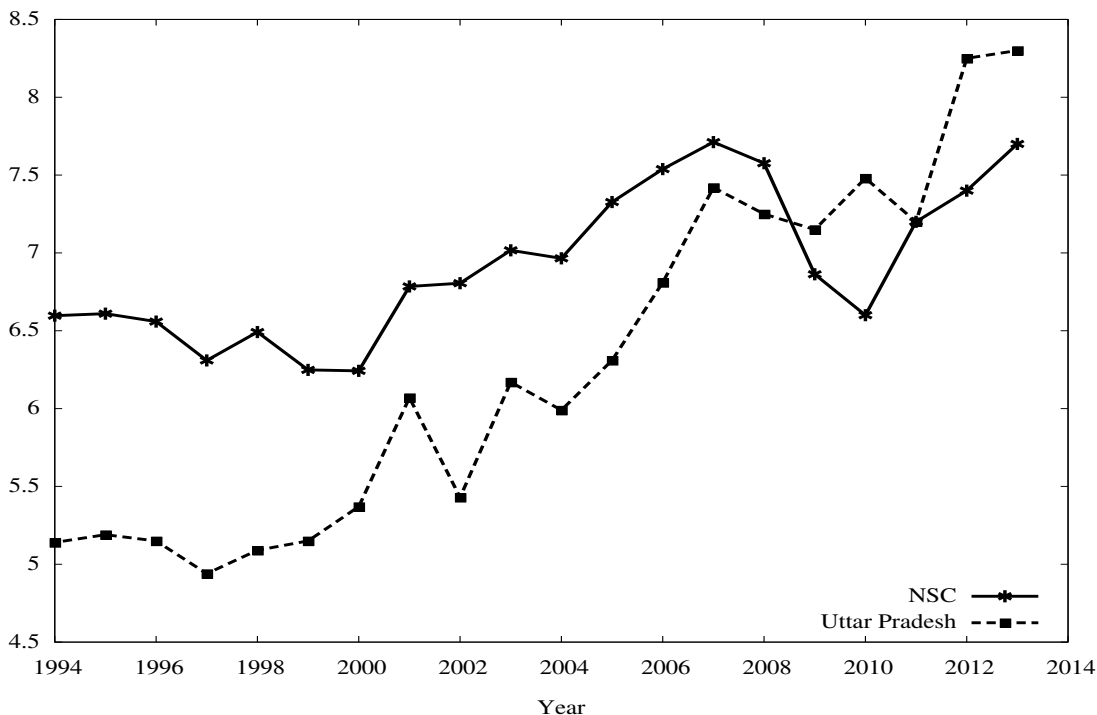
<sup>1</sup> The Golden Rule states that over the economic cycle, the Government will borrow only to invest and not to fund current expenditure.

was serious primary deficit in NSC states and UP which moderated during the first half of 2000s but rose to high levels again in 2008-09 and 2009-10. However, the recent trends indicate moderation in primary deficit, especially, for UP but it won't be easy to achieve the situation of golden rule.

**(d) Own Tax Revenue (OTR)**

The declining trend of OTR also worsens fiscal health of the state governments during second half of nineties. However, it picked up during 2000s. Moreover, the OTR as percent of GSDP of UP is lower than NSC states. It is only after 2008-09 that UP observed considerably better revenue performance.

**Figure 4: Own Tax Revenue (as percent of GSDP)**

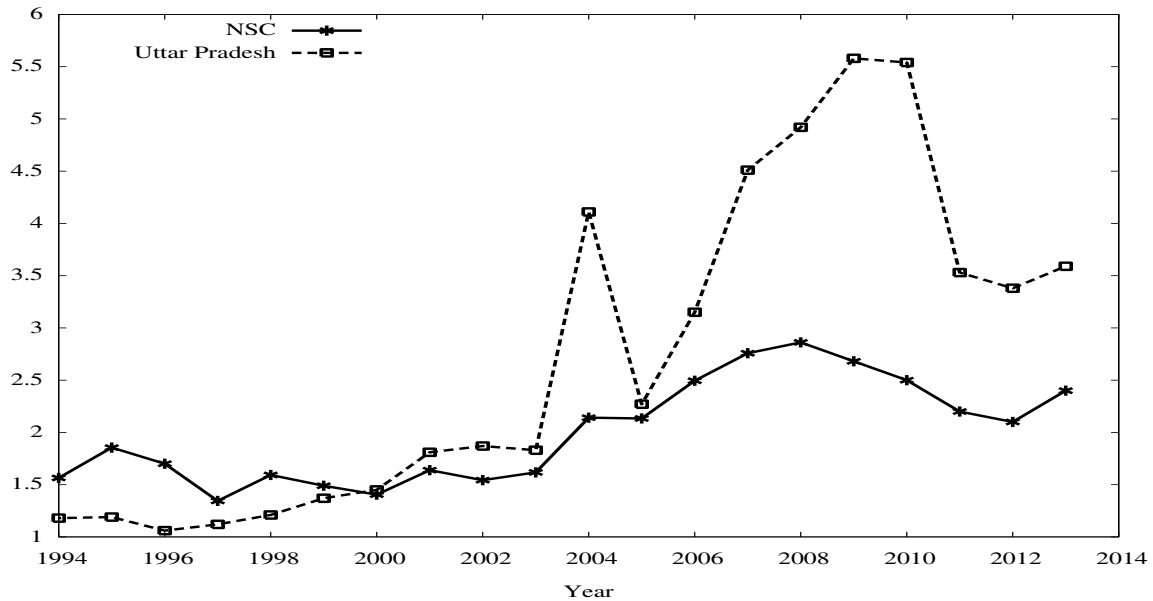


**(e) Capital Outlay**

Capital outlay recorded a moderate rise till the end of 1990s. There was extreme shock in UP in 2003-04 mainly because of inclusion of a provision for power bonds of ₹ 5871.86 crores, otherwise capital outlay would have been 1.52 percent of GSDP. However, steep rise in capital outlay has been experienced in the case of UP during 2005-10 before falling down to in the range

of 3 to 4 percent. Still, NSC states and UP has shown upward trends of capital outlay after 2009-10. Capital outlay of NSC states is correspondingly performing poorer than UP.

**Figure 5: Capital Outlay (as percent of GSDP)**



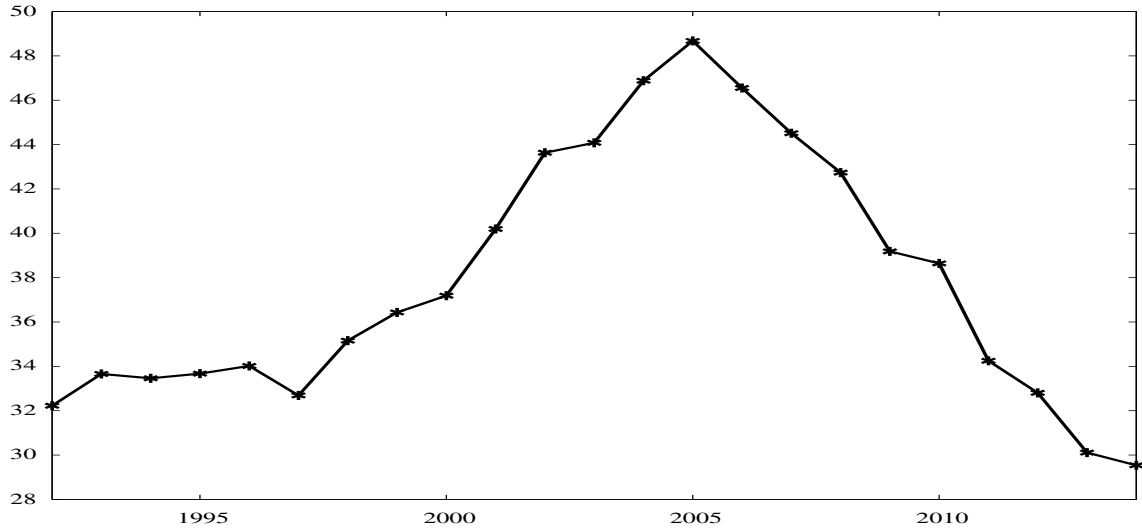
### Debt Burden and Interest Liability of the State

As a consequence of good performance on revenue and capital receipts and moderate increase in revenue and capital expenditure, the debt burden of the state is on the decrease as evident from the debt-GSDP ratio and, consequently, the interest payments as percent of GSDP have also been declining (Figure 6 & 7). It can be noted that outstanding debt risen slowly till 1997-98, afterwards it recorded a steep rise in it up to 2004-05. Similar trends can also be observed in interest payment. However, sever shocks can be seen during 2002-06, but there has been decline in interest payment post-FRBMA period for both NSC states and UP. Incidentally, UP has higher interest payment liability (as percent of GSDP) in comparison to NSC states throughout period barring 2002-03.

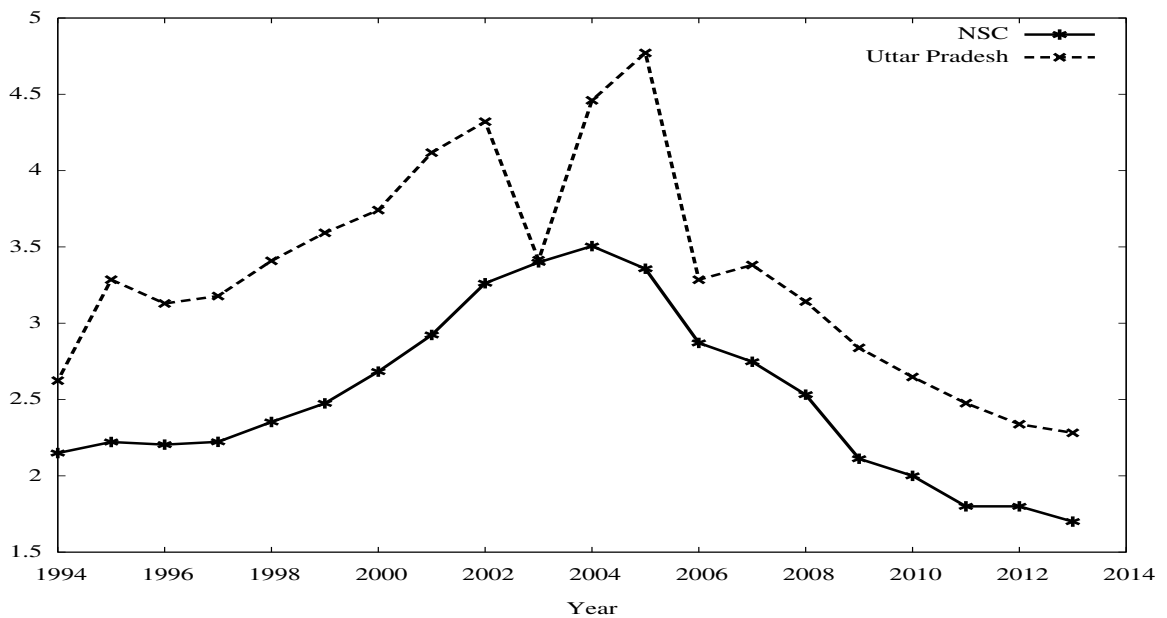
As per revised dates for attaining fiscal rules, the state was supposed to maintain 46.9 percent debt-GSDP ratio in 2011-12 but UP is much ahead of the target. However, to achieve the target of reducing debt-GSDP ratio to 25 percent upto financial year 2017-18, the UP government needs to reduce its debt on an average by 2.18 percent of GSDP every year.

It is important to note that the reduction in debt and interest burden is effected by two factors. First and obvious reason is that fiscal rules policy and better economic performance. The second and equally significant is the relief given by the national government through DSS and DCRF schemes.

**Figure 6: Total Outstanding Debt (as percent of GSDP)**



**Figure 7: Interest Payment (as percent to GSDP)**



DSS was in operation from 2002-03 to 2004-05 only. It was brought to swap high cost loans into low cost loans. It enabled SNGs to repay high cost loans contracted from the center, through low cost market borrowings and proceeds from small savings. Consequently, loans were swapped through additional market borrowing of the state and their net small savings proceeds at the prevailing interest rate over a period of three years ending in 2004-05 as per the laid conditions.

On the other hand the DCRF, recommended by the Twelfth Finance Commission, had two components – Debt Consolidation and Debt write-off. Debt consolidation was offered for all central loans from the Ministry of Finance taken by the SNGs until March 31, 2004 and outstanding as on March 31, 2005 into fresh loans of 20 years to be repaid in 20 equal installments carrying an interest rate of 7.5 percent provided SNG concerned enacted its FRBMA. Repayments due from states during the period 2005-06 to 2009-10 on these loans were eligible for write-off. The total loans of UP swapped during the 2002-03 to 2004-05 amounted to ₹ 111.84 billion (16.80 percent of total outstanding debt), out of which ₹ 61.22 billion was through additional open market borrowings and ₹ 50.62 small savings loans. Additionally, during 2005-06 to 2009-10, the UP government was able to consolidate ₹ 212.80 billion and ₹ 71.00 billion were written-off.

Thus, the comparison of long term trends of financial indicators implies that fiscal health of the state, particularly, before enactment of FRBMA was in stress. High fiscal and revenue deficit, primary deficit, rising interest liability, slow rise in capital outlay and rising debt burden were highlights in pre FRBMA period. Nevertheless, fiscal indicators are showing significant improvements since enactment of FRBMA. Another common observation emerged from the analysis is that trends in all fiscal variables for NSC states and UP followed the similar path. However, despite the downward trend in debt and deficit indicators 'the government's long run debt-deficit behavior is fairly a question of stability and sustainability in the fiscal situation' (Das 2013).

### **Debt Sustainability: Analytics and Analysis**

According to the Domar stability condition, to stabilize debt/GDP ratio ( $d/Y$ ) rate of interest should be lower than the output growth ( $r < g$ ). One of the basic conditions of Domar debt sustainability is that the level of primary deficit should remain the same (if it zero) or declining

as the fiscal deficit (F) is the total borrowing (net of repayment) required to service inherited debt and cover the primary deficit (P) (Rajaraman, Bhide, and Pattnaik 2005). The Domar stability condition can be defined as:

$$y-r > 0 \quad (1)$$

$$r_t = (IP)_t / (D)_{t-1} \quad (2)$$

where:

y = Growth of GDP

r = Average interest rate

IP = interest payment

D = Outstanding debt

t = Time period

Equation 1 and 2 imply that the debt/GDP ratio ( $d/Y$ ) is stable if the GDP growth ( $g$ ) exceeds the interest rate ( $r$ ) on government debt. As fiscal deficit in a year is the current primary deficit plus interest liability inherited on the outstanding debt stock. Thus:

$$F_t = P_t + i \cdot D_{t-1} \quad (3)$$

In terms of ratio of GSDP (for the sub-national governments)

$$f_t = p_t + \frac{iD_{t-1}}{GSDP_{t-1}(1+n)} \quad (4)$$

$$f_t = p_t + \frac{id_{t-1}}{(1+n)} \quad (5)$$

Where  $p_t = PD/GSDP$  in year t

n = growth rate of GSDP

f = FD/GSDP

Further, the total debt stock is added by the fiscal deficit incurred in a year, thus:

$$d_t = \frac{iD_{t-1}}{GSDP_{t-1}(1+n)} + f_t \quad (6)$$

Taking the above relationship, it can be rephrased as:

$$f_t = d_t - d_{t-1} = p_t + \left[ \frac{D_{t-1}(1+i)}{GSDP_{t-1}(1+n)} - \frac{D_{t-1}}{GSDP_{t-1}} \right] \quad (7)$$

If the primary deficit is zero, and  $i = n$ , the difference between  $d_t$  and  $d_{t-1}$  will be reduced to zero and debt will be stabilised. Thus, with a zero primary deficit, borrowing to pay interest on



inherited debt will not raise the debt stock as long as  $i = n$ . Reinstating the sustainability condition as:

$$d_t - d_{t-1} = d_{t-1}(i-n) + p_t \quad (8)$$

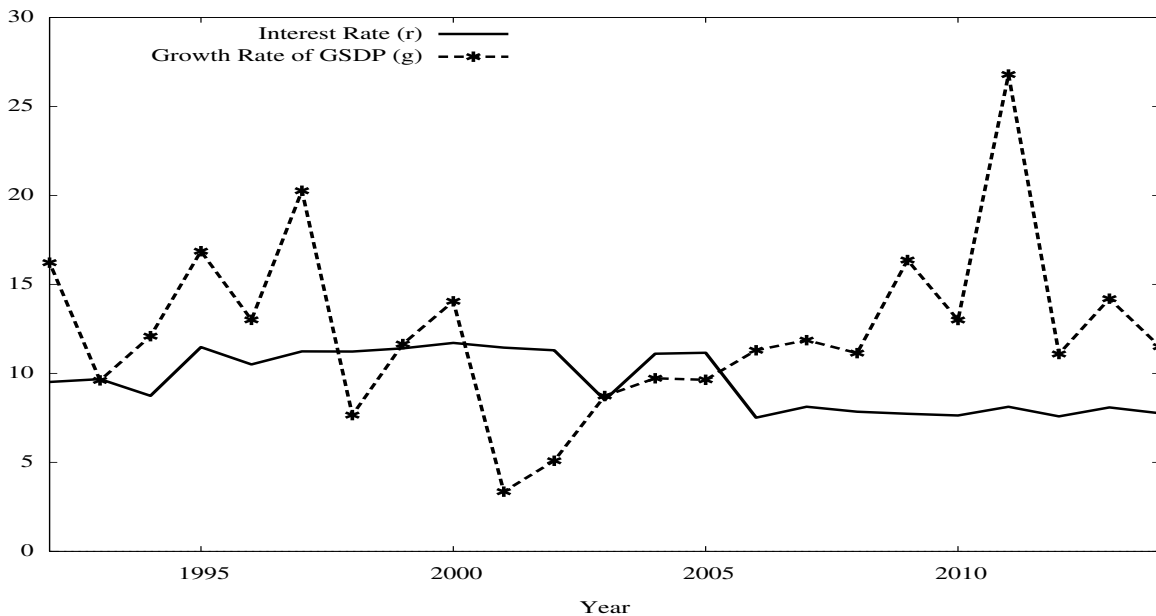
The case for debt stabilization is  $[d_t - d_{t-1} = 0]$  and if it is zero. Then, we need:

$$p_t^* = -d_{t-1}[i-n] \quad (9)$$

$p_t^*$  = Stable level of primary deficit

It means that it is possible to stabilize debt with a positive primary deficit if growth in GSDP is sufficient to compensate primary deficit after covering up interest. However, if the interest rate is higher than the GSDP growth rate, a zero primary deficit will not be adequate, then, a negative primary balance will require for debt stabilization.

**Figure 8: Growth (g) and Interest rate (r) of Uttar Pradesh (in percent)**

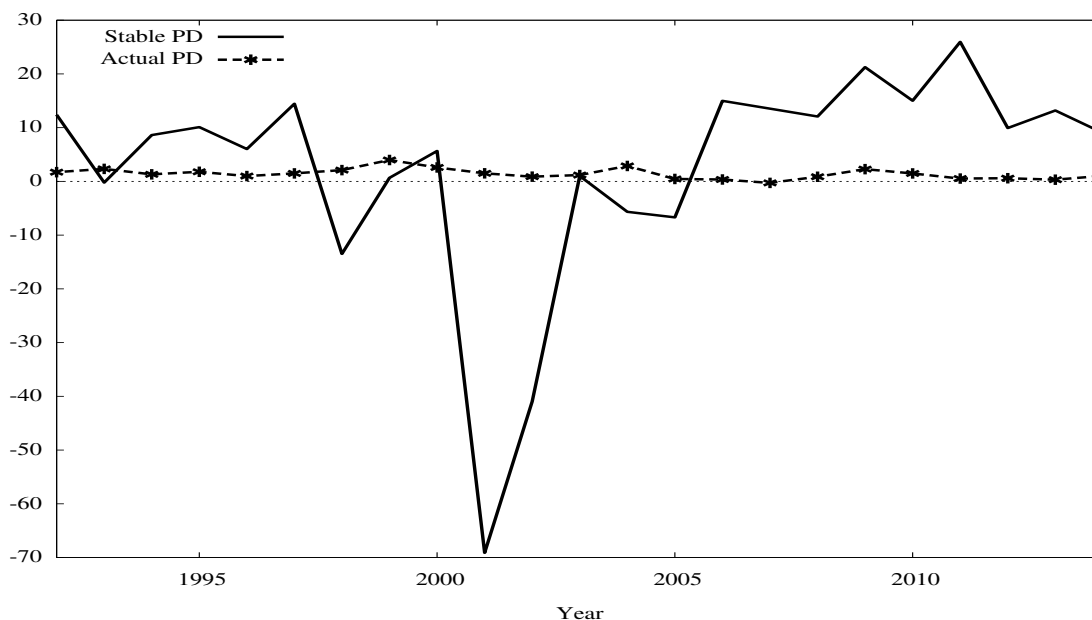


The movement of growth vis-à-vis interest rate shows except for the years 1997-98 to 2004-05 growth rate (g) was higher than interest rate (r). The positive gap (g-r) is more persistent during post FRBMA period. However, wide variations are seen in the GSDP growth without any clear trends. Indeed, it is considerable decline in interest rate in 2004-05 and thereafter which led to positive gap between g and r. The decline in interest rate period is coinciding with the period in which interest payment liability is also declining significantly (figure 7).

The movements in the average interest rates vis-à-vis nominal GSDP growth reflect that the Domar stability condition has been fulfilled for the post FRBMA enactment years since 2004-05. Stable level of primary deficit (equation 9) has also been calculated to know differences between actual and stable primary deficit.

Trends of actual vis-à-vis stable primary deficit are in similarity with moments of growth vs interest rate. Due to positive gap between  $g$  and  $r$ , stable primary deficit is higher than actual primary deficit during before 1997-98 years and post 2004-05 years, which means state could have afforded higher primary deficit than it was. However, here also the period of 1997-98 to 2004-05 is reflected as period of fiscal stress as high primary surplus was required for sustainability of public debts.

**Figure 9: Actual vs Stable Primary deficit (as percent of GSDP)**



Patnaik, Prakash and Mishra (2005) found weak debt sustainability for the Center and all states combined during pre-FRBM years. The results of our study also confirm weak debt sustainability for Uttar Pradesh in pre-FRBM years, but evidence suggests strong debt sustainability in post-FRBM period. However, Domar sustainability condition is not sufficient but is a necessary condition. According to the contemporary literature, fiscal sustainability rule requires real growth rate to go over real interest rate and primary balance to be non-negative for the debt/GDP ratio to be stable. Thus, the necessary condition is that real interest rate should be lower than real

GDP growth and the sufficient condition is that adequate primary surplus should be maintained to finance debt services. Indicators analysis addresses these issues.

### (a) Indicator Analysis

Economists often argue that Domar debt sustainability is a narrow view to look at wide-ranging debt sustainability issue. Alternatively, a set of sustainability indicators has been developed to review the debt sustainability (Rajaraman, Bhide, and Pattnaik 2005; RBI 2013). In the table 1, alternative conditions are set out to capture the different aspects of debt sustainability. The potential aspects with their symbolic representation reflected by the alternative indicators have also been mentioned in the table 1.

**Table 1: Sustainability Indicators**

Sn.	Indicators	Symbolic Representation	Interpretation
1	a. Rate of growth of GSDP (Y) should be more than rate of growth of debt (D)	$Y-D>0$	Assess the sustainability in aggregate terms and test the essential condition that growth of income must exceed growth of debt and rate of interest.
	b. Real output growth (y) should be higher than real interest rate (r)	$y-r>0$	
2	a. Primary deficit (PD) should not be rising faster than GSDP	$PD/GSDP<0$	Tests the sustainability from the point of view of revenue account. Additional condition that primary deficit must be declining and sufficient surplus must be generated to repay current debt stock. There should be positive primary revenue balance.
	b. Primary revenue balance (PRB) should be in surplus and adequate enough to meet interest payments (IP) [PRB-IP>0]	$PRB/GSDP>0$	
		$[(PRB-IP)/GSDP] > 0$	
3	Proportion of repayments (REP) to Gross Borrowings (TGB) should be falling over time [REP/TGB ↓↓↓]	$REP/TGB \downarrow\downarrow\downarrow$	Measures debt trap situation. If the interest payment and repayment exceed total gross borrowings, economy said to be in debt trap.
4	a. Interest payments (IP) and repayments (REP) adjusted for primary revenue balance should not exceed total gross borrowings (TGB)	$[(IP+REP-PRB)/TGB]<1$	
	b. Total net borrowing (TNB) as a ratio of total gross borrowing (TGB) should be declining	$TNB/TGB\downarrow\downarrow\downarrow$	
5	a. Interest burden defined by interest payments (IP) to GDP ratio should decline over time	$IP/GSDP\downarrow\downarrow\downarrow$	Interest payment as proportion to GSDP, revenue receipts, as well as revenue expenditure should be falling over time.

	b. Interest payment as a proportion of revenue expenditure should decline overtime	IP/RE↓↓↓	More resources should be left for making payment on other productive purposes.
	c. Interest payment as a proportion of revenue receipts should fall over time	IP/RR↓↓↓	
	d. $OD/Y(r-y)-PD/Y < 0$	$OD/GSDP*(r-y)-PD/GSDP < 0$	
6	Return on capital investments (ROC) should be equal to or less than cost of borrowings (COB) [ROC ≥ COB]	$ROC = IR_t/OFA_{t-1}$ $COB = IP_t/OD_{t-1}$ $IR_t/OFA_{t-1} - IP_t/OD_{t-1} \geq 0$	Asses the sustainability from the perspective of capital account. The return on investment must be greater than the cost of borrowings. It also shows the extent of fiscal susceptibility of debt trap.

Note: IR- Interest Receipts; OFA - Outstanding Financial Assets.

For the purpose of the sustainability indicators analysis, the whole time period is divided into four phases- 1991-92 to 1996-97, 1997-98 to 2003-04, 2005-05 to 2008-09 and 2009-10 to 2011-12. While first two phases represent pre-FRBM period, on the other hand, the latter two represents post-FRBM period. The values are period averages of the different phases. As per the sustainability indicators, the fiscal position of UP during pre-FRBM period was unsustainable as indicated by most of the indicators. During the pre-FRBM years, real GSDP growth was lower than the real interest rate. Against of this, there has been significant improvement in the post-FRBM years. The compulsory condition of sustainability that GSDP growth should be greater than growth of debt and interest rate has been fulfilled during the post-FRBM years. However, the additional condition that primary balance to be non-negative has not been met out in the whole period of analysis.

**Table 2: Indicator Analysis (Uttar Pradesh)**

Sn.	Indicators	Symbolic Representation	1991-92 to 1996-97	1997-98 to 2003-04	2004-05 to 2008-09	2009-10 to 2011-12
1	a. Rate of growth of GDP (Y) should be more than rate of growth of debt (D) b. [Y-D>0]	Y	14.79	8.52	14.40	15.66 (13.24)
		D	15.24	15.50	9.24	8.61 (8.92)
		Y-D>0	-0.45	-6.98	5.17	7.05 (4.32)
2	Real output growth (y) should be higher than real interest rate (r)	Y	4.25	3.38	7.87	6.81
		R	8.67	9.23	6.77	6.03
		y-r>0	-4.41	-5.84	1.10	0.77
3	a. Primary deficit (PD) should not be rising faster than GSDP b. Primary revenue balance (PRB) should be in surplus and adequate enough to meet	PD/GSDP<0	1.60	2.16	0.67	0.78 (0.75)
		PRB/GSDP>0	-1.15	0.50	-3.16	-3.30 (-3.25)
		IP/GSDP	2.94	3.86	3.23	2.27

	interest payments (IP) [PRB-IP>0]					(2.27)
		$[(PRB-IP)/GSDP] > 0$	-4.09	-3.37	-6.39	-5.57 (-5.52)
4	a. Proportion of repayments (REP) to Gross Borrowings (TGB) should be falling over time [REP/TGB ↓↓↓]	REP/TGB ↓↓↓	26.77	28.82	55.21	34.60 (39.55)
	b. Interest payments (IP) and repayments (REP) adjusted for primary revenue balance should not exceed total gross borrowings (TGB)	$[(IP+REP-PRB)/TGB] < 1$	1.31	0.93	2.12	1.83 (1.79)
	c. Total net borrowing (TNB) as a ratio of total gross borrowing (TGB) should be declining	TNB/TGB ↓↓↓	0.73	0.71	0.45	0.65 (0.60)
5	a. Interest burden defined by interest payments (IP) to GDP ratio should decline over time	IP/GSDP ↓↓↓	2.94	3.86	3.23	2.27 (2.27)
	b. Interest payment as a proportion of revenue expenditure should decline overtime	IP/RE ↓↓↓	18.10	22.37	19.30	12.71 (12.25)
	c. Interest payment as a proportion of revenue receipts should fall over time	IP/RR ↓↓↓	20.47	29.79	19.86	12.02 (11.63)
6	$OD/Y(r-y)-PD/Y < 0$	$OD/GSDP*(r-y)-PD/GSDP < 0$	155.83	260.65	-54.19	-30.68 (-23.18)
7	Return on capital investments (ROC) should be equal to or less than cost of borrowings (COB) [ROC ≥ COB]	$ROC = IR_t/OFA_{t-1}$	5.27	3.50	13.08	9.61 (9.86)
		$COB = IP_t/OD_{t-1}$	9.54	9.69	7.16	6.53 (6.58)
		$IR_t/OFA_{t-1} - IP_t/OD_{t-1} \geq 0$	-4.27	-6.19	5.91	3.08 (3.28)

Note: a. Values in parenthesis are average of 2009-10 to 2012-13.

Source: Calculated from Finance Accounts, Uttar Pradesh Government and RBI Data.

On revenue account, though, primary balance is negative but it declined during the third phase, however, recorded a marginal increase in last phase due to slowdown in the economy and decline in revenue collections. There has been significant decline in IP as percentage of RR and RE in post-FRBM years, implying more resources in the hands of UP government as well as reduction in committed expenditures.

The state government has shed-off huge amount of outstanding debt under the legislative umbrella of FRBMA as evident from REP/TGB ratio in third phase. It will not only reduce future debt servicing but also allow the state to use thus saved financial resources in other productive channels. Moreover, as the basics of financial management says that the return on the

investments made by the SNGs should be more than the cost of borrowing, the UP government has been successful in converting the difference between these two from negative to positive in post-FRBM years. This twist is the outcome of both declines in cost of borrowing as well as crucial increase in returns also. Nonetheless, the brought out improvement in fiscal stance through FRBMA is delicate as sustainability indicators are indicating trivial deterioration in sustainability. The difference between real output growth and rate of interest has also declined in fourth phase.

### **(b) Budget Constraints Approach**

Sustainability of debts requires that the future primary surpluses must be sufficient to repay the current outstanding stock of debt. As per inter temporal budget constrains criterion, a state government's debt is sustainable if the outstanding debt stock level does not exceed the sum of present values of current and future primary surpluses. The government stability can be formulated as:

$$d_t = \sum_{j=1}^n \prod_{i=1}^j (1 + r_{t+i})^{-1} p_{t+j} \quad (10)$$

Where  $d_t$  is debt to GSDP ratio;  $s$  is primary deficit to GSDP ratio;  $r$  is rate of interest on past debt;  $t$  for time period.

Under this approach, the long run equilibrium relationship i.e. testing of the sustainability requires a formal econometric test of cointegration between debt and primary deficit. The equilibrium, hence, sustainability in the literature involving time series data, requires stationarity in the combination of variables (Das 2013; Enders 2009). In this study, the debt sustainability of a SNG requires statistical cointegration in debt and primary deficit time series.

Traditionally, the test of cointegration between time series variables is performed by two successive tests for unit root(s). In the first stage, presence of the number of unit root(s) for each series individually and order of integration is determined. Generally, the second unit root test is performed provided that the variables are contained the same number of unit root(s) in first stage, that means, the variables must have same order of integration. If the error series ( $\hat{u}$ ) from the linear combination of the variables found stationary then the long run equilibrium is said to be

existed. The stationarity has been tested by applying the Augmented Dickey-Fuller (1979) Unit Root Test on  $d$  and  $p$ . The results are given in the following table:

**Table 3: Augmented Dickey Fuller Test Result: Uttar Pradesh**

Series	Model	Order	Lag length	Test Statistics ( $\tau$ )	5% Critical Value	Shapiro-Wilk W (p-value)
Outstanding Debt	ADF ( $\alpha, t$ )	Level	3	-3.0226	-3.60	0.927 (0.0948)
		First Difference	4	-1.77761		
		Second Difference	1	-7.6979		
Primary Deficit	ADF ( $\alpha$ )	Level	1	-2.8859	-3.00	0.964 (0.557)
		First Difference	2	-4.8612		
		Second Difference	3	-5.9134		

*Note:* ADF ( $\alpha, t$ ) means model with constant ( $\alpha$ ) and trend ( $t$ ). Lag length is decided by the Akaike/Schwarz criterion (AIC).

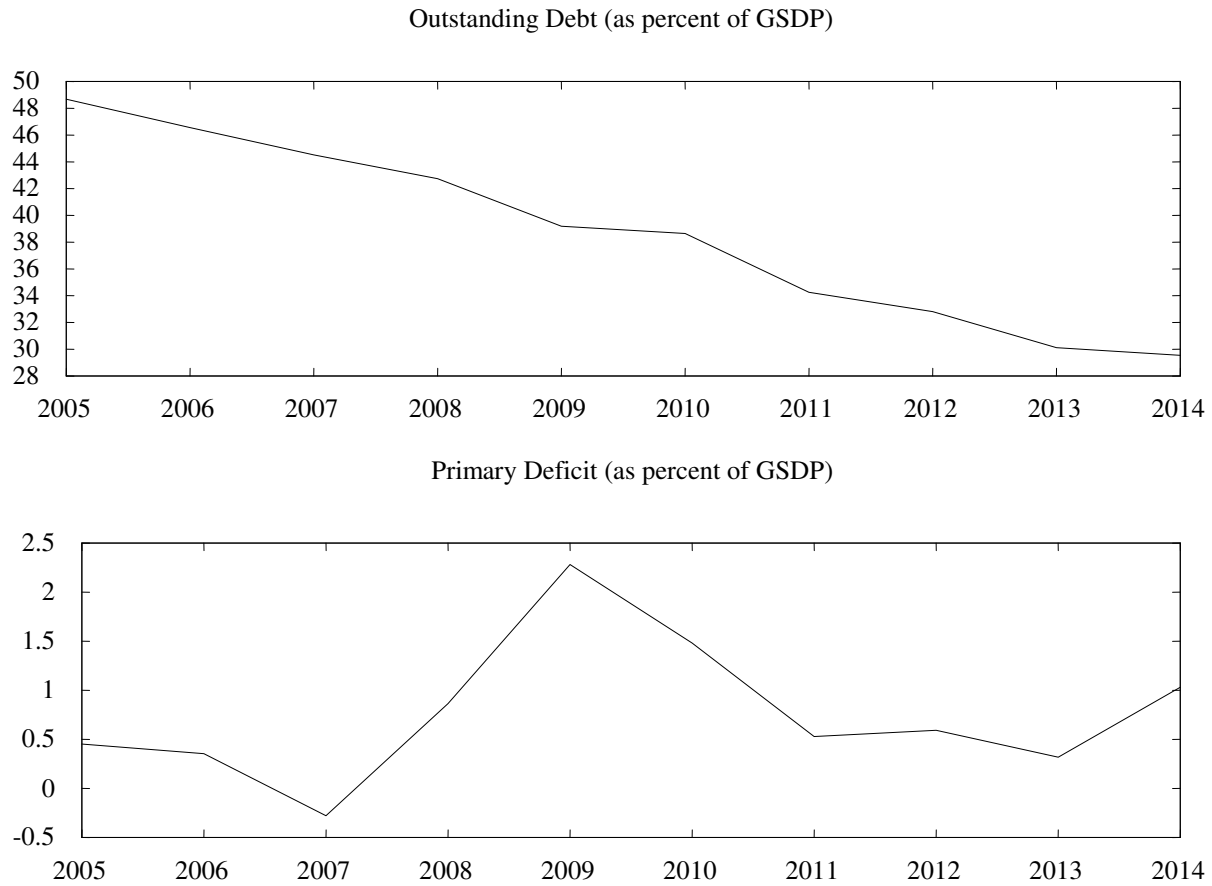
As revealed from the results that both variables are non-stationary at level and stationary at second-differences. This shows variables are integrated of order two i.e.  $I(2)$  which suggests us to use cointegration test. Engel-Granger (1987) Cointegration test is used to test long term equilibrium.

**Table 4: Engel-Granger Co-integration Test Results**

Indicator	Test Value	P Value
$\tau$ in Level	-2.7634	0.3779
$\tau$ -statistics in 1 <sup>st</sup> Difference	-3.0560	0.2405
$\tau$ -statistics in 2 <sup>nd</sup> Difference	-7.4904	0.0003
Critical Value 5%		4.11
Critical Value 10%		3.73
Co-integration result	No-cointegration	

The Engel-Granger Cointegration regression results are depicted in table 4. UP has been failed to achieve super consistency, even, partial cointegration also in the debt and deficit variables. Thus, as per cointegration results UP is far from attaining long run equilibrium. Therefore, the debt position of the state found to be highly unsustainable under the case of strong sustainability (Pattnaik, Prakash, and Misra 2004). The unsustainable fiscal health of the state can be justified by high debts and deficits, high interest liability, slow growth in own tax revenue and creeping capital outlay during 1994-95 to 2004-05 period.

**Figure 10: Trends of Debt and Deficit- 2005-14**



However, post 2004-05 trends offers a hope that the adoption of fiscal rules strategy is beneficial as outstanding debt series (2004-05 to 2013-14) found to be stationary at level ( $\tau = -4.533$ ;  $p < 0.05$ ; with constant and trend). Other fiscal indicators too corroborate the improvement in fiscal health of UP government during the same period.

### **Conclusion**

The study presents an overview of key fiscal trends of UP government and NSC states. Sustainability of debt has also been tested by three alternative methods – Domar debt sustainability, indicator analysis and budget constrain approach. Our analysis of major fiscal trends depicts an unhealthy state of affairs upto 2004-05. However, after 2004-05 indicators have shown significant improvement in fiscal health of the state. Yet, it has been seen that it is highly amenable to external shocks like economic slowdown, pay commission awards. The post 2004-



05 fiscal performance seems to suggest that fiscal rules policy has positive policy intervention on fiscal spectrum of the UP and NSC states.

The results of different approaches give a mix picture. Domar debt sustainability condition is satisfied for the whole period except for 1997-98 to 2004-05. However, indicator analysis indicates weak sustainability as condition of zero or primary surplus is not fulfilled for any of the four sub-periods. On the other hand, cointegration test indicates absence of long run equilibrium which means long run debt sustainability has not been found in the case of UP government. However, radical changes in the fiscal health of the government are apparent during post-FRBMA years and some of the changes are noteworthy like continuous surplus on revenue account since 2006-07, bringing fiscal deficit to 3 percent of GSDP (as mandated by FRBMA), falling primary deficit, reduction in outstanding liabilities of the state, thereby, reducing the burden of interest payment on the exchequer. This is further substantiated by Domar debt sustainability condition, indicators analysis and stationarity testing which shows preliminary signs of long run sustainability of debt levels.

Nevertheless, it can be concluded that –first, serious deterioration took place in the fiscal health of the state starting from the first half of the 1990s to 2004-05, thereafter, steady improvement has been seen in the fiscal indicators; second, broad trends in fiscal indicators of the UP are similar to NSC states. Along with this, one common conclusion can also be drawn, which is also confirmed by trends in fiscal indicators as well as sustainability analysis, that after introduction of fiscal rules policy (FRBMA), state health improved considerably. Policy implications of the finding implicate that UP and other state governments need to stick with fiscal rules policy with better debt management as it will not only reduce debt stock but also loosen money for other productive activities. However, deficits should not be reduced on the cost of lower capital outlay.

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