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PUBLIC DEBT IN KARNATAKA**

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**April 2024**

# *Sustainability and Threshold Value of Public Debt in Karnataka*

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# **Sustainability and Threshold Value of Public Debt in Karnataka**

**K. R. Shanmugam and P.S. Renjith**

## **Abstract**

*This study analyzes the sustainability and the threshold level of public debt in Karnataka using the modern time series methods and threshold regression method. The results of the study indicate that Karnataka's public debt level is unsustainable, and its debt sustainability threshold is about 20 percent. Since Karnataka's debt is negatively related to growth, the state should control its debt to a sustainable level. The simulation exercise based on the debt dynamics of the state suggests that the state GSDP (nominal) should grow at 14 percent and the fiscal deficit target should be 2 percent from 2024-25 onwards to attain the debt sustainability target in 2028-29 and with 13 percent growth the state could reach the target in 2030-31. The relevant policy strategy for the state is to increase its revenue-GSDP ratio by 1 percent.*

**Keywords:** *sustainability, threshold value, public debt, FRBM, debt solvency, Karnataka*

**JEL Codes:** *Q54, H63, C23, D72*

## **INTRODUCTION**

Karnataka is the second fastest growing major Indian state, with a 10-year (2012-13 to 2021-22) average growth rate of 7.43 percent, next only to Gujarat (8.41 percent). It ranks second in per capita income (Rs. 2.66 lakh (2021-22), next only to Telanga (Rs. 2.71 lakh). It is the fourth largest economy. Its economy is driven mainly by IT and ITES (30 percent share), manufacturing (15 percent) and agriculture (10 percent). Karnataka is a mineral rich (chromite, magnesite etc). It is the leading producer of gold (80 percent) in India.

Karnataka managed its public finances well. It was the first state in the country to enact the FRBM Act in 2002. From 2004-05 to 2019-20, it showed a revenue surplus. It kept its fiscal deficit below the 3 percent level till 2019-20. Its public debt (outstanding liabilities) relative to GSDP was below 20 percent till 2019-20. But its government finances deteriorated in 2020-21 and 2021-22 due to the COVID-19 pandemic. Its fiscal deficit relative to GSDP increased to 4.13 percent and 3.36 percent in respective years. Its debt-GSDP increased to 24.46 percent in 2020-21 and 24.13 percent in 2021-22. The newly elected government has announced five guarantees including Guru Lakshmi, Annabhagya etc and the latest budget indicates that Karnataka's public debt will reach 5.84 lakh crore (22.72 percent) at the end of March 2024. Thus, from 2020-21 onwards, its debt level has exceeded the 20 percent level suggested by the Fiscal Responsibility and Budget Management (FRBM) Review Committee, as the sustainable level for Indian states.

Excessive debt (i.e., debt overhang) is bad for growth, development and stability; it can negatively affect capital stock accumulation and economic growth via heightened long term interest rates, higher distortionary tax rates, inflation, and a general constraint on counter cyclical fiscal policies which may lead to increased volatility and lower growth rates (Rugy and Salmon, 2020).

Therefore, it is essential to analyze: (i) whether the public debt in Karnataka is sustainable or not; (ii) what is the debt threshold for Karnataka?, (iii) what are the causes for high levels of public debt?, and (iv) what are fiscal policy strategies required for the state to get rid of the debt trap? This study attempts to analyze these issues.

## **ECONOMIC PERSPECTIVES ON PUBLIC DEBT**

When its expenditure exceeds its revenues, the government borrows. The fiscal deficit (=primary deficit+interest payment) is net borrowing by the government. Public debt is the total liabilities or borrowings of the government. Public debt is sustainable if the government is able to meet its current and future obligations without external financial assistance or going into default. In a lucid sense, it is basically about good housekeeping (Blanchard *et. al.* 1991). There are three main theoretical views on debt/deficit financing in the literature:

- (i) **Ricardian Equivalence Theorem:** Budget deficits today require higher taxes in the future when a government cuts taxes without changing the present or future public spending. Being forward-looking, the household will realize that they need to pay higher taxes in the future so that their total tax burden remains unchanged;
- (ii) **Keynesian Theorem:** Deficit financing can boost aggregate demand and thereby stimulate growth. Hence, this is beneficial for the economy; and
- (iii) **Neo-classical Theorem:** Component of revenue deficit in the fiscal deficit implies a reduction in government saving or an increase in government dissaving and thus, distorting the rate of growth.

There is no consensus among economists on whether deficit financing is good or bad or neutral (Rangarajan and Srivastava, 2005). It needs to be resolved empirically. However, on the empirical front also, there is no universal agreement on how public debt sustainability can be assessed (Akhmadeev *et. al.* 2018). According the traditional Domar (1944) stability condition, “As long as the real economic growth is greater than the real interest rate, the government can have a positive primary deficit such that its debt will not rise and so the debt is sustainable”. This approach was extended later to consider the inter-temporal budget constraint (IBC) of the Government and also with additional indicators (growth, liquidity, creditworthiness, fiscal burden, fiscal space, etc.) and renamed as “Indicator approach” (Blanchard *et. al.* 1991; Pattnaik *et. al.* 2003). Since this approach applied the condition on a year-to-year basis and didn’t validate whether IBC of the Government is satisfied or not.

The modern empirical approach to debt sustainability started with the seminal work of Hamilton and Flavin (1986), which introduced the unit root test to check whether the public debt series (in the US) was stationary or not. Trehan and Walsh (1991) employed another test to analyse whether a quasi-difference of public debt ( $D_t - \nu D_{t-1}$ ) with  $0 \leq \nu < 1 + r$ , (where  $r$  is the interest rate) is stationary and whether public debt and primary surpluses ( $S_t$ ) are co-integrated. If the public debt is quasi-difference stationary and public debt and primary surpluses are co-integrated or alternatively, if total expenditure and revenue receipts are co-integrated, then the public debt is sustainable (Greiner and Fincke 2009).

Bohn (1998) developed a model based approach in 1998 to test whether the primary surplus-GDP ratio ( $s_t$ ) is positive and, at least, a linearly rising function of the debt-GDP ratio ( $d_t$ ) as:

$$s_t = \alpha + \psi d_t + \phi_1 yvar_t + \phi_2 gvar_t + \varepsilon_t \quad (1)$$

where,  $\varepsilon$  is the random error and  $\alpha$  and  $\psi$  are parameters to be estimated. A positive and statistically significant value of  $\psi$  indicates that debt is sustainable.  $yvar$  accounts for fluctuations in revenues and reflects the deviation of real GDP from its trend, computed using the Hodrick-Prescott (HP) filter. Positive values for  $yvar$  indicate booms and negative values indicate recessions. The  $gvar$  reflects the deviation of real primary spending from its normal value with positive values indicating expenditures above the normal level and vice versa.

According to this Bohn model, if governments run into debt today, they would have to take corrective actions in the future by increasing the primary surplus and the positive response of primary surplus to public debt implies a mean reverting process. Later, it was extended by specifying non-linearity and time-varying coefficients in the model as:

$$s_t = \alpha + \psi_t d_{t-1} + \phi_1 yvar_t + \phi_2 gvar_t + \varepsilon_t \quad (2)$$

where the reaction coefficient  $\psi_t$  is time-varying. Mathematically, any non-linear model can be approximated by a linear model with time-varying coefficients. This approximation is good under certain smoothness assumptions. Empirical estimations using these linear approximations employ the popular penalized spline method. To avoid endogeneity issues, Greiner and Fincke (2009) replaced  $d_t$  with  $d_{t-1}$ .

Ghosh *et. al.* (2013) introduced the concept of 'fiscal fatigue'. It happens when public debt achieves some threshold and departs from this threshold value when the primary balance does not adjust to debt. Therefore, it is essential to test for the responsiveness of primary balance to lagged levels of debt relative to GDP in different regimes, using the threshold regression method. The threshold model allows coefficients (of region-varying variable (s)) to differ across regions. Those regions are identified by a threshold variable being above or below a threshold value.

A large number of empirical studies used the above approaches to verify whether the public debt is sustainable or not in various countries. For instances, Kaur *et. al.* (2014) used the indicator approach to verify the debt sustainability of Indian states; Uctum *et. al.* (2006) used the unit root test to test the debt sustainability in G7 countries, selected Latin American and Asian countries and found that the debt was sustainable only in G-7 countries. Hakkio and Rush (1991) and Jha and Sharma (2004) analyzed the sustainability by verifying the co-integrating relationship between public revenue and expenditure.

Abiad and Ostry (2005) employed the extended version of the Bohn model to test the debt sustainability of 31 emerging market countries from 1990 to 2002. Greiner and Kauermann (2008) used the penalized spline method and found that debt is sustainable in Germany and not in Italy. Griener and Fincke (2009) used the Bohn framework and p-spline technique to analyse the debt sustainability issue of the USA and 6 Euro countries (Austria, France, Germany, Italy, The Netherlands, Portugal) and 6 developing countries (Botswana, Costa Rica, Mauritius, Panama, Rwanda, and Tunisia). Except in France, the debt was sustainable in USA and 5 Euro countries. Debt was sustainable in only Botswana and Rwanda.

Tiwari (2012) used the Bohn framework and spline methodology and found that debt was unsustainable in India from 1970 to 2009. Shanmugam and Renjith (2021) used panel version of Bohn framework and p-spline technique to test the debt sustainability of 20 Indian states. Lixin (2019) employed the threshold estimation and found that from 1985 to 2015, China's public and external debt were both sustainable. Shanmugam and Shanmugam (2023) employed the above approaches to check the debt sustainability in Tamil Nadu.

## **PUBLIC DEBT IN KARNATAKA**

In India, central and state governments have different borrowing powers. The central government debt comprises domestic debt and external debt. State governments can borrow from the domestic market and raise loans and advances from the central government. They have no power to raise loans outside India except loans for externally aided projects intermediated by the central government. The domestic debt of the state government consists of market loans, loans from financial institutions like commercial banks, NABARD, LIC, NCDC etc., ways and advances from RBI, special securities issued to NSSF etc. The loans and advances comprise non-plan loans, loans for state/union territory plan schemes, loans for central plan schemes, loans for centrally-sponsored schemes, loans for special schemes and other loans. The public account debt of the state includes small savings, provident funds, reserve funds, deposits bearing interest and deposits not bearing interest etc.

The outstanding liabilities (or debt) of the Karnataka was Rs. 15,627 crore in 1997-98 and increased to Rs. 1,03,030 crore in 2011-12. It further increased to Rs. 5,28,494 crore in 2022-23 RE. Debt relative to GSDP (2011-12 series) increased from 14.12 percent in 1997-98 to 22.55 percent in 2003-04 (Table 1). Then, it continuously declined to 16.69 percent in 2007-08 due to various fiscal measures including the implementation of the FRBM Act in 2002.

The state kept its fiscal deficit level below 3 percent of GSDP from 2003-04 to 2019-20. It also showed a revenue surplus till 2019-20. While the debt relative to GSDP started increasing slightly from 2008-09 to 2019-20, it was below the 20 percent mark. Only from 2020-21 (COVID year) has the state deviated from the FRBM norms of both revenue and fiscal deficits. The debt level also exceeded the 20 percent level suggested by the FRBM committee as a sustainable level from 2020-21 (Figure 1).

**Table 1: Major Fiscal Indicators for Karnataka\***

| Year      | Outstanding Liabilities as percent of GSDP | Primary Deficit as percent of GSDP | Fiscal deficit as percent of GSDP | Revenue Deficit as percent of GSDP | Interest Payment as percent of GSDP | Primary Expenditure as percent of GSDP | Revenue Receipts as percent of GSDP | Revenue Expenditures as percent of GSDP |
|-----------|--------------------------------------------|------------------------------------|-----------------------------------|------------------------------------|-------------------------------------|----------------------------------------|-------------------------------------|-----------------------------------------|
| 1997-98   | 14.12                                      | -0.20                              | -1.46                             | -0.25                              | 1.26                                | 9.85                                   | 9.59                                | 9.84                                    |
| 1998-99   | 13.99                                      | -1.12                              | -2.34                             | -0.91                              | 1.22                                | 9.67                                   | 8.44                                | 9.35                                    |
| 1999-00   | 15.49                                      | -1.57                              | -2.97                             | -1.62                              | 1.40                                | 10.65                                  | 8.97                                | 10.59                                   |
| 2000-01   | 17.26                                      | -1.19                              | -2.74                             | -1.21                              | 1.55                                | 10.88                                  | 9.63                                | 10.84                                   |
| 2001-02   | 20.31                                      | -1.99                              | -3.66                             | -2.05                              | 1.67                                | 11.56                                  | 9.55                                | 11.60                                   |
| 2002-03   | 21.68                                      | -1.16                              | -3.07                             | -1.54                              | 1.92                                | 11.11                                  | 9.41                                | 10.95                                   |
| 2003-04   | 22.55                                      | -0.42                              | -2.42                             | -0.28                              | 1.99                                | 11.61                                  | 11.15                               | 11.44                                   |
| 2004-05   | 21.15                                      | 0.09                               | -1.62                             | 0.74                               | 1.71                                | 11.72                                  | 11.79                               | 11.05                                   |
| 2005-06   | 20.03                                      | 0.03                               | -1.41                             | 0.89                               | 1.44                                | 11.66                                  | 11.64                               | 10.75                                   |
| 2006-07   | 19.07                                      | -0.15                              | -1.55                             | 1.37                               | 1.40                                | 12.59                                  | 12.42                               | 11.05                                   |
| 2007-08   | 16.69                                      | -0.23                              | -1.48                             | 1.05                               | 1.25                                | 11.73                                  | 11.42                               | 10.37                                   |
| 2008-09   | 17.32                                      | -1.02                              | -2.11                             | 0.39                               | 1.10                                | 11.55                                  | 10.48                               | 10.08                                   |
| 2009-10   | 18.58                                      | -1.26                              | -2.42                             | 0.36                               | 1.16                                | 12.34                                  | 10.94                               | 10.58                                   |
| 2010-11   | 16.82                                      | -0.92                              | -1.95                             | 0.76                               | 1.03                                | 11.61                                  | 10.65                               | 9.88                                    |
| 2011-12   | 17.00                                      | -0.97                              | -2.06                             | 0.75                               | 1.09                                | 12.51                                  | 11.52                               | 10.74                                   |
| 2012-13   | 16.79                                      | -1.01                              | -2.09                             | 0.27                               | 1.07                                | 12.28                                  | 11.24                               | 10.97                                   |
| 2013-14   | 16.57                                      | -1.11                              | -2.09                             | 0.04                               | 0.98                                | 12.10                                  | 10.96                               | 10.92                                   |
| 2014-15   | 17.35                                      | -1.07                              | -2.14                             | 0.06                               | 1.03                                | 12.52                                  | 11.40                               | 11.34                                   |
| 2015-16   | 16.80                                      | -0.75                              | -1.83                             | 0.17                               | 1.09                                | 12.16                                  | 11.37                               | 11.20                                   |
| 2016-17   | 17.48                                      | -1.31                              | -2.37                             | 0.11                               | 1.06                                | 12.35                                  | 11.03                               | 10.92                                   |
| 2017-18   | 17.48                                      | -1.21                              | -2.33                             | 0.34                               | 1.04                                | 12.32                                  | 11.03                               | 10.69                                   |
| 2018-19   | 18.28                                      | -1.48                              | -2.60                             | 0.05                               | 1.04                                | 12.71                                  | 11.15                               | 11.11                                   |
| 2019-20   | 19.83                                      | -1.13                              | -2.37                             | 0.07                               | 1.15                                | 12.12                                  | 10.89                               | 10.82                                   |
| 2020-21   | 24.46                                      | -2.69                              | -4.13                             | -1.19                              | 1.35                                | 12.44                                  | 9.64                                | 10.83                                   |
| 2021-22   | 24.13                                      | -2.09                              | -3.36                             | -0.70                              | 1.27                                | 12.05                                  | 9.97                                | 10.67                                   |
| 2022-23RE | 23.58                                      | -1.42                              | -2.73                             | -0.27                              | 1.31                                | 10.90                                  | 9.47                                | 9.74                                    |

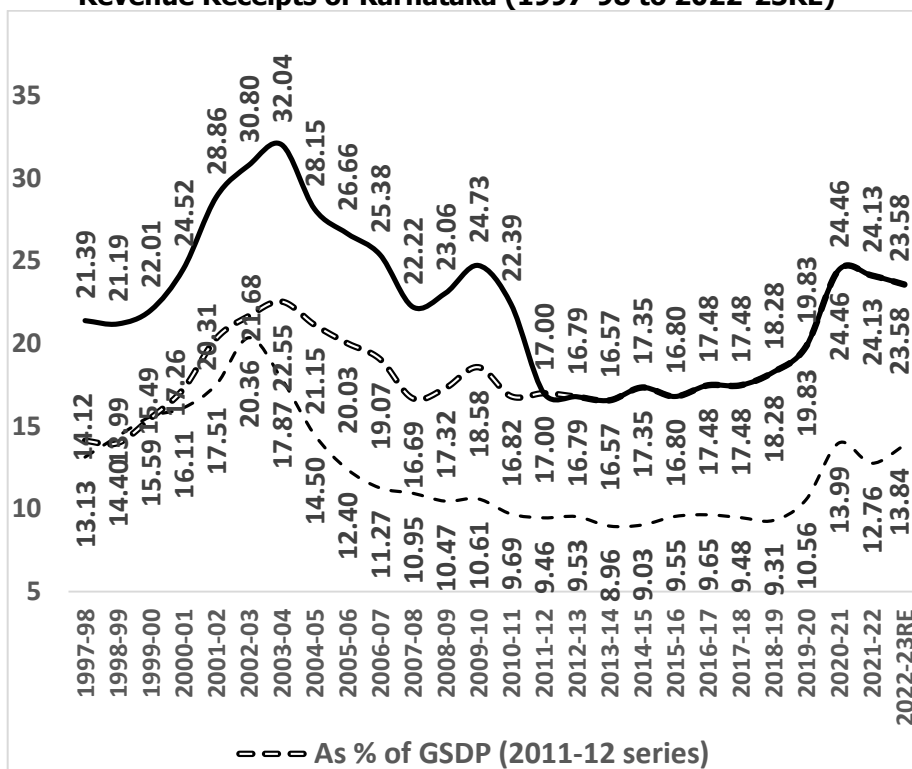
**Note:** \*GSDP 2011-12 base series used to compute ratios. From 1997-98 to 2010-11, the back series was converted into the 2011-12 base series by EPW Research Foundation. RE-Revised Estimates

**Source:** CAG Report on Finance Accounts and State Government Budget Documents (various years).

If we use actual GSDP series (i.e., Up to 1998-99, the 1993-94 base series; 1999-00 to 2003-04, the 1999-00 series; and 2004-05 to 2010-11, the 2004-05 series), the debt-GSDP was 21.39 percent in 1997-98 and increased to 22.55 percent in 2003-04.

The trends in revenue receipts and revenue expenditures (and total expenditures=primary expenditure+ interest payment) relative to GSDP as shown in Table 1 explain the movement of the debt-GSDP ratio. The gap between the revenue expenditure-GSDP ratio and the revenue receipts-GSDP ratio was larger till 2003-04. After that, revenue receipts-GSDP ratio exceeded the revenue expenditure-GSDP ratio till 2019-20. At the time, the debt-GSDP ratio was 20 percent. From 2020-21 onwards, the revenue expenditure-GSDP ratio continuously exceeded the revenue receipts-GSDP ratio. This was the period where the debt-GSDP ratio exceeded the 20 percent mark.

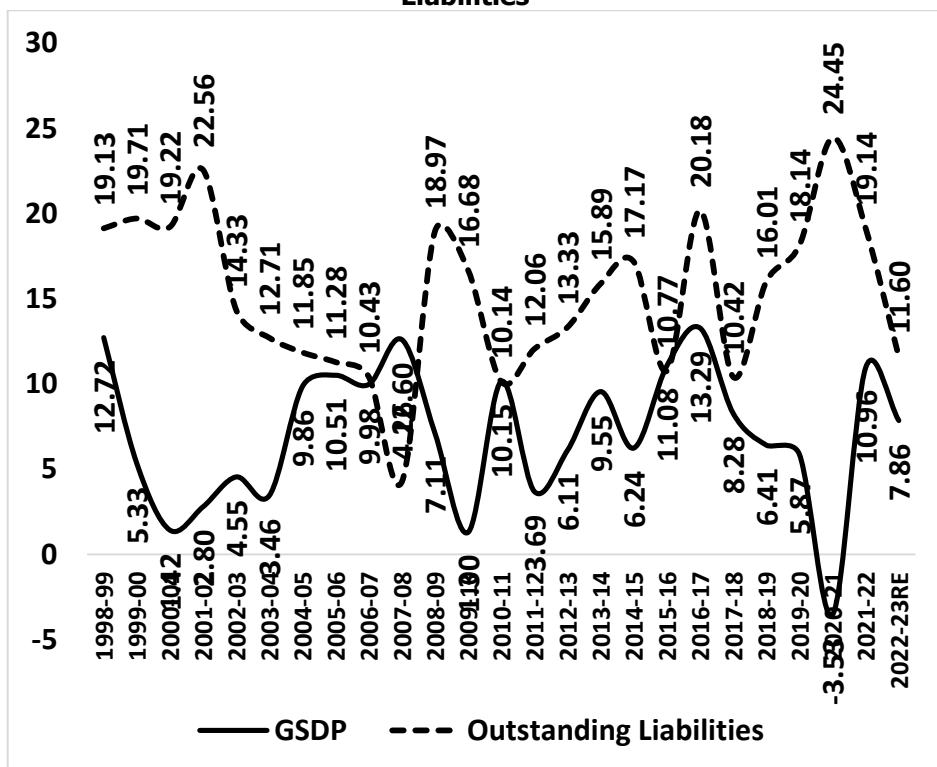
**Figure 1: Outstanding Liabilities to GSDP and Interest to Revenue Receipts of Karnataka (1997-98 to 2022-23RE)\***



**Source:** Same as in Table 1

It is noted that the states' GSDP (real) growth declined significantly between 1998-99 and 2004-05, resulting in increased growth of borrowing. Thereafter, the GSDP growth picked up and reached a high growth of 12.6 percent in 2007-08 (Figure 2). Due to this high growth, which was also supported by austerity measures including the implementation of the FRBM act in 2002, the debt was kept under control. After 2007-08, economic growth slowed down, touching the lowest level in 2020-21 due to the COVID-19 pandemic. During this period, there was a steady increase in debt levels with a spike in 2020-21. The interest payment relative to revenues also increased (Figure 1).

**Figure 2: Annual Growth Rates of Real GSDP and Outstanding Liabilities**



**Source:** Same as in Table 1

## EMPIRICAL TESTS FOR DEBT SUSTAINABILITY

**(i) Unit Root Test:** Table 2 reports the Augmented Dicky-Fuller (ADF) test results. The debt-GSDP ratio in Karnataka has unit root, i.e., it is not stationary, indicating that the debt is unsustainable.

**Table 2: Stationary (ADF) Test Results for Debt-GSDP Ratio (1997-98 to 2022-23)**

| Augmented Dickey-Fuller Test Statistics | t-statistics     | Prob.*  |
|-----------------------------------------|------------------|---------|
|                                         | -1.2667          | 0.6285  |
| Test Critical Values                    | 1 percent level  | -3.7241 |
|                                         | 5 percent level  | -2.9862 |
|                                         | 10 percent level | -2.6326 |

**Note:** \*Mackinnon (1996) one-sided p-values; Source: Authors' Estimations

**(ii) Co-integration Test:** It examines whether the government revenue and total expenditures relative to GSDP are co-integrated or not. It basically examines whether they move together such that the resultant of their relationship produces a stationary series (Hamilton and Flavin, 1986). Table 3 indicates that these two series are not co-integrated at the 5 percent level of significance. This means that the debt in Karnataka is not sustainable.

**Table 3: Results of Johansen's Cointegration (Rank) Test\***

| (i) Unrestricted Cointegration Rank Test (Trace) |            |                  |                     |         |  |
|--------------------------------------------------|------------|------------------|---------------------|---------|--|
| Hypothesized No. of CE(s)                        | Eigenvalue | Trace Statistics | 0.05 Critical Value | Prob.** |  |
| None                                             | 0.1789     | 5.0536           | 12.3209             | 0.5601  |  |
| Atmost 1                                         | 0.0134     | 0.3231           | 4.1299              | 0.6319  |  |

Trace test indicates no cointegration at the 0.05 level; \* Max test also provides similar results and so not reported. \*\* Mackinnon-Haug-Michelis (1999) p-values. Source: Authors' Estimations

**(iii) Bohn Model Based Non-linear Test:** Table 4 presents the penalized spline estimation results of equation (2). As expected, the coefficient of business cycle variable *yvar* is positive and that of *gvar* is negative. The former is statistically significant at 1 percent level and the latter is significant only at 10 percent. These results indicate that while the GDP above its normal value has increased the primary surplus, primary spending above its normal value has reduced the primary surplus in the state. Although the parameter associated with the lagged debt-GDP ratio is positive, it is not statistically significant even at the 10 percent level, implying that the public debt is unsustainable in Karnataka. Thus, all the three modern statistical tests confirm that the public debt in Karnataka is not sustainable.

**Table 4: p-spline Estimation Results of Debt Sustainability Equation (Dependent Variable: Primary Deficit to GSDP percent,  $s_t$ )**

| Variables                         | Notation       | Coefficient (t value) |
|-----------------------------------|----------------|-----------------------|
| Intercept                         | $\hat{\alpha}$ | -3.4540 (-2.675)      |
| Lagged Debt-GSDP ratio ( percent) | $d_{t-1}$      | 0.0497 (0.878)        |
| Real GSDP gap                     | <i>yvar</i>    | 0.00001 (3.729)       |
| Real Primary Expenditure Gap      | <i>gvar</i>    | -0.0001 (-1.711)      |
| edf.                              |                | 7.080                 |
| F (p-value)                       |                | 14.30 (0.000)         |
| R-sq.(adj)                        |                | 0.837                 |
| GCV                               |                | 0.1161                |
| N                                 |                | 25                    |

**Source:** Authors' Estimations

**(iv) Estimating Debt Sustainability Threshold:** Table 5 presents threshold regression results, in which the debt-GSDP ratio is the threshold variable. The sustainable debt-GSDP for Karnataka is estimated at 20.03 percent, which is almost similar to the 20 percent norm given by the FRBM Review Committee for all Indian states. This model considers a single threshold dividing the sample into two regimes. It considers that

the behaviour of primary deficit relative to GSDP may change if the debt-GSDP ratio crosses the threshold. It may trigger suitable responses by policymakers to reduce the primary deficit-GSDP ratio if the debt-GSDP ratio crossed the prudent norm of 20.03 percent (in our case). It is observed from Table 5 that when debt-GSDP increased by one unit, the primary balance increased by 0.17 unit in region 1 where the debt level was below the threshold and by 0.11 unit in region 2 where the debt exceeded the threshold.

**Table 5: Threshold Regression Results (1997-98 to 2022-23)**

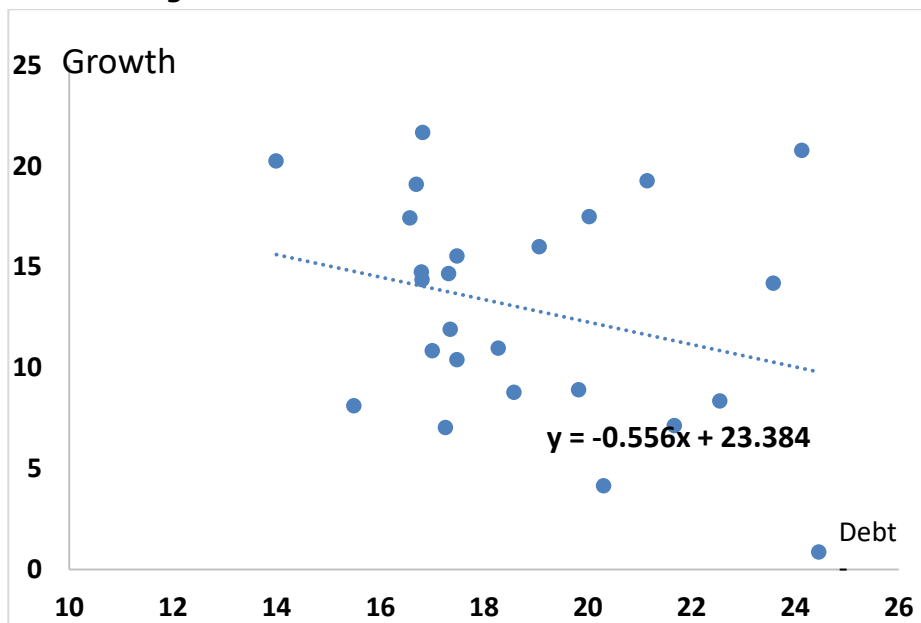
| Dependent Variable: Primary Deficit to GSDP percent ( $s_t$ )<br>Threshold Variable: Lagged Debt-GSDP ratio percent ( $d_{t-1}$ ) |           |             |              |       |
|-----------------------------------------------------------------------------------------------------------------------------------|-----------|-------------|--------------|-------|
| Variables                                                                                                                         | Notation  | Coefficient | t-statistics | Prob. |
| <b><math>d_t &lt; 20.03</math> (Region 1)</b>                                                                                     |           |             |              |       |
| Lagged Debt-GSDP ratio (percent)                                                                                                  | $d_{t-1}$ | 0.1704      | 2.66         | 0.008 |
| <b><math>20.03 \leq d_t</math> (Region 2)</b>                                                                                     |           |             |              |       |
| Lagged Debt-GSDP ratio (percent)                                                                                                  | $d_{t-1}$ | 0.1146      | 2.19         | 0.028 |
| <b>Region Invariant Variables</b>                                                                                                 |           |             |              |       |
| Real GSDP gap                                                                                                                     | yvar      | 0.000002    | 0.41         | 0.683 |
| Real Primary Expenditure Gap                                                                                                      | gvar      | -0.00037    | -0.99        | 0.321 |
| Constant                                                                                                                          | $\hat{d}$ | -3.8946     | -3.51        | 0.000 |
| Sum Squared Resid.                                                                                                                | SSR       | 6.2651      |              |       |
| Akaike Info Criterion                                                                                                             | AIC       | -24.5969    |              |       |

**Source:** Authors' Estimations

### **(v) Examining Debt-Growth Relationship**

Figure 3 depicts the linear relation between growth ( $y_t$ ) and debt-GSDP ( $x_t$ ) for Karnataka from 1998-90 to 2022-23. The debt-GSDP coefficient is negative, indicating that 1 percent in the debt-GSDP ratio would reduce the nominal growth by 0.6 per cent. This negative relation is consistent with the Neo-classical view that debt is detrimental to growth. We have also verified a non-linear (quadratic) relation between debt and growth, but it does not exist.

**Figure 3: Debt-Growth Relation in Karnataka**

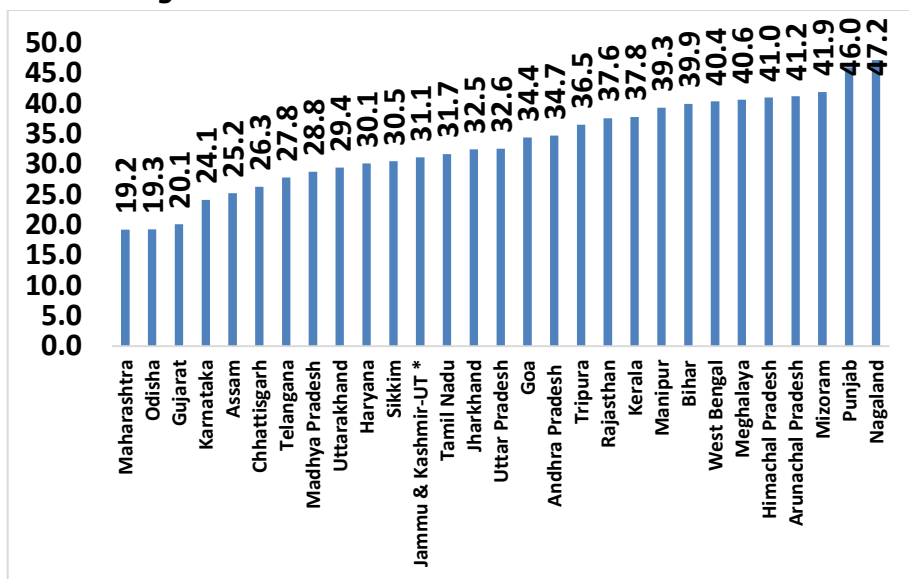


**Source:** As in Table 1

### **DEBT PROFILE: AN INTERSTATE COMPARISON**

Figure 4 shows the debt profile of Indian states in 2021-22. If we go by the norm of the FRBM Review Committee, only Maharashtra (19.29 percent) and Odisha (19.3 percent) meet this norm. Gujarat is closer to the norm. Karnataka ranked 4<sup>th</sup> in having a low debt-GSDP ratio. Nagaland had the highest debt-GSDP ratio (47.2 percent), followed by Punjab (46 percent) and Mizoram (41.9 percent).

**Figure 4: Debt Profile of Indian States in 2021-22**



**Source (Basic Data):** RBI's State Finance: A Study of State Budgets and Mospi.

### **SIMULATION MODEL EXAMINING THE YEAR OF REACHING THE DEBT THRESHOLD TARGET**

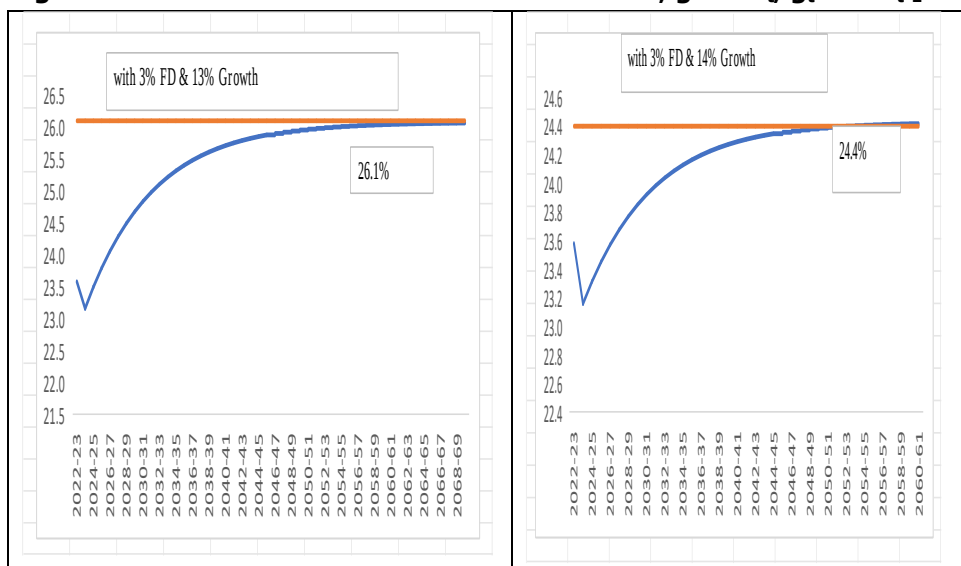
According to the standard debt dynamic formula, the debt-GSDP ratio ( $d_t$ ) at the end of a fiscal year depends on (i) fiscal deficit-GSDP ratio ( $f_t$ ), (ii) last year debt-GSDP ratio ( $d_{t-1}$ ) and (iii) nominal growth rate ( $g_t$ ). The change in debt-GSDP ratio between two successive years is given by:  $(d_t - d_{t-1}) = f_t - d_{t-1} (g_t / (1 + g_t))$ . Using this relation, one can project or simulate debt-GSDP level in future period, given assumptions on  $f_t$  and  $g_t$  and previous year debt ( $d_{t-1}$ ). We have done a few simulation exercises using different assumptions on these three components to examine whether the Karnataka government will achieve the sustainable level of debt or not and, if so, when it will reach. The following initial values of debt to GSDP, fiscal deficit and nominal growth of Karnataka's economy from the recent budget documents are used: (i) debt to GSDP ratio for 2022-23: 23.58 percent; (ii) fiscal deficit for 2022-23: 2.728 percent and

for 2023-24: 2.6 percent; and (iii) growth for 2022-23: 14.2 percent and for 2023-24: 14.66 percent

In exercise 1, the nominal annual growth rate of the economy is assumed to be 13 percent from 2024-25 onwards (based on the last 10 years' actual average growth of the economy of 12.54 percent) and the fiscal deficit is assumed at 3 percent from 2024-25 onwards. In exercise 2, the higher growth of 14 percent is used, other things remain the same. Simulations based on the debt dynamics formula (exercise 1) indicate that the debt-GSDP ratio will decline to 23.2 percent in 2023-24 and then it will increase continuously to 26.1 percent in 2062-61 and then it will stabilise at that level beyond 2075-76, i.e., it will never reduce even after 100 years (Figure 5). In exercise 2, the debt-GSDP will initially decline to 23.2 percent in 2023-24. After that, it will increase continuously to 24.4 percent in 2045-46 and thereafter, it will stabilise for a longer period.

In exercise 3, when a still higher growth of 15 percent is used from 2024-25, the debt-GSDP ratio will stabilise at 23 percent from 2033-33 (not shown). With 16 percent growth, it will stabilize at 21.8 percent from 2041-42 (not shown). Beyond 16 percent growth is a difficult task as it is highly ambitious, given the historical growth path. Therefore, other possibility to control debt is to reduce the fiscal deficit target. If we assume a 2 percent fiscal deficit target, the debt-GSDP ratio will reach the sustainable level (20 percent) in 2030-31 with 13 percent growth and will reach a sustainable level in 2028-29 with 14 percent growth (Table 6).

**Figure 5: Simulation Results of Debt-GSDP Ratio, given  $f_t$ ,  $g_t$  and  $d_{t-1}$**



**Table 6: Simulation Results to achieve the Sustainable Debt-GSDP ratio**

| Year    | 13 percent Growth and 2 percent Fiscal Deficit |             |       |       |               | 14 percent Growth and 2 percent Fiscal Deficit |             |       |       |               |
|---------|------------------------------------------------|-------------|-------|-------|---------------|------------------------------------------------|-------------|-------|-------|---------------|
|         | $f_t$                                          | $d_t$       | $g$   | $1+g$ | $d_t-d_{t-1}$ | $f_t$                                          | $d_t$       | $g$   | $1+g$ | $d_t-d_{t-1}$ |
| 2022-23 | 2.73                                           | 23.6        | 0.142 | 1.142 |               | 2.73                                           | 23.6        | 0.142 | 1.142 |               |
| 2023-24 | 2.59                                           | 23.2        | 0.147 | 1.147 | -0.422        | 2.59                                           | 23.2        | 0.147 | 1.147 | -0.422        |
| 2024-25 | 2                                              | 22.5        | 0.13  | 1.13  | -0.664        | 2                                              | 22.3        | 0.14  | 1.14  | -0.844        |
| 2025-26 | 2                                              | 21.9        | 0.13  | 1.13  | -0.588        | 2                                              | 21.6        | 0.14  | 1.14  | -0.740        |
| 2026-27 | 2                                              | 21.4        | 0.13  | 1.13  | -0.520        | 2                                              | 20.9        | 0.14  | 1.14  | -0.649        |
| 2027-28 | 2                                              | 20.9        | 0.13  | 1.13  | -0.460        | 2                                              | 20.4        | 0.14  | 1.14  | -0.569        |
| 2028-29 | 2                                              | 20.5        | 0.13  | 1.13  | -0.407        | 2                                              | <b>19.9</b> | 0.14  | 1.14  | -0.499        |
| 2029-30 | 2                                              | 20.2        | 0.13  | 1.13  | -0.360        | 2                                              | 19.4        | 0.14  | 1.14  | -0.438        |
| 2030-31 | 2                                              | <b>19.8</b> | 0.13  | 1.13  | -0.319        | 2                                              | 19.0        | 0.14  | 1.14  | -0.384        |

Thus, ensuring 14 percent growth of the economy, the state should target a revenue surplus from 2023-24 onwards such that it contains its fiscal deficit to only 2 percent level to obtain the sustainable debt level of about 20 percent before 2029-30. It will not be a tough task for Karnataka given its past record.

### **STRATEGIES TO CONTROL DEBT AND REACH A SUSTAINBLE LEVEL**

Based on the above analyses, the following policy implications emerge:

(i) Although the current level of debt-GSDP (i.e., 23.8 percent) is within the limit set by the 15<sup>th</sup> FC (considering the pandemic), it is not the sustainable debt level for Karnataka. Our analysis clearly indicates that the Karnatka's debt is negatively related to its growth. That is, it is not clearly growth inducing. Maintaining below a sustainable level of debt will be beneficial for the state to boost its economic growth, which will also help the state to increase its own revenues further, if they are buoyant;

(ii) Sustained debt level will reduce the interest payments. Table 1 indicates that when the debt-GSDP ratio was below 20 percent in 2019-20, the interest to revenue receipts was 10.56 percent and when the debt-GSDP increased to 23.58 percent in 2022-23, the interest to revenue receipts increased to 13.84 percent. The difference in interest is more than Rs.10,000 crore. Thus, the reduction of debt-GSDP ratio will automatically reduce the interest. This will further improve the state's fiscal status as these saved amounts can be spent on growth inducing-investments.

(iii) The state should aim at 14 percent nominal growth rate to create buoyancy in tax revenues/additional resources to control the debt level.

(iv) Despite higher growth of 14 percent, debt sustainability is possible only if the fiscal deficit is brought down to 2 percent of GSDP from 2024-25 onwards.

(v) Appropriate policy strategy is revenue augmentation or containing expenditures or both, such that the fiscal deficit should be reduced to 2 percent. Given the results, the state needs to increase its revenues by 1.0 percent of GSDP. In 2019-20, its revenue receipts-GSDP ratio was 10.89 percent, but in 2022-23, it declined to 9.47 percent. The revenue augmentation within the limited scope of the state is possible only through better tax compliance, revision of tax on transport (motor vehicles), and by augmenting non-tax revenues. The other option is to cut down on unproductive subsidies and expenses besides better targeting of welfare schemes through efficient data management.

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