

**Sustainability of Public Debt in Karnataka State****By****Smt. Prameela S, Research Scholar (Part-Time) and Assistant Professor in Economics,**
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1. Introduction to Public Debt Sustainability analysis:

Public Debt Sustainability analysis at the sub-national level is one of the highly debated issues in public finance literature. Public Debt Sustainability is a term that has been used with increasing frequency in the academic literature and multilateral policy discussions, but with different connotations under different circumstances (Balassone and Franco, 2000; Chalk and Hemming, 2000). Domar (1944) was a pioneer in developing the public debt sustainability framework, postulated that the growth rate of income exceeding the interest rate was a necessary condition for debt sustainability. Subsequently, Blanchard (1990) provided two conditions for sustainability:

- a) the ratio of Public Debt to Gross National Product (GNP) should eventually converge back to its initial level, even if there is excessive variation in the short term, and
- b) the present discounted value of the ratio of primary deficits to GNP should be equal to the negative of the current level of public debt to GNP.

Fiscal sustainability and debt sustainability are inter-related; the latter has assumed significance with the adoption of debt rules as part of a fiscal rules framework. Apart from examining debt sustainability in a static framework, empirical studies have also analysed this issue taking into account the uncertainties about medium-term projections of economic growth, primary balance, cost of public sector borrowings and existence of implicit guarantees, and fiscal reaction functions incorporating dynamic properties of fiscal policymaking.

2. Framework of Public Debt Sustainability Analysis

It is against this backdrop that the time series analysis with an indicator approach has been used to examine the improvement in the public debt position of Karnataka State in terms of state-level fiscal and macroeconomic variables. The data analysis was conducted for the post-debt consolidation period (2000-01 to 2020-21). The post-debt consolidation period was identified based on the passing of Karnataka Ceiling on Government Guarantee Act (KCGGA), 1999. The analytical framework attempts to capture the time series dimension of the state-level data with an indicator approach has been depicted in the following statement:



**Statement of Analytical Framework on Fiscal Sustainability of States in India:
An Indicator Approach**

S. No.	Indicators	Sustainability Condition
1	Outstanding Public Debt (OPD) as percent of Nominal Gross State Domestic Product (Nominal GSDP)	$OPD/GSDP < 20\%$
2	Growth Rate of nominal GSDP (Y_g) should be more than the growth rate of Outstanding Public Debt (D_g)	$Y_g > D_g$ (or) $Y_g - D_g > 0$
3	Real GSDP Growth Rate (y) should be higher than Real Interest Rate (r)	$y > r$ (or) $y - r > 0$
4	Primary Balance (PB) should be in surplus, i.e. the difference between Revenue Receipts and Revenue Expenditure should be greater than zero	$RB > 0$ (or) $RR - RE > 0$
5	Effective Revenue Balance (ERB) should be in surplus and adequate to meet interest payments (IP)	$ERB/IP > 100$
6	Interest Burden defined by Interest Payments (IP) to GSDP ratio should decline over time	$\frac{IP_t}{GSDP_t} < \frac{IP_{t-1}}{GSDP_{t-1}}$
7	Interest Payments as a proportion of Revenue Expenditure should decline overtime	$\frac{IP_t}{RE_t} < \frac{IP_{t-1}}{RE_{t-1}}$
8	Interest Payment as a proportion of Revenue Receipts should fall over time	$\frac{IP_t}{RR_t} < \frac{IP_{t-1}}{RR_{t-1}}$

Notes: Real interest rate is measured as average interest rate on Outstanding Public Debt *minus* difference between the growth rate of nominal GSDP (Y_g) and the growth rate of real GSDP (y).

The researcher has examined the position of each indicator of Public Debt Sustainability depicted in the above statement with the time series data for the Post-Reform Period for the Karnataka State and has made data analysis on each indicator in the following paragraphs.

Indicator – 1: Outstanding Public Debt as percent of Nominal GSDP in Karnataka State

The time series data on the trends in Outstanding Public Debt as percent of Nominal GSDP in Karnataka State has been given in Table – 1. It is observed from the Table that Outstanding Public Debt as percent of Nominal GSDP in Karnataka State is the highest at 22.57% in 2003-04 and it is the lowest at 16.57% in 2013-14 during the period of study. As per the trends, it is obvious that the Outstanding Public Debt as percent of Nominal GSDP in Karnataka State has increased from 17.71 % in 2000-01 to 22.57% in 2003-04, but then it continuously declined to its lowest level at 16.57% in 2013-14. However, the Outstanding Public Debt as percent of Nominal GSDP in Karnataka State has again exhibited the increasing trend with ups and downs from its lowest level in 2013-14 to 21.12% in 2020-21.



The regression equation of linear trend line is $Y = 19.83 - 0.113X$, with $R^2 = 0.136$ exhibits a declining trend in the Outstanding Public Debt as percent of Nominal GSDP in Karnataka State, but its explanatory power is statistically insignificant as its R^2 value is very low at 0.136, i.e., the linear trend explains only 13.6 % of variations in the Outstanding Public Debt as percent of Nominal GSDP in Karnataka State. The regression equation of quadratic trend line of Outstanding Public Debt as percent of Nominal GSDP in Karnataka is $Y = 22.46 - 0.799X + 0.031X^2$, with $R^2 = 0.44$ exhibits a declining trend in the beginning up to 2013-14 and then an increasing trend up to 2020-21, but its explanatory power is statistically insignificant as its R^2 value is low at 0.44, i.e., the quadratic trend equation explains only 44 % of variations in the Outstanding Public Debt as percent of Nominal GSDP in Karnataka State. However, based on the R^2 value, it can be concluded that quadratic trend equation is a better fit than linear trend equation to explain the trends in the Outstanding Public Debt as percent of Nominal GSDP in Karnataka State.

Finally, it is clear from the Table that the Outstanding Public Debt as percent of Nominal GSDP in Karnataka State exhibits sustainability because it is less than 20% in most years of study period, especially after 2005-06 except the latest year 2020-21.

Tale – 1: Trends in the Outstanding Public Debt as percent of Nominal GSDP in Karnataka State

Year	Nominal GSDP (Rs. Crore)	Outstanding Public Debt (Rs. Crore)	Outstanding Public Debt as Percent of Nominal GSDP
2000-01	153982	27271	17.71
2001-02	160355	33123	20.66
2002-03	171783	37326	21.73
2003-04	186137	42018	22.57
2004-05	221985	46563	20.98
2005-06	260801	52236	20.03
2006-07	302514	57682	19.07
2007-08	360280	60143	16.69
2008-09	413109	71550	17.32
2009-10	449381	83482	18.58
2010-11	546756	91943	16.82
2011-12	606010	103030	17.00
2012-13	695413	116767	16.79
2013-14	816666	135318	16.57
2014-15	913923	158553	17.35
2015-16	1045168	175623	16.80
2016-17	1207608	211071	17.48
2017-18	1336914	233058	17.43
2018-19	1490624	270377	18.14
2019-20	1628928	319418	19.61
2020-21	1665320	351759	21.12



Notes:

1. Nominal GSDP = Gross State Domestic Product at current prices (2011-12 series)
2. For the Year 2020-21 the data refers Revised Estimates.

Sources of Data:

1. Government of Karnataka: Economic Survey of Karnataka, Various Years.
2. Government of Karnataka: Budget Volumes, Various Years.
3. Government of Karnataka: Medium Term Fiscal Plan of Karnataka, Various Years.
4. Reserve Bank of India: State Finances - A Study of Budgets, Various Years.

Indicator -2: Growth Rate of Nominal GSDP (Y_g) should be greater than Growth Rate of Outstanding Public Debt (D_g)

The time series data on the trends in Growth Rates of Nominal GSDP (Y_g) and Growth Rates of Outstanding Public Debt (D_g) in Karnataka State has been given in Table – 2. It is observed from the Table that the difference between the Growth Rates of Nominal GSDP (Y_g) and the Growth Rates of Outstanding Public Debt (D_g) is positive in 9 years and it is negative in 12 years during the period of study. The regression equation of linear trend line is $Y = 0.706 - 0.158X$, with $R^2 = 0.014$ exhibits the difference between the Growth Rates of Nominal GSDP (Y_g) and the Growth Rates of Outstanding Public Debt (D_g) in Karnataka State, but its explanatory power is statistically insignificant as its R^2 value is very low at 0.014, i.e., the linear trend explains only 1.4% of variations in the difference between the Growth Rates of Nominal GSDP (Y_g) and the Growth Rates of Outstanding Public Debt (D_g) in Karnataka State. The regression equation of quadratic trend line exhibits the difference between the Growth Rates of Nominal GSDP (Y_g) and the Growth Rates of Outstanding Public Debt (D_g) is $Y = 10.29 + 2.842X - 0.142X^2$, with $R^2 = 0.333$ exhibits an increasing trend in the beginning up to 2013-14 and then a declining trend up to 2020-21, but its explanatory power is statistically insignificant as its R^2 value is low at 0.33, i.e., the quadratic trend equation explains only 33 % of variations in the difference between the Growth Rates of Nominal GSDP (Y_g) and the Growth Rates of Outstanding Public Debt (D_g) in Karnataka State. However, based on the R^2 value, it can be concluded that quadratic trend equation is a better fit than linear trend equation to explain the trends in the difference between the Growth Rates of Nominal GSDP (Y_g) and the Growth Rates of Outstanding Public Debt (D_g) in Karnataka State. Hence, it is obvious that the Public Debt is not in a sustainable position in the State because the Growth Rates of Nominal GSDP (Y_g) are greater than the Growth Rates of Outstanding Public Debt (D_g) only in 9 years out of 21 years of the study period.

Table – 2: Trends in the Growth Rates of Nominal GSDP and Outstanding Public Debt in Karnataka State

Year	Nominal GSDP (Y) (Rs. Crore)	Outstanding Public Debt (D) (Rs. Crore)	Annual Growth Rate of nominal GSDP (Y_g) (%)	Annual Growth Rate of Outstanding	Condition for Sustainability of Public Debt: ($Y_g - D_g$) > 0
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				Public Debt (D_g) (%)	(%)
2000-01	153982	27271	-----	-----	-----
2001-02	160355	33123	4.14	21.46	-17.32
2002-03	171783	37326	7.13	12.69	-5.56
2003-04	186137	42018	8.36	12.57	-4.21
2004-05	221985	46563	19.26	10.82	8.44
2005-06	260801	52236	17.49	12.18	5.30
2006-07	302514	57682	15.99	10.43	5.57
2007-08	360280	60143	19.10	4.27	14.83
2008-09	413109	71550	14.66	18.97	-4.30
2009-10	449381	83482	8.78	16.68	-7.90
2010-11	546756	91943	21.67	10.14	11.53
2011-12	606010	103030	10.84	12.06	-1.22
2012-13	695413	116767	14.75	13.33	1.42
2013-14	816666	135318	17.44	15.89	1.55
2014-15	913923	158553	11.91	17.17	-5.26
2015-16	1045168	175623	14.36	10.77	3.59
2016-17	1207608	211071	15.54	20.18	-4.64
2017-18	1336914	233058	10.71	10.42	0.29
2018-19	1490624	270377	11.50	16.01	-4.52
2019-20	1628928	319418	9.28	18.14	-8.86
2020-21	1665320	351759	2.23	10.12	-7.89

Notes:

1. Nominal GSDP = Gross State Domestic Product at current prices (2011-12 series)
2. For the Year 2020-21 the data refers Revised Estimates.

Sources of Data:

1. Government of Karnataka: Economic Survey of Karnataka, Various Years.
2. Government of Karnataka: Budget Volumes, Various Years.
3. Government of Karnataka: Medium Term Fiscal Plan of Karnataka, Various Years.
4. Reserve Bank of India: State Finances - A Study of Budgets, Various Years.

Indicator – 3: Real output growth (RY_g) should be higher than Real Interest Rate (RIR), i.e., $RY_g - RIR > 0$

The time series data on the trends in Growth Rates of Real GSDP (RY_g) and Real Rate of Interest (RIR) in Karnataka State has been given in Table – 3. It is observed from the Table that the difference between the Growth Rates of Real GSDP (RY_g) and Real Rate of Interest (RIR) is positive in 18 years and it is negative in 4 years only during the period of study.

The regression equation of linear trend line is $Y = 4.405 + 0.071X$, with $R^2 = 0.005$ exhibits a positive trend in the difference between the Growth Rates of Real GSDP (RY_g) and Real Rate of Interest (RIR) in Karnataka State, but its explanatory power



is statistically insignificant as its R^2 value is very low at 0.005, i.e., the linear trend explains only 0.5% of variations in the difference between the Growth Rates of Real GSDP (RY_g) and Real Rate of Interest (RIR) in Karnataka State. The regression equation of quadratic trend line on the difference between the Growth Rates of Real GSDP (RY_g) and Real Rate of Interest (RIR) is $Y = -6.205 + 2.965X - 0.137X^2$, with $R^2 = 0.565$ exhibits an increasing trend in the beginning up to 2011-12 and then a declining trend up to 2020-21 and its explanatory power is statistically significant as its R^2 value is higher at 0.565, i.e., the quadratic trend equation explains 56.5 % of variations in the difference between the Growth Rates of Real GSDP (RY_g) and Real Rate of Interest (RIR) in Karnataka State. However, based on the R^2 value, it can be concluded that quadratic trend equation is a better fit than linear trend equation to explain the trends in the difference between Growth Rates of Real GSDP (RY_g) and Real Rate of Interest (RIR) in Karnataka State. Hence, it is obvious that the Public Debt is in a sustainable position in the State because the Growth Rates of Real GSDP (RY_g) are greater than Real Interest Rate (RIR) in 18 years out of 21 years of the study period and it is clear that the Government of Karnataka is able to borrow with lower interest rates, which makes the public debt sustainability.

Table – 3: Trends in the Real GSDP Growth Rates, Nominal and Real Interest Rates in Karnataka State

Year	Nominal Interest Rate (NIR)	Inflation Rate	Real Interest Rate (RIR)	Annual Rate of growth of Real GSDP (RY_g) (%)	Condition for Sustainability of Public Debt (%): ($RY_g - RIR$) > 0
1	2	3	4 = (2-3)	5	6 = (5-4)
2001-02	9.84	1.34	8.50	2.80	-5.70
2002-03	9.94	2.58	7.36	4.55	-2.81
2003-04	9.94	4.90	5.04	3.46	-1.58
2004-05	9.03	9.41	-0.38	9.85	10.23
2005-06	8.09	6.97	1.11	10.51	9.40
2006-07	8.11	6.02	2.09	9.98	7.88
2007-08	7.81	6.49	1.32	12.60	11.28
2008-09	7.54	7.56	-0.02	7.11	7.13
2009-10	7.29	7.48	-0.20	1.30	1.49
2010-11	6.76	11.52	-4.76	10.15	14.91
2011-12	6.59	7.15	-0.55	3.69	4.24
2012-13	6.63	8.64	-2.01	6.11	8.12
2013-14	6.71	7.88	-1.17	9.55	10.72
2014-15	6.95	5.67	1.28	6.24	4.96
2015-16	6.78	3.28	3.49	11.08	7.58



2016-17	6.85	2.26	4.59	13.29	8.69
2017-18	6.60	2.10	4.50	8.61	4.11
2018-19	6.62	5.00	1.61	6.49	4.88
2019-20	6.85	4.27	2.58	5.00	2.43
2020-21	7.08	4.85	2.23	-2.62	-4.85

Note: GSDP = Gross State Domestic Product

Source: 1. Government of Karnataka: Economic Survey of Karnataka, Various Years

2. Government of Karnataka: Budget Volumes, Various Years

3. Government of Karnataka: Medium Term Fiscal Plan of Karnataka, Various Years

4. Reserve Bank of India: State Finances - A Study of Budgets, Various Years

Indicator - 4: Primary Balance should be in surplus, i.e., Revenue Receipts (RR) should be greater than Revenue Expenditure (RE): $RR - RE > 0$

The achievement of Primary Balance Indicator has been presented in Table - 4. It is observed from the Table that the Primary Balance was negative during beginning years of the post-reform period from 2000-01 to 2003-04 and it became positive with effect from the financial year 2004-05, i.e. the Government of Karnataka has achieved the fixed target of 'Positive Primary Balance' in its revenue account one year before the targeted year. It is observed from the Table and Graph that the Government of Karnataka was able to maintain the positive primary balance for a long period of time from 2004-05 to 2019-20, but it is expected that there will be a huge negative primary balance in the Financial Year, 2020-21 due to expected decline in the Revenue Receipts. The basic reason for the decline in the Revenue Receipts is the slump in economic activities due to continuous of lockdown of economic activities in the State as part of call for lockdown by the Government of India during 2020-21 in order to control the spread of COVID-19 Pandemic. Hence, it is clear that COVID-19 Pandemic conditions have pushed the Finances of the Government of Karnataka into huge negative primary balance of Rs. 19486 Crore as per the revised estimates in the Karnataka Budget, presented in 2021. The regression equation of linear trend line is $Y = 1829 - 129.8X$, with $R^2 = 0.025$ exhibits a negative trend in the Primary Balance of Revenue Account in Karnataka State, but its explanatory power is statistically insignificant as its R^2 value is very low at 0.025, i.e., the linear trend explains only 2.5% of variations in the Primary Balance of Revenue Account in Karnataka State. The regression equation of quadratic trend line is $Y = -6453 + 2030X - 98.21X^2$, with $R^2 = 0.447$ and it exhibits an increasing trend in the beginning up to 2010-11 and then a declining trend up to 2020-21, but its explanatory power is statistically insignificant as its R^2 value is only 0.447, i.e., the quadratic trend equation explains only 44.7 % of variations in the Primary Balance of Revenue Account in Karnataka State. However, based on the R^2 value, it can be concluded that quadratic trend equation is a better fit than linear trend equation to explain the trends in the Primary Balance of Revenue Account in Karnataka State.



Table – 4: Trends in Revenue Receipts, Revenue Expenditure and Primary Balance in Karnataka State

Year	Revenue Expenditure (RE) (Rs. Crore)	Revenue Receipts (RR) (Rs. Crore)	Primary Balance (PB) PB = (RR - RE) > 0 (Rs. Crore)
2000-01	16685	14823	-1862
2001-02	18605	15321	-3284
2002-03	18815	16169	-2646
2003-04	21285	20760	-525
2004-05	24932	26570	1638
2005-06	28041	30352	2311
2006-07	33435	37587	4152
2007-08	37375	41151	3776
2008-09	41660	43291	1631
2009-10	47537	49156	1619
2010-11	54034	58206	4172
2011-12	65115	69806	4691
2012-13	76293	78176	1883
2013-14	89190	89544	354
2014-15	103614	104142	528
2015-16	117028	118817	1789
2016-17	131921	133214	1293
2017-18	142483	147000	4517
2018-19	164300	164979	679
2019-20	174258	175443	1185
2020-21	179195	159709	-19486

Source: 1. Government of Karnataka: Economic Survey of Karnataka, Various Years
2. Government of Karnataka: Budget Volumes, Various Years
3. Government of Karnataka: Medium Term Fiscal Plan of Karnataka, Various Years
4. Reserve Bank of India: State Finances - A Study of Budgets, Various Years

Indicator – 5: Primary Revenue Balance (PRB) should be in surplus and adequate to meet interest payments (IP), i.e., (Revenue Receipts – Primary Revenue Expenditure) should be greater than Interest Payments: PRB – IP > 0

The achievement of Indicator – 5 has been presented in Table -5. It is observed from the Table that the difference between the Primary Revenue Balance and Interest Payments was negative during beginning years of the post-reform period from 2000-01 to 2003-04 and it became positive with effect from the financial year 2004-05, i.e. the Government of Karnataka has achieved the fixed target of 'Positive Primary Revenue Balance' in its revenue account and is sufficient to make the Interest Payments one year



before the targeted year. It is observed that the Government of Karnataka was able to maintain the positive primary revenue balance in the Revenue Account and is sufficient to make the interest payments for a long period of time from 2004-05 to 2019-20, but it is expected that there will be a huge negative primary revenue balance in 2020-21 due to expected decline in the Revenue Receipts. The call for lockdown by the Government of India during 2020-21 in order to control the spread of COVID-19 Pandemic pushed the Finances of the Government of Karnataka into huge negative difference between the Primary Revenue Balance and Interest Payments at Rs. 19486 Crore in the financial year 2020-21. The regression equation of linear trend line is $Y = 1829 - 129.8X$, with $R^2 = 0.025$ exhibits a negative trend in the Primary Balance of Revenue Account in Karnataka State, but its explanatory power is statistically insignificant as its R^2 value is very low at 0.025, i.e., the linear trend explains only 2.5% of variations in the Primary Balance of Revenue Account in Karnataka State. The regression equation of quadratic trend line is $Y = -6453 + 2030X - 98.21X^2$, with $R^2 = 0.447$ and it exhibits an increasing trend in the beginning up to 2010-11 and then a declining trend up to 2020-21, but its explanatory power is statistically insignificant as its R^2 value is only 0.447, i.e., the quadratic trend equation explains only 44.7 % of variations in the Primary Balance of Revenue Account in Karnataka State. However, based on the R^2 value, it can be concluded that quadratic trend equation is a better fit than linear trend equation to explain the trends in the Primary Revenue Balance of Revenue Account in Karnataka State.

Table – 5: Trends in the Primary Revenue Balance and Interest Payments in Karnataka State

Year	Primary Revenue Balance (PRB) (Rs. Crore)	Interest Payments (IP) (Rs. Crore)	PRB – IP > 0
2000-01	526	2388	-1862
2001-02	-601	2683	-3284
2002-03	646	3292	-2646
2003-04	3185	3710	-525
2004-05	5432	3794	1638
2005-06	6076	3765	2311
2006-07	8388	4236	4152
2007-08	8282	4506	3776
2008-09	6163	4532	1631
2009-10	6832	5213	1619
2010-11	9813	5641	4172
2011-12	10753	6062	4691
2012-13	8716	6833	1883
2013-14	8191	7837	354
2014-15	9932	9404	528



2015-16	12535	10746	1789
2016-17	13326	12033	1293
2017-18	18447	13930	4517
2018-19	16102	15423	679
2019-20	19704	18519	1185
2020-21	3133	22619	-19486

Source: 1. Government of Karnataka: Economic Survey of Karnataka, Various Years
2. Government of Karnataka: Budget Volumes, Various Years
3. Government of Karnataka: Medium Term Fiscal Plan of Karnataka, Various Years
4. Reserve Bank of India: State Finances - A Study of Budgets, Various Years

Indicator - 6: Interest Burden defined by Interest Payments (IP) to GSDP ratio should decline over time, i.e., $\frac{IP_t}{GSDP_t} < \frac{IP_{t-1}}{GSDP_{t-1}}$

The trends in Nominal GSDP, Interest Payments and Interest Payments as % of GSDP in Karnataka State have been given in Table – 6. It is observed from the table and graph that the Interest Payments as % of GSDP has increased from 2.20 % in 2000-01 to 2.83 % in 2003-04, but there is a declining trend from 2004-05 onwards up to its lowest level at 1.06 in 2017-18. However, an increasing trend in Interest Payments as % of GSDP has been visible in the last three years of the study period.

The regression equation of linear trend line is $Y = 2.535 - 0.079X$, with $R^2 = 0.770$ and it exhibits a declining trend in the Interest Payments as % of GSDP in Karnataka State, its explanatory power is statistically significant as its R^2 value is very high at 0.770, i.e., the linear trend explains 77% of variations in the Interest Payments as % of GSDP during the period of study in Karnataka State. The regression equation of quadratic trend line is $Y = 2.867 - 0.166X + 0.003X^2$, with $R^2 = 0.826$ and it exhibits a declining trend in the Interest Payments as % of GSDP in Karnataka State, but it started an increasing trend up to 2020-21. The explanatory power of quadratic trend line is statistically significant as its R^2 value is only 0.826, i.e., the quadratic trend equation explains only 82.6 % of variations in the Interest Payments as % of GSDP in Karnataka State. However, based on the R^2 value, it can be concluded that quadratic trend equation is a better fit than linear trend equation to explain the trends in the Interest Payments as % of GSDP in Karnataka State.

Finally, it can be inferred that the Interest Burden defined by Interest Payments (IP) to GSDP ratio has declined over time, i.e., $\frac{IP_t}{GSDP_t} < \frac{IP_{t-1}}{GSDP_{t-1}}$ and hence it is concluded that the Government of Karnataka is successful in maintaining the targeted levels of the Interest Burden defined by Interest Payments (IP) to GSDP ratio, which has declined



over time and their values are below 2%, i.e., at low vulnerable levels of public debt or high Public Debt Sustainability.

Table – 6: Trends in Nominal GSDP and Interest Payments in Karnataka State

Year	Nominal GSDP (Y) (Rs. Crore)	Interest Payments (IP) (Rs. Crore)	Interest Payments as % of GSDP
2000-01	153982	2388	2.20
2001-02	160355	2683	2.38
2002-03	171783	3292	2.72
2003-04	186137	3710	2.83
2004-05	221985	3794	2.55
2005-06	260801	3765	1.92
2006-07	302514	4236	1.86
2007-08	360280	4506	1.67
2008-09	413109	4532	1.46
2009-10	449381	5213	1.54
2010-11	546756	5641	1.37
2011-12	606010	6062	1.40
2012-13	695413	6833	1.31
2013-14	816666	7837	1.30
2014-15	913923	9404	1.37
2015-16	1045168	10746	1.46
2016-17	1207608	12033	1.08
2017-18	1336914	13930	1.06
2018-19	1490624	15423	1.10
2019-20	1628928	18519	1.09
2020-21	1665320	22619	1.25

Source: 1. Government of Karnataka: Economic Survey of Karnataka, Various Years
2. Government of Karnataka: Budget Volumes, Various Years
3. Government of Karnataka: Medium Term Fiscal Plan of Karnataka, Various Years
4. Reserve Bank of India: State Finances - A Study of Budgets, Various Years

Indicator – 7: Interest Payments (IP) as a proportion of Revenue Expenditure (RE) should decline overtime, i.e., $\frac{IP_t}{RE_t} < \frac{IP_{t-1}}{RE_{t-1}}$

The trends in Revenue Expenditure, Interest Payments and Interest Payments as % of Revenue expenditure in Karnataka State have been given in Table – 7. It is observed from the table and graph that the Interest Payments as % of Revenue Expenditure has increased from 14.31 % in 2000-01 to 17.50 % in 2002-03, but there is a declining trend



from 2003-04 onwards up to its lowest level at 8.79% in 2013-14. However, an increasing trend in Interest Payments as % of Revenue Expenditure has been visible in the last seven years of the study period. The regression equation of linear trend line is $Y = 15 - 0.333X$, with $R^2 = 0.562$ and it exhibits a declining trend in the Interest Payments as % of Revenue Expenditure in Karnataka State, its explanatory power is statistically significant as its R^2 value is high at 0.562, i.e., the linear trend explains 56.2% of variations in the Interest Payments as % of Revenue Expenditure during the period of study in Karnataka State. The regression equation of quadratic trend line is $Y = 18.5 - 0.143X + 0.036X^2$, with $R^2 = 0.761$ and it exhibits a declining trend in the Interest Payments as % of Revenue Expenditure in Karnataka State up to 2013-14, but then it started an increasing trend up to 2020-21. The explanatory power of quadratic trend line is statistically significant as its R^2 value is 0.761, i.e., the quadratic trend equation explains only 76.1 % of variations in the Interest Payments as % of Revenue Expenditure in Karnataka State. However, based on the R^2 value, it can be concluded that quadratic trend equation is a better fit than linear trend equation to explain the trends in the Interest Payments as % of Revenue Expenditure in Karnataka State. Finally, it can be inferred that the Interest Burden defined by Interest Payments (IP) to Revenue Expenditure ratio has declined over time, i.e., $\frac{IP_t}{GSDP_t} < \frac{IP_{t-1}}{GSDP_{t-1}}$ and hence it is concluded that the Government of Karnataka is successful in maintaining the targeted levels of the Interest Burden defined by Interest Payments (IP) to Revenue Expenditure ratio, which has declined over time and their values are below 15%, i.e., at low vulnerable levels of public debt or high Public Debt Sustainability.

Table – 7: Trends in Revenue Expenditure and Interest Payments in Karnataka State

Year	Revenue Expenditure (RE) (Rs. Crore)	Interest Payments (IP) (Rs. Crore)	Interest Payments as % of Revenue Expenditure
2000-01	16685	2388	14.31
2001-02	18605	2683	14.42
2002-03	18815	3292	17.50
2003-04	21285	3710	17.43
2004-05	24932	3794	15.22
2005-06	28041	3765	13.43
2006-07	33435	4236	12.67
2007-08	37375	4506	12.06
2008-09	41660	4532	10.88
2009-10	47537	5213	10.97
2010-11	54034	5641	10.44
2011-12	65115	6062	9.31
2012-13	76293	6833	8.96
2013-14	89190	7837	8.79
2014-15	103614	9404	9.08
2015-16	117028	10746	9.18
2016-17	131921	12033	9.12



2017-18	142483	13930	9.78
2018-19	164300	15423	9.39
2019-20	174258	18519	10.63
2020-21	179195	22619	12.62

Source: 1. Government of Karnataka: Economic Survey of Karnataka, Various Years
2. Government of Karnataka: Budget Volumes, Various Years
3. Government of Karnataka: Medium Term Fiscal Plan of Karnataka, Various Years
4. Reserve Bank of India: State Finances - A Study of Budgets, Various Years

Indicator – 8: Interest Payments (IP) as a proportion of Revenue Receipts (RE) should decline overtime, i.e., $\frac{IP_t}{RR_t} < \frac{IP_{t-1}}{RR_{t-1}}$

The trends in Revenue Receipts, Interest Payments and Interest Payments as % of Revenue Receipts in Karnataka State have been given in Table – 8. It is observed from the table and graph that the Interest Payments as % of Revenue Receipts has increased from 16.11 % in 2000-01 to 20.36 % in 2002-03, but there is a declining trend from 2003-04 onwards up to its lowest level at 8.68% in 2011-12. However, an increasing trend in Interest Payments as % of Revenue Receipts has been visible in the last nine years of the study period. The regression equation of linear trend line is $Y = 16.08 - 0.387X$, with $R^2 = 0.468$ and it exhibits a declining trend in the Interest Payments as % of Revenue Receipts in Karnataka State, its explanatory power is statistically insignificant as its R^2 value is low at 0.468, i.e., the linear trend explains only 46.8% of variations in the Interest Payments as % of Revenue Receipts during the period of study in Karnataka State. The regression equation of quadratic trend line is $\hat{Y} = 21.38 - 1.769\hat{X} + 0.062\hat{X}^2$, with $R^2 = 0.828$ and it exhibits a declining trend in the Interest Payments as % of Revenue Receipts in Karnataka State up to 2011-12, but then it started an increasing trend up to 2020-21. The explanatory power of quadratic trend line is statistically significant as its R^2 value is very high at 0.828, i.e., the quadratic trend equation explains only 82.8 % of variations in the Interest Payments as % of Revenue Receipts in Karnataka State. However, based on the R^2 value, it can be concluded that quadratic trend equation is a better fit than linear trend equation to explain the trends in the Interest Payments as % of Revenue Receipts in Karnataka State. Finally, it can be inferred that the Interest Burden defined by Interest Payments (IP) to Revenue Receipts (RR) ratio has declined over time, i.e., $\frac{IP_t}{RR_t} < \frac{IP_{t-1}}{RR_{t-1}}$ and hence it is concluded that the Government of Karnataka is successful in fulfilling the targeted levels of the Interest Burden defined by Interest Payments (IP) to Revenue Receipts ratio, which has declined over time and their values are below 15%, i.e., at low vulnerable levels of public debt sustainability.



Table –8: Trends in Revenue Receipts and Interest Payments in Karnataka State

Year	Revenue Receipts (RR) (Rs. Crore)	Interest Payments (IP) (Rs. Crore)	Interest Payments as % of Revenue Receipts
2000-01	14823	2388	16.11
2001-02	15321	2683	17.51
2002-03	16169	3292	20.36
2003-04	20760	3710	17.87
2004-05	26570	3794	14.28
2005-06	30352	3765	12.40
2006-07	37587	4236	11.27
2007-08	41151	4506	10.95
2008-09	43291	4532	10.47
2009-10	49156	5213	10.61
2010-11	58206	5641	9.69
2011-12	69806	6062	8.68
2012-13	78176	6833	8.74
2013-14	89544	7837	8.75
2014-15	104142	9404	9.03
2015-16	118817	10746	9.04
2016-17	133214	12033	9.03
2017-18	147000	13930	9.48
2018-19	164979	15423	9.35
2019-20	175443	18519	10.56
2020-21	159709	22619	14.16

Source: 1. Government of Karnataka: Economic Survey of Karnataka, Various Years
 2. Government of Karnataka: Budget Volumes, Various Years
 3. Government of Karnataka: Medium Term Fiscal Plan of Karnataka, Various Years
 4. Reserve Bank of India: State Finances - A Study of Budgets, Various Years

3. Summary of Research Findings and conclusions of the chapter

The researcher has examined the Public Debt Sustainability or vulnerability of Karnataka State in terms of Public Debt Burden (measured in terms of Outstanding Public Debt as % GSDP) and Interest Burden (measured in terms of Interest Payments as % of GSDP, Revenue Expenditure and Revenue Receipts) provides a useful indication of the Public Debt Sustainability or vulnerability of Karnataka State.

The Data Analysis presented in this chapter has come out with the following conclusions:

- As per the Indicator – 1, Karnataka State remained as the state with a low Public Debt Burden because the Outstanding Public Debt as % GSDP is less than 20 per



cent during the period 2006-07 to 2019-20 and it never crossed the threshold level of 25% during the period of study.

- As per the Indicator – 2, the Public Debt in Karnataka State is not in a sustainable position because the Growth Rates of Nominal GSDP ($\frac{G_{NP}}{NP}$) are greater than the Growth Rates of Outstanding Public Debt ($\frac{D_{NP}}{NP}$) only in 9 years out of 21 years of the study period.
- As per the Indicator – 3, the Public Debt Karnataka State is in a sustainable position because the Growth Rates of Real GSDP ($\frac{G_{RP}}{RP}$) are greater than Real Interest Rate (RIR) in 18 years out of 21 years of the study period and it is clear that the Government of Karnataka is able to borrow with lower interest rates.
- As per the Indicator – 4, the Public Debt in Karnataka is sustainable because the Government of Karnataka was able to maintain the positive primary balance in its Revenue Account for a long period of time from 2004-05 to 2019-20, i.e., 16 years out 21 years of the study period.
- As per the Indicator – 5, the Public Debt in Karnataka is sustainable because the Government of Karnataka was able to maintain the positive primary revenue balance in the Revenue Account and is sufficient to make the interest payments for a long period of time from 2004-05 to 2019-20, i.e., 16 years out 21 years of the study period.
- As per the Indicator – 6, the Government of Karnataka is successful in maintaining the targeted levels of the Interest Burden defined by Interest Payments (IP) to GSDP Ratio, which were declined over time and their values are below 2%, i.e., at low vulnerable levels of public debt or high Public Debt Sustainability, especially after 2005-06.
- As per the Indicator – 7, the Government of Karnataka is successful in maintaining the targeted levels of the Interest Burden defined by Interest Payments (IP) to Revenue Expenditure (RE) Ratio, which has declined over time and their values are below 10% from 2011-12 to 2018-19 and less than 15%, especially after 2004-05, i.e., at low vulnerable levels of public debt or high Public Debt Sustainability, especially after 2005-06.
- As per the Indicator – 8, the Government of Karnataka is successful in maintaining the targeted levels of the Interest Burden defined by Interest Payments (IP) to Revenue Receipts (RR) Ratio, which has declined over time and their values are below 10% from 2010-11 to 2018-19 and less than 15%, especially after 2005-06 i.e., at low vulnerable levels of public debt or high Public Debt Sustainability.

Finally, it is concluded that the Government of Karnataka has taken enough measures to meet the said target of attaining the 'Zero Revenue Deficit Budget' by the financial year 2005-06 as fixed by the FRBM Act and achieved the said target one year before the targeted year. Further, it is concluded that the Government of Karnataka was able to maintain surplus balances in its Revenue Accounts of the financial years from 2005-06 to 2019-20 and hence it is clear that the Government of Karnataka could be able to maintain sustainable public debt levels in all the indicators during the Study period.



But the quadratic trend equations and their quadratic trend line for many indicators predicts that there is a possibility for the Government of Karnataka to face the Revenue Deficits and most of the indicators may cross their sustainable levels in future and the basic reason the this expected reversing trend is the adverse impact of COVID-19 Pandemic lockdown conditions, which have reduced the economic activities in many sectors of Karnataka Economy and forced the Government of Karnataka to face the huge expected revenue deficit during the financial year 2020-21 due to huge decline in Revenue Receipts.