Indian Public Policy Review 2023, 4(1): 01-26
https://doi.org/10.55763/ippr.2023.04.01.001

IPPR

Achieving One Trillion Dollar Economy for Tamil Nadu: Some Implications and Concerns

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Abstract

This study examines whether Tamil Nadu's economy will become a US $1 trillion economy by 2030, given its current slow growth regime, inflation, and rupee depreciation. Our analyses indicate that, assuming an inflation rate of 5% and 2% exchange rate depreciation per annum, the Tamil Nadu economy needs to grow at a real growth rate of 13.2% per annum for 8 consecutive years from 2023-24 to 2030-31 to reach the US $1 trillion target. Considering the growth contributions of sub sectors, this study simulates multiple growth strategies to achieve 9% overall growth, which would achieve the target in 2033-34. Further, it examines whether export promotion will help to achieve this target. Finally, it shows that the current level of debt-GSDP ratio is a hindrance to growth. It suggests that ensuring 14% nominal (i.e., 9% real) growth of economy, the state should target for a revenue surplus from 2023-24 onwards, such that it contains its fiscal deficit to only 2% level and obtains a sustainable threshold debt level of about 18% in 2034-35.

Keywords: Economic growth, exchange rate movement, incremental capital output ratio, sustainable threshold debt

JEL Codes: H63, D72, H72, C22, E32

Publication Date: 31 January 2023

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1. Introduction

Tamil Nadu has been one of India's most progressive states, in terms of many economic and social parameters. It is the second-largest economy in the country. Its share in India's GDP was 9.2% in 2021-22. Tamil Nadu is a highly-industrialized state, contributing 12.1% of manufacturing GDP of the country. It ranks first in number of factories and urbanization; second in credit deposit ratio, low IMR and low birth rate (RBI 2022); second in head count ratio (percentage of population who are multidimensionally poor) (Niti Aayog 2021); third in literacy and female literacy (Census of India 2011). It ranks fourth in export preparedness index 2021 and National Logistic Index 2021 (Niti Aayog & Institute for Competitiveness 2021) (Ministry of Commerce and Industry 2021).

Growth matters as it paves the way for development and prosperity of a country or state. Over the past few years, Tamil Nadu had lost its edge in terms of economic growth. From 2005-06 to 2011-12, Tamil Nadu economy (in 2004-05 base) grew at an annual rate of 10.3%, against all-India growth of 8.2%; from 2012-13 to 2021-22, (in 2011-12 base) it grew only at the rate of 6.43%, as against all-India growth of 5.48%.[1]

The newly elected Chief Minister of Tamil Nadu had announced at the Investors Conclave in July 2021 an ambitious target to make Tamil Nadu a US$1 trillion economy by 2030. The state has also set a target to bring in investment of ₹23 trillion by 2030. In other fora, the Chief Minister said that Tamil Nadu's export should be increased to $100 billion by 2030 (from the current level of $26 billion).

It is well known that the COVID-19 pandemic affected all economies, including Tamil Nadu economy. Its real growth rate declined to 1.42% in 2020-21, and the growth of nearly half of the sub-sectors (forestry & logging; mining & quarrying; electricity; gas; a sector comprising trade, hotels, and restaurants; a sector consisting of transport, storage, communication etc.; public administration) contracted.

While growth rate has fallen, Tamil Nadu is one of the few states which had a positive growth. At the all-India level, the growth rate declined by 6.6%. The recent Russia-Ukraine war has aggravated the challenges faced by the economy. Further, the government finances are under stress. According to the recent budget, the total outstanding debt of Tamil Nadu state will reach ₹ 6.53 lakh crore at the end of fiscal year 2022-23, i.e., the debt-GSDP ratio will reach 26.3%, as against the 20% ceiling suggested by the Fiscal Responsibility and Budget Management (FRBM) Review Committee. [2] This high debt-GSDP rate may be a hindrance to growth.

Given this background, the central questions are: will Tamil Nadu's economy become a one trillion dollar economy by 2030 or not? If yes, how much growth is needed to achieve the target? To achieve the required growth, what are the growth strategies required in general, and for specific sub-sectors of the economy? Will the investments and exports targets of Government help in achieving the target? Will the fiscal space facilitate the state to achieve its target?

This study attempts to provide answers to these questions. The next Section briefly discusses on the calculations of how and when US$ 1 trillion economy can be achieved using different assumptions on growth rate, exchange rate etc. The following two Sections explain the growth profile of the Tamil Nadu economy and the sectoral growth pattern. The subsequent Sections present the structural composition of GSDP and the relative contributions of sectoral growths to aggregate growth of the Tamil Nadu economy. Then, the relation between growth and exports in Tamil Nadu, and between growth and invested capital in industries, are examined. The next Section reviews some fiscal issues, while the final Section provides concluding remarks.

2. TOWARDS A US$ TRILLION TAMIL NADU ECONOMY

In 2022-23, the projected GSDP (nominal) of Tamil Nadu in the state's budget document is ₹24,84,807 crore, i.e., ₹ 24.85 trillion (or 0.32 US$ Trillion). To meet the target of US$ 1 trillion Tamil Nadu economy in 2030, the nominal growth rate for the next eight years starting from 2023-24 to 2030-31 can be derived using certain assumptions on exchange rate.

Assuming a fixed exchange rate of ₹ 80.73 per 1 US$ (as on 22nd September 2022), the derived nominal growth rate required to achieve the target size of US $ 1 trillion by 2030-31 will be 15.9% (Table 1).

Regarding inflation rate, which is needed to derive the real growth rate, the annual CPI (consumer price index) inflation (i.e., 12-month average from April to March) from 2014-15 to 2021-22 and GDP deflator-based inflation from 2014-15 and 2021-22 are compared. While they exhibit year-on-year fluctuations, the average CPI inflation for Tamil Nadu was 5.35% (against an all-India rate of 4.84%), and the average GDP deflator-based inflation for Tamil Nadu was 4.03% (as against an all-India GDP derived inflation of 4.33%).[3]

Since, in general, the CPI-based inflation is considered for economic analyses, this study assumes an inflation rate of 5% for Tamil Nadu in coming years. It is noted that although the target inflation rate as per the Monetary Policy Framework for the country is 4%, this study assumes 5% for Tamil Nadu.

Assuming an inflation rate of 5% in Tamil Nadu, the Tamil Nadu economy needs to grow at a real rate of 10.9% per annum for 8 consecutive years (i.e., from 2023-24 to 2030-31) to reach the US $1 trillion target. Since Tamil Nadu had already registered an annual real growth of 10.3% from 2005-06 to 2011-12, the state has the potential to achieve the required growth rate.

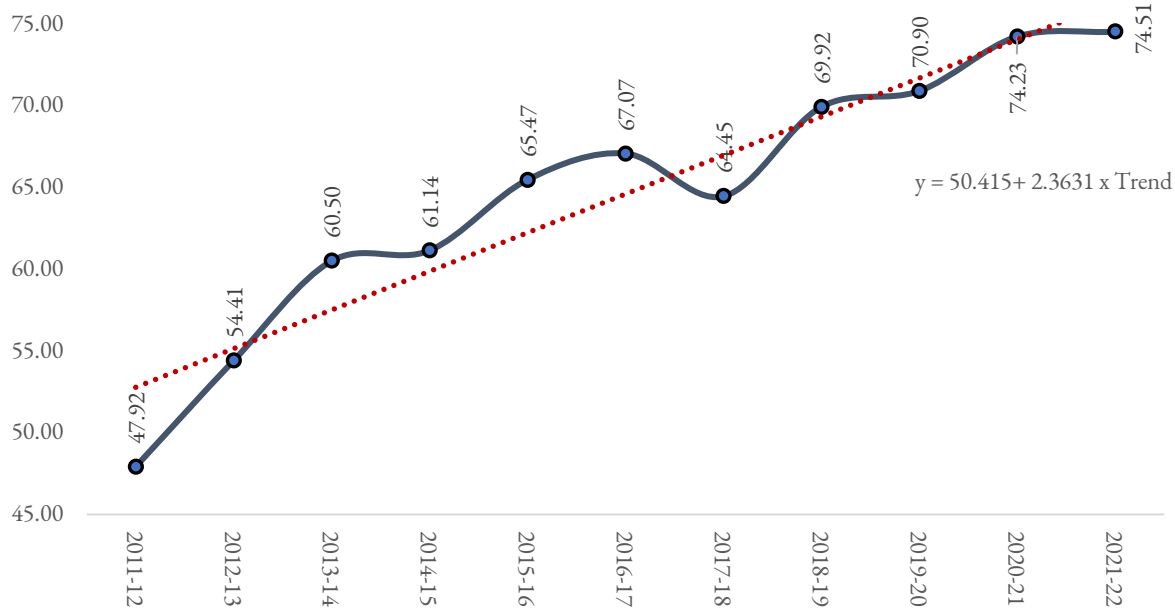
However, it is noticed that the growth of Tamil Nadu economy is not independent of the growth of other Indian States. When the Indian economy grew at 8.2% from 2005-06 to 2011-12, Tamil Nadu recorded 10.3% growth; when the growth of Indian economy slowed down to 5.48% since 2012-13, Tamil Nadu's growth also declined to 6.43%, a reduction of about 4 percentage points. This low growth regime is of great concern.

Table 1: Growth Required to Achieve a US$ 1 Trillion Economy by 2030-31 with a Fixed Exchange Rate

Year	Nominal GSDP (₹ Crore)	Nominal GSDP (₹ Trillion)	Derived Nominal Growth (%)	Real Growth Rate (%)	Exchange Rate (₹ / US$)	Nominal GSDP (US$ Trillion)	Per Capita GSDP (₹)	Per Capita GSDP US$
2022-23	2484807	24.8	-	-	80.73	0.31	323290	4005
2023-24	2879125	28.8	15.9	10.9	80.73	0.36	373481	4626
2024-25	3336017	33.4	15.9	10.9	80.73	0.41	431473	5345
2025-26	3865414	38.7	15.9	10.9	80.73	0.48	498467	6174
2026-27	4478822	44.8	15.9	10.9	80.73	0.55	576774	7144
2027-28	5189573	51.9	15.9	10.9	80.73	0.64	667375	8267
2028-29	6013113	60.1	15.9	10.9	80.73	0.74	772219	9565
2029-30	6967343	69.7	15.9	10.9	80.73	0.86	893535	11068
2030-31	8073000	80.7	15.9	10.9	80.73	1.00	1033913	12807

Under these circumstances, the target remains ambitious and difficult to achieve, since the assumption of a constant exchange rate is a strong one. The history of average annual exchange rate movement shown in Figure 1 indicates that the exchange rate increased from ₹ 47.92 per US$ in 2011-12 to ₹74.51 per US$ in 2021-22, registering an average annual change of ₹ 2.36 (it is also significant at 1%). Therefore, it is not wise to assume a constant exchange rate.

Figure 1: Exchange Rate Movement (₹ per US$)



Source (Basic Data): RBI Website.

Given the fact that the average annual depreciation of Indian rupee viz.-a-viz. the US $ varies in different time intervals (2.7% during 2014-15 to 2021-22; 3.03% during 2014-15 to 2018-19; 2.1% during 2019-20 to 2021-22), we assume 2% depreciation. Table 2 shows that the implied nominal growth rate would be 18.2% and the required real growth rate would be 13.2%, which is a very ambitious target.[4]

Table 2: Growth Required to Achieve a US$ 1 Trillion Economy by 2030-31 with a Varying Exchange Rate

	Nominal GSDP (₹ Crore)	Nominal GSDP (₹ Trillion)	Derived Nominal Growth (%)	Real Growth Rate (%)	Exchange Rate (₹ /US$)	Nominal GSDP (US$ Trillion)	Per Capita GSDP (₹)	Per Capita GSDP US$
2022-23	2484807	24.8	-	-	80.73	0.31	323290	4005
2023-24	2936707	29.4	18.2	13.2	82.34	0.36	380950	4626
2024-25	3470792	34.7	18.2	13.2	83.99	0.41	448904	5345
2025-26	4102008	41.0	18.2	13.2	85.67	0.48	528977	6174
2026-27	4848021	48.5	18.2	13.2	87.38	0.55	624319	7144
2027-28	5729708	57.3	18.2	13.2	89.13	0.64	736836	8267
2028-29	6771742	67.7	18.2	13.2	90.92	0.74	869644	9565
2029-30	8003287	80.0	18.2	13.2	92.73	0.86	1026391	11068
2030-31	9458806	94.6	18.2	13.2	94.59	1.00	1211394	12807

Since Tamil Nadu's economy registered an average growth of around 6.4% from 2012-13 to 2021-22, the required real growth rate of 13.2% is not feasible. That is, this scenario is ruled out. Therefore, we examine the alternative scenarios with real growth of

1. 6.5% (close to the current level);
2. 8%;
3. 9% (as per medium-term fiscal plan of the Government of Tamil Nadu); and
4. 10%.

Based on these real growth rates and 5% inflation, the derived nominal growth rate in respective scenarios would be 11.5% (S1); 13% (S2); 14% (S3); and 15% (S4). Assuming 2% exchange rate depreciation in all years, simulations can be done with alternative growth assumptions to arrive at the year by which the US$1 trillion target would be reached. The simulation results are shown in Figure 2, which also shows the scenario 5 (S5) for derived nominal growth rate of 18.2% (i.e. 13.2% real growth), as in Table 2.

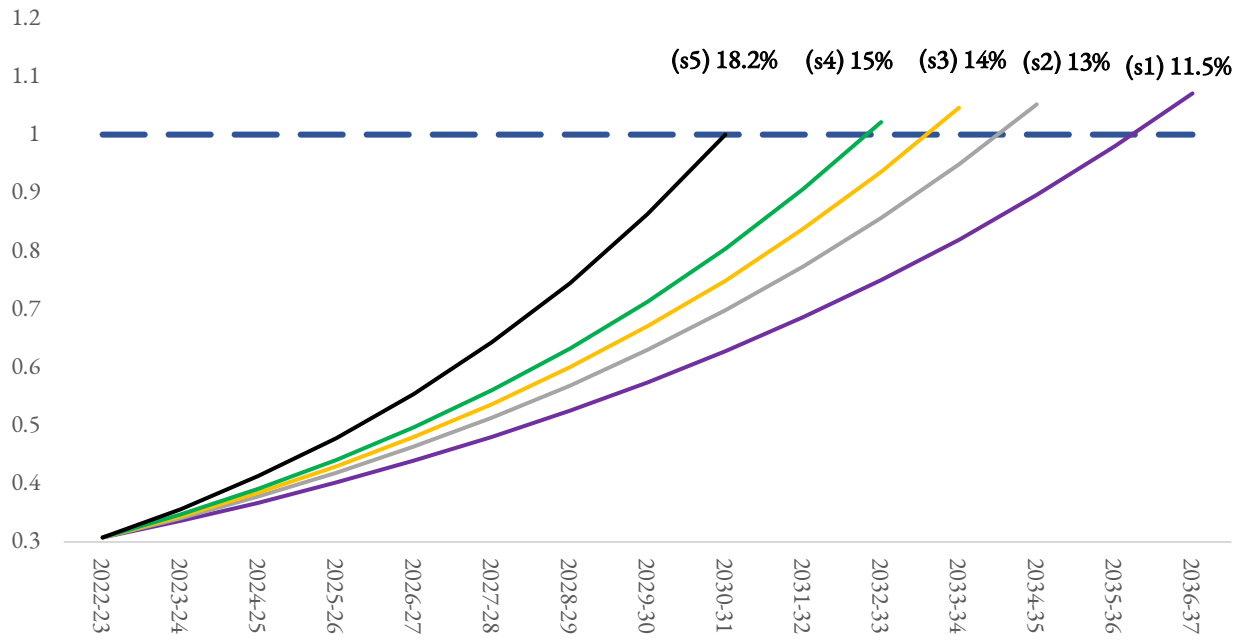
The US$ 1trillion economy target is reached by 2030-31 at the nominal growth rate of 18.2% (S5). The target is shifted to 2032-33 with 15% nominal growth rate (S4), to 2033-34 with 14% (S3), and

even further to 2034-35 with 13% (S2). The target would be reached in 2035-36 with growth rate of 11.5% (S1).

Thus, with the optimistic scenario of 15% nominal growth, the target is expected to be reached in 2032-33; with 14% rate (as in medium term fiscal plan), it would be reached in 2033-34; and with a generally accepted level of 13% (8% real rate + 5% inflation), the target would be reached in 2034-35.

Therefore, reaching the target in 2030 is ruled out.[5] The 14% scenario (S3) assumed in medium-term fiscal plan appears to be achievable. We can however be more confident of nominal growth rate of 13%. Thus, the achievement of the goal of a trillion-dollar economy is possible either in 2033-34 or 2034-35.

Figure 2: Simulations to Show the Year in Which the Tamil Nadu Economy Reaches US$1 Trillion Target (with 2% Exchange Rate Depreciation Every Year)



The 9% real growth scenario to achieve the target by 2033-34 is shown in Table 3. Under this scenario, the per capita income of the state in the terminal year will be US$13,400 - a shade higher than the US$13,205 per capita income required to classify as a developed country as of now (World Bank 2022). It is note that for higher exchange rate depreciation, required nominal and real rates of growth will be higher. With a real growth rate of 8%, the target would get postponed by one more year to 2024-35. We should also keep this in mind as a possible scenario.

In all the scenarios, we have indicated the growth rate as being the same every year. This is a matter of convenience for calculation. In real life, growth rates may change from year to year. What the scenarios indicate is that, on average, the relevant target growth rate should be achieved.

Table 3: 9 % Growth Scenario to Achieve US$1 Trillion

Year	Nominal GSDP (₹ Crore)	Nominal GSDP (₹ Trillion)	Derived Nominal Growth (%)	Real Growth Rate (%)	Excha-nge Rate (/US$)	Nominal GSDP (US$ Trillion)	Per Capita GSDP (₹)	Per Capita GSDP US$
2022-23	2484807	24.8481			80.73	0.31	323290	4005
2023-24	2832680	28.3268	14.0	9.0	82.34	0.34	367456	4462
2024-25	3229255	32.2926	14.0	9.0	83.99	0.38	417664	4973
2025-26	3681351	36.8135	14.0	9.0	85.67	0.43	474731	5541
2026-27	4196740	41.9674	14.0	9.0	87.38	0.48	540448	6185
2027-28	4784284	47.8428	14.0	9.0	89.13	0.54	615255	6903
2028-29	5454083	54.5408	14.0	9.0	90.92	0.60	700427	7704
2029-30	6217655	62.1766	14.0	9.0	92.73	0.67	797391	8599
2030-31	7088127	70.8813	14.0	9.0	94.59	0.75	907780	9597
2031-32	8080464	80.8046	14.0	9.0	96.48	0.84	1034909	10727
2032-33	9211729	92.1173	14.0	9.0	98.41	0.94	1179841	11989
2033-34	10501372	105.014	14.0	9.0	100.38	1.05	1345071	13400

We now examine the possibility of raising the real growth to the required level of 9% (i.e., 14% in nominal term) in the subsequent sections.

3. Growth Profile Of Tamil Nadu Economy

While Tamil Nadu registered a strong real growth performance of 10.3% (as against all-India growth of 8.2%) from 2005-06 to 2011-12, its average growth declined to 6.43% (as against all-India growth of 5.48%) from 2012-13 to 2021-22 (Figure 3). Tamil Nadu's growth pattern is more volatile than India's growth pattern. Its trend (potential) growth rate (generated using the HP filter) continuously declined, from 6.72% in 2013-14 to 6.17% in 2019-20, and further to 5.8% in 2021-22.[6]

Even if we consider the state's strong growth potential during 2005-06 to 2011-12, we may expect to achieve the average nominal growth in the range of 14-15%. However, this is a highly optimistic scenario, given the recent growth trend. Interstate comparison (Figure 4) reveals that Tamil Nadu ranked fifth in average growth (10.3%) during 2005-06 to 2011-12. During 2012-13 to 2021-22, it ranked only tenth (with about 6.3% real growth).

Figure 3: Economic Growth: Tamil Nadu and India

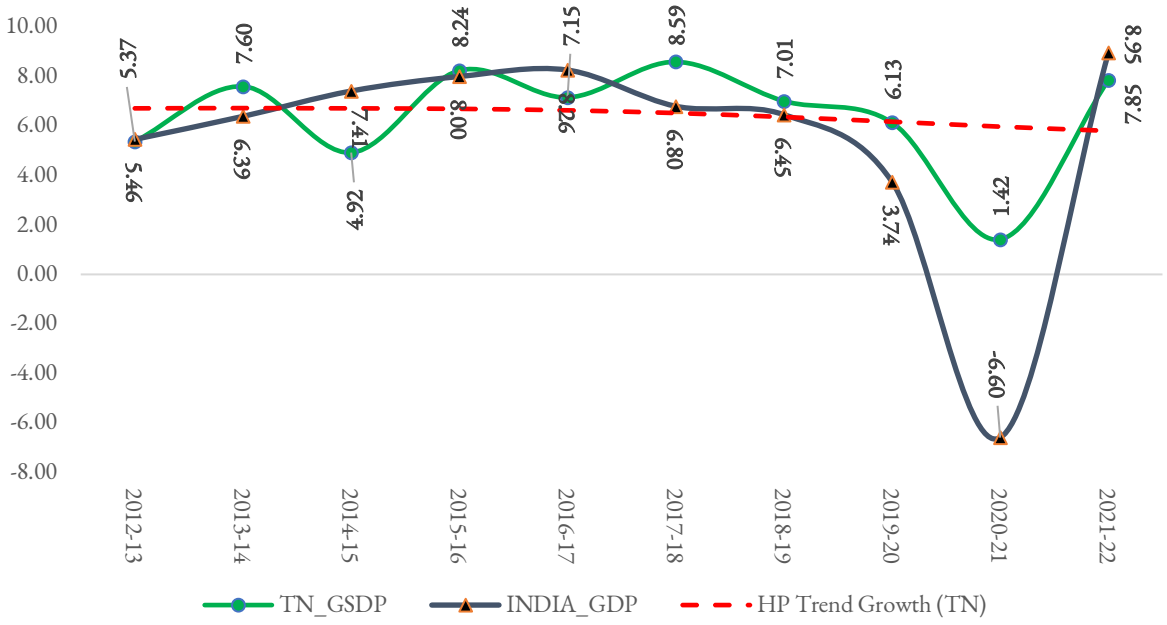
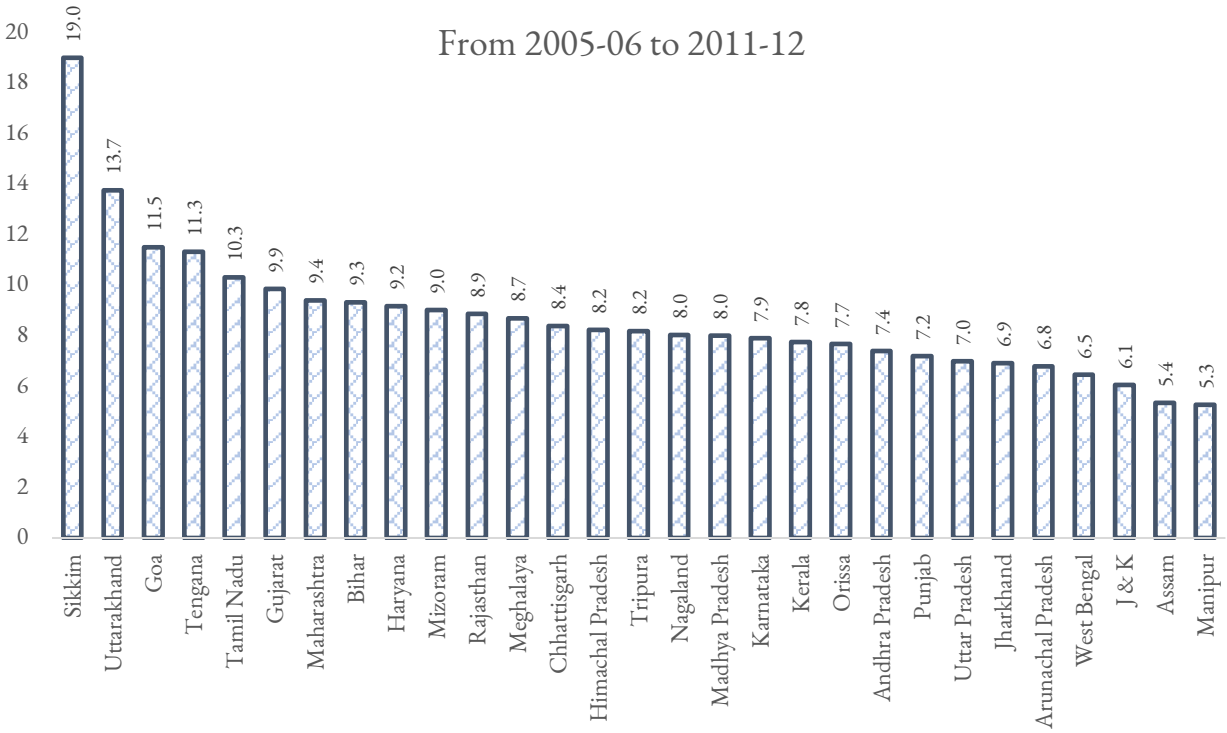
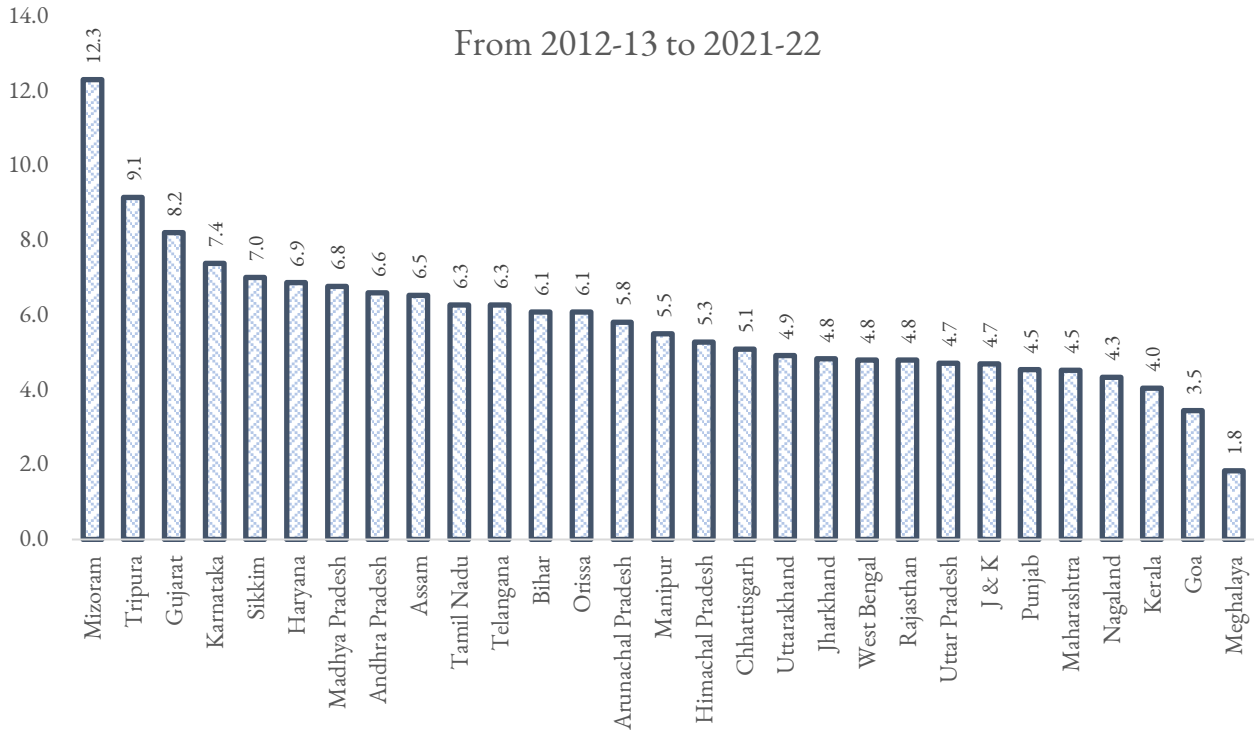


Figure 4: Average Real Economic Growth of Indian States





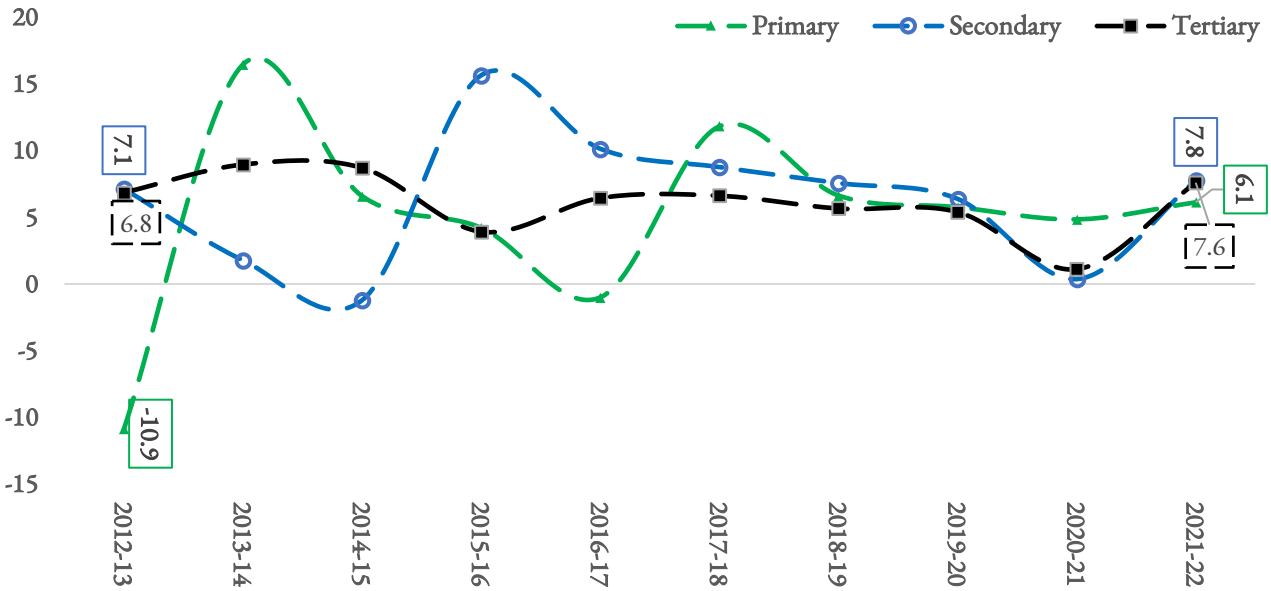
3.1 Growth Pattern of Three Broad Sub Sectors

Sectoral growth patterns reveal that during 2012-13 to 2021-22, the primary sector (consisting of agriculture crops, livestock, forestry and logging, fishing and aquaculture and mining and quarrying) grew at an average rate of 5.05%, while the secondary sector (comprising manufacturing, electricity, gas, water supply etc. and construction) recorded an average growth of 6.43% (Figure 5).

The tertiary or services sector grew at an average rate of 6.12%. These rates are relatively low, as compared to their respective sectoral growths of 6.05%, 10.09%, and 11.28% during the 2005-06 to 2011-12 period. The fall in growth rates of these sector, particularly the services sector (with more than 50% share), is the major concern.

Further, the growth paths of both the primary sector and the secondary sector are more volatile than the services growth curve. The high volatility in both primary and secondary sectors implies that the risk-adjusted returns from them are low, so they may find it difficult to attract private investments. Since nearly 42% of the workers are in agriculture and the state has larger number of MSMEs, the stable growth of these sectors is important.

Figure 5: Sectoral Growth in Tamil Nadu



3.2 Structure of GSDP

Like in many other Indian States, the structure of gross state domestic product (GSDP) in Tamil Nadu has been shifting away from primary (agriculture) towards non-primary sectors.

- The share of primary sector in total GSDP (in 1999-00 prices) of Tamil Nadu in 1999-00 was about 17% (not shown in Fig. 5).
- As indicated in Table 4, its share declined to 12.11% in 2011-12, and further to 10.6% in 2020-21.
- The secondary sector share was 29.6% in 1999-00, but its share increased to 33.56% in 2011-12, and remained more or less the same level till 2020-21.
- The share of tertiary sector was 53% in 1999-00 and stabilized around 46% during 2011-12 to 2020-21.
- It is noted that between 2011-12 to 2020-21, the share of primary sector declined by 1.52 percentage points. This trend is expected to continue.

3.3 Contributions of Sectoral Growth Rates

Relative contributions of the sectors to overall growth rate in each year can be computed by decomposing growth as a weighted sum of sectoral growth rates, with weights being equal to the respective share of the sector in the overall GSDP in the previous year.

The growth decomposition formula is:

$$G(Y) = [(Y_1)_{-1}/ Y_{t-1} * (\Delta Y_1/(Y_1)_{-1}] + [(Y_2)_{-1}/ Y_{t-1} * (\Delta Y_2/(Y_2)_{-1}] + [(Y_3)_{-1}/ Y_{t-1} * (\Delta Y_3/(Y_3)_{-1}] + [(Y_4)_{-1}/ Y_{t-1}] * (\Delta Y_4/(Y_4)_{-1}]$$

In the above equation,

G(Y) is the overall growth rate of GSDP (indicated by Y_t) in year t; $(Y_i)_{-1}$ is the ith sector GSDP (i=1,2,3,4; 1-primary, 2-secondary, 3-tertiary and 4-taxes minus subsidies on products) in previous year; ΔY_i – change in sector ith GSDP in year t over previous year; each right-side term is i^{th} sector's growth rate $[G(Y_i) = (\Delta Y_i/(Y_i)_{-1}]$ multiplied with sectoral share $[w_i = (Y_i)_{-1}/ Y_{t-1}]$.

Table 4: Share of GSDP in Tamil Nadu at 2011-12 Prices

(Percent)

Sub-Sectors	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21	Avg. Share
1.Primary	12.11	10.24	11.09	11.26	10.84	10.02	10.32	10.28	10.24	10.59	10.70
2.Secondary	33.56	34.12	32.27	30.39	32.47	33.37	33.43	33.60	33.68	33.33	33.02
3.Tertiary	46.55	47.21	47.80	49.52	47.54	47.23	46.37	45.79	45.47	45.33	46.88
4.Taxes, minus subsidies on Products	7.78	8.43	8.84	8.83	9.15	9.38	9.89	10.33	10.61	10.75	9.40
GSDP	100	100	100	100	100	100	100	100	100	100	100

Source (Basic Data): NSO, MOSPI.

The growth decomposition results in Table 5 shows that the tertiary/services sector is the dominant component of the growth rate (with 10-year average contribution of 2.87%), followed by the secondary sector (2.1%) and the primary sector (0.51%). Thus, the non-primary sectors jointly contributed about 4.97% out of 6.43% average growth of Tamil Nadu. That is, the tertiary and secondary sectors jointly contributed about 75% of average growth of Tamil Nadu. Tamil Nadu needs to stabilize or increase the growths of these two broad sectors.

Table 5: Contributions of Sectoral Growth Rates to GSDP Growth (%)

Sub Sectors	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22	10 Yr. Avg.
Primary	-1.32	1.69	0.73	0.47	-0.11	1.18	0.68	0.59	0.50	0.65	0.51
Secondary	2.39	0.60	-0.39	4.76	3.29	2.92	2.53	2.14	0.12	2.58	2.10
Tertiary	3.19	4.23	4.16	1.94	3.06	3.12	2.62	2.47	0.50	3.44	2.87
Taxes- minus subsidies on Products	1.10	1.08	0.43	1.07	0.91	1.35	1.17	0.93	0.30	1.17	0.95
GSDP	5.37	7.60	4.92	8.24	7.15	8.59	7.01	6.13	1.42	7.85	6.43
% Share of Growth Contribution											
Primary	-24.53	22.19	14.82	5.76	-1.53	13.79	9.76	9.65	35.00	8.26	9.32
Secondary	44.60	7.96	-7.98	57.73	46.01	34.06	36.09	34.96	8.57	32.93	29.49
Tertiary	59.39	55.65	84.53	23.51	42.85	36.38	37.42	40.27	35.58	43.84	45.94
Taxes- minus subsidies on Products	20.54	14.20	8.64	13.00	12.67	15.77	16.73	15.12	20.85	14.97	15.25
GSDP	100	100	100	100	100	100	100	100	100	100	100

Sub Sectoral Growth Strategies to Achieve the Target: Considering the medium-term fiscal target of the government, and the state's strong growth potential during the 2005-06 to 2011-12 period, we

believe the state should target an average nominal growth of 14%. In that scenario, the target of US$ 1 trillion economy is expected to be achieved in 2033-34.

Our discussions (above) on 10-year growth rates of various sub sectors and their contributions to overall growth clearly indicate that the existing growth rates of sub sectors are not sufficient to reach the target real growth rate of 9%. Therefore, we simulate how much growth of the sub-sectors is required to achieve the required real growth rate of 9%. This is done using the sector specific GSDP values (real) for the year 2021-22, and the required (possible) growth rate for each subsector, in seven alternative scenarios. These possible growth strategies are shown in Table 6. It is noted that the government should aim to achieve one of these scenarios every year till 2033-34 to maintain the required real growth rate.

Table 6: Sub Sectoral Growth Strategies to Achieve the Target Growth (%)

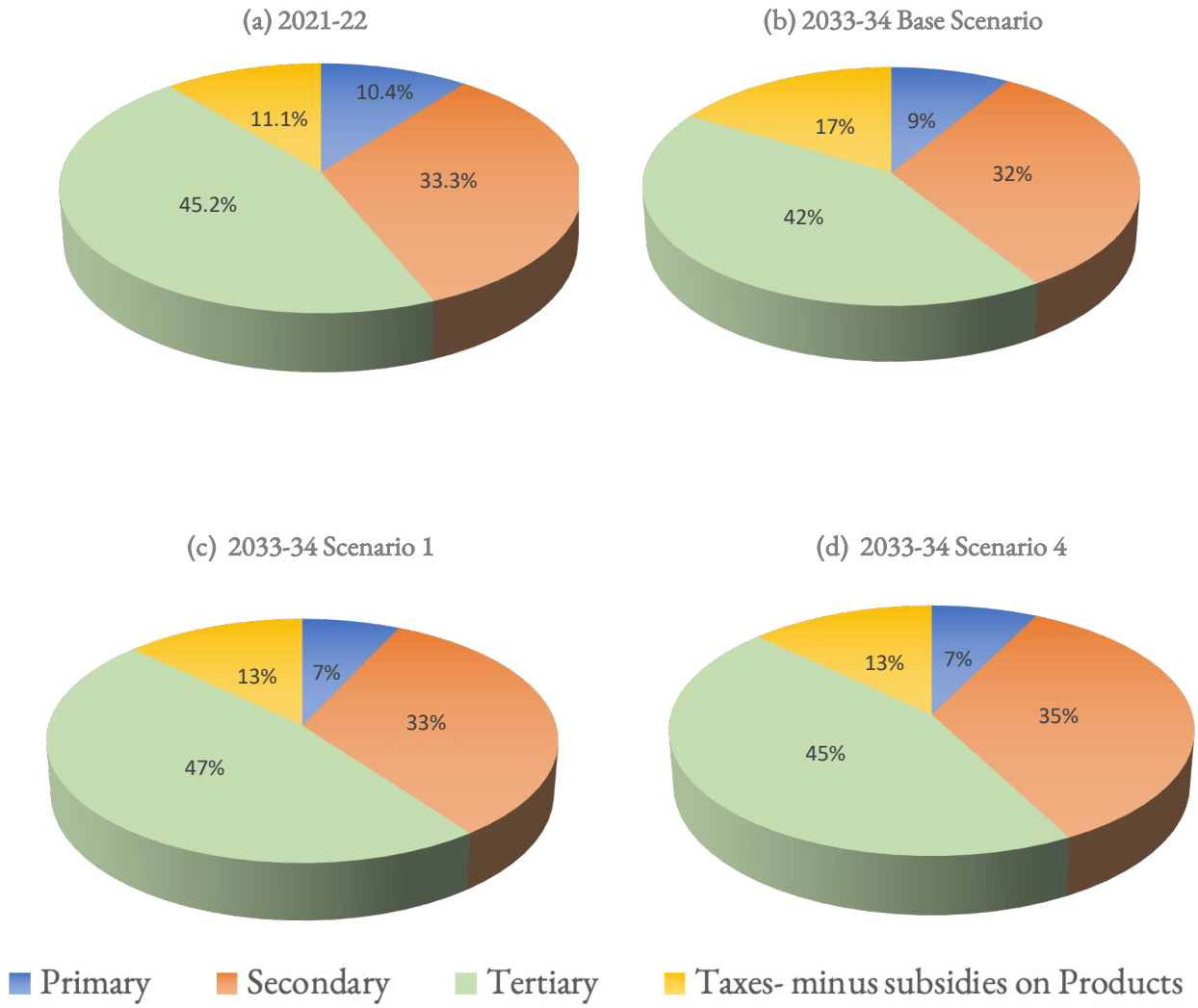
Sub Sectors (Scenarios)	10 Yrs. Avg. (base)	Sub-Sectors' Growth to Achieve the Target Growth (1)	(2)	(3)	(4)	(5)	(6)	(7)
Primary	5.05	5.50	6.00	6.00	6.00	6.00	6.00	5.00
Secondary	6.43	9.00	8.00	8.50	9.50	10.0	10.50	11.00
Tertiary	6.12	9.50	10.00	9.70	9.00	8.50	8.20	8.20
Taxes- minus subsidies on Products	10.28	10.50	10.50	10.50	10.50	10.50	10.50	10.50
GSDP	6.43	9.00	9.00	9.00	9.00	9.00	9.00	9.00

- As the government has taken initiatives to attract new industries (new industrial policy 2021 to achieve an annual growth of 15% in the manufacturing sector; new MSME policy), we consider above 9% (real) growth for secondary sector in four alternative scenarios, to achieve overall 9% growth of GSDP, and 9% growth of secondary sector in one alternative scenario to achieve the 9% target growth.
- For the first four scenarios for 9% growth of overall GSDP, we consider 9 and above 9% growth of tertiary sector.
- In the remaining three scenarios, we consider 8.2 – 8.5% growth of this sector.
- We consider 6% growth of primary sector in five alternative scenarios to obtain 9% overall growth
- In the remaining 2 scenarios, we consider 5 and 5.5% growth of primary sector.
- It is noted that in 2021-22, the share of primary sector in total GSDP was 10.42%, the share of secondary sector was 33.3%, and the share of tertiary sector was 45.02% (Figure 6a). If the sectors will grow at the average rate of last 10 years (base scenario in Table 6) till 2033-34, the share of primary, secondary, and tertiary sectors will become 8.66%, 32.39%, and 42.47% respectively (Figure 6b).

- If these sectors will grow at the respective rate given in Scenario-1 in Table 6, the share of primary, secondary and tertiary sectors will be 6.96%, 32.92% and 47.23% respectively in 2033-34 (Figure 6c).
- If they will grow at the respective rate in Scenario-4, the share of primary sector will become 7.39%, the share of secondary sector will become 34.87% and the share of tertiary sector will become 44.82% (Figure 6d).

Since we assume higher growth rates of secondary sector and tertiary sector in both scenario-1 and scenario-4, the share of primary sector will go down further in 2033-34.

Figure 6: Sectoral Shares in Different Scenarios



In the context of achieving the overall growth of 9%, the sector-specific key policy recommendations [given in the "Report of the High-Level Committee on Medium-Term Policy Response Related to COVID-19" (2020), under the chairmanship of Dr. C. Rangarajan] may be useful. These are given in Appendix 1.

3.4 Exports and Economic Growth

One of the strategies revealed by the government is that Tamil Nadu's export should be increased to $100 billion by 2030 from the current level of $ 26 billion to meet the target of US$ 1 trillion economy. The Export-Led Growth Hypothesis (ELGH) theory of economic growth states that the rapid growth in exports can lead to higher economic growth.

Many studies show the positive effect of exports on economic growth through enhanced economies of scale, adoption of advanced technology and greater capacity utilization (Feder, 1982; Lucas, 1988; Vohra, 2001). They show that export growth increased investments in those sectors in which a country/state has a comparative advantage, increasing overall GDP and raising the rate of economic growth. However, a few other studies show that exports have a negative impact on economic growth, noting that this effect is associated with primary goods comprising a large share of total exports (Lee and Huang 2002) (Kim and Lin 2009) (Kalaitzi and Cleeve 2018)

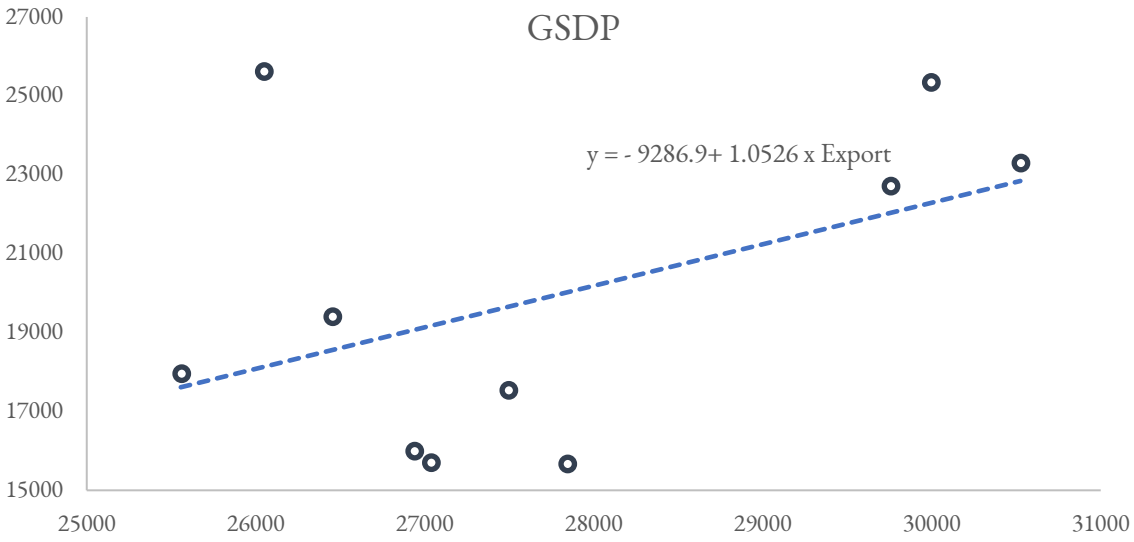
In 2006-07, Tamil Nadu's share in total export of the country was 10.36%; it declined marginally to 9.58% in 2019-20, and further to 8.98% in 2020-21 (Table 7). Regressing Tamil Nadu's nominal GSDP (in US $ million) on its export (in US$ million) during 2011-12 to 2020-21 provides a slope coefficient of 1.052 (Figure 7). However, this relation is not statistically significant even at 10%.[7] The inference that we can draw is that while exports do play a role on accelerating growth, they are not a major determinant of economic growth. [8]

Table 7: Exports (US $ Million)

States	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14
India	126361	163132	185295	178751	251136	305964	300401	312610
Tamil Nadu	13097	14816	18538	16085	23378	27843	27036	26937
TN share %	10.36	9.08	10.00	9.00	9.31	9.10	9.00	8.62
States	**2014-15**	**2015-16**	**2016-17**	**2017-18**	**2018-19**	**2019-20**	**2020-21**	**2021-22**
India	310352	262291	275852	303376	330070	313110	289898	n.a
Tamil Nadu	27493	25557	26453	29754	30524	29996	26047	n.a
TN share %	8.86	9.74	9.59	9.81	9.25	9.58	8.98	

Source: EPW Research Foundation, Monthly bulletin of Foreign Trade Statistics (2019) and Indiastat.

Figure 7: Impact of Exports on GSDP



Alternatively, we can consider a simple export-GSDP ratio procedure. In 2020-21, Tamil Nadu's exports as a percentage of GSDP was 8.87% (not shown). If the economy grows at the required 14% with varying exchange rate, the GSDP (nominal) will reach US$0.75 trillion in 2030-31.

Assuming the same export-GSDP ratio of 8.87% in 2020-21, the export will reach US$66.5 billion. When the economy reaches US$1 trillion in 2033-34, the export reaches US$88.704 billion only and not $100 billion in 2033-34. In fact, to achieve the target of $100 billion of exports, we need to launch a drive so that export-GSDP ratio moves from the current 8.87% to 10%.

3.5 Invested Capital of Industries and Economic Growth

Industry is an engine for economic growth. One of strategies for the government is to attract an investment of ₹23 trillion by 2030. Since the data on capital formation/investment or savings of different sectors and overall sectors are unavailable, Table 8 shows the data on invested capital industries (fixed capital + physical working capital) provided in RBI's Handbook of Statistics on Indian States for Tamil Nadu and All India from 2004-05 to 2018-19.

In 2004-05, the invested capital of industries of Tamil Nadu was US$ 17143 million, accounting for 10.14% of total industrial invested capital of the country. It increased to US$ 60399 million in 2018-19, but its share declined to 8.84%.

In fact, the growth is determined by the investment rate and the efficiency in the use of capital. According to the Harrod-Domar equation, the growth rate is equal to the investment rate divided by the incremental capital-output ratio (Rangarajan 2017). The incremental capital output ratio (ICOR) is the additional unit of capital required to produce an additional unit of output. The higher the ICOR, the less efficient we are in the use of capital. For India, the incremental capital output ratio is commonly assumed as 4.

Table 8: Invested Capital of Industries (US $ Million)

Year	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12
India	169017	203638	236799	317959	333783	407445	525339	592858
Tamil Nadu	17143	21179	25511	32171	31960	41633	51043	54187
Share (%)	10.14	10.40	10.77	10.12	9.57	10.22	9.72	9.14
Year	**2012-13**	**2013-14**	**2014-15**	**2015-16**	**2016-17**	**2017-18**	**2018-19**	**2019-20**
India	577857	559413	574707	588543	640544	692103	683323	n.a
Tamil Nadu	53715	62896	53835	53464	60019	62754	60399	n.a
Share (%)	9.30	11.24	9.37	9.08	9.37	9.07	8.84	n.a

Source: RBI's Hand Book of Statistics on Indian States (various issues).

Our analysis above indicates that the Tamil Nadu economy needs to grow at a real growth rate of 9% per annum for 11 consecutive years (from 2023-24 to 2033-34). Using ICOR of 4, the investment rate in Tamil Nadu needs to be around 36% of GSDP from 2023-24. At the all-India level, the investment rate of 38% of GDP in 2007-08 and with an ICOR of 4, the growth rate in that year for the country was close to 9.4%.

Currently, the investment rate is less than 30% for the country. Our analysis indicates the required investment rate for Tamil Nadu is 36%. Since the state can attract investments from other Indian states and from other countries (in the form of FDI), it needs to work out the strategy to obtain 36% investment rate. Policies should be formulated to create an appropriate investment climate in Tamil Nadu.

3.6 Fiscal Issues

Public spending can boost economic growth; however, government finances of Tamil Nadu are under stress in recent years. In particular, the state suffers from an unsustainable level of outstanding liabilities or public debt.

- The outstanding liabilities of Tamil Nadu Government was ₹17,124 crore in 1996-97, and increased to ₹49,445 crore 2003-04.
- It further increased to ₹1,27,128 crore in 2011-12 and to ₹5,12,555 crore in 2020-21 (not shown).
- Debt relative to GSDP (2011-12 series) was 23.13% in 2003-04.
- Thereafter, it continuously declined to 16.92% in 2011-12, due to various fiscal measures including the implementation of FRBM Act.
- After that, however, it continuously increased to 26.94% in 2020-21 (Figure 8). It is noticed that after 2015-16, it exceeded 20%, the suggested sustainable debt level for all Indian states by the FRBM Review Committee.

The trends in revenue receipts, revenue expenditures, and total expenditures (primary expenditure+ interest payment) relative to GSDP as shown in Figure 9 explain the movement of 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 2008-09, and again in 2011-12 and 2012-13. At the time, the debt-GSDP ratio showed a declining trend.

Figure 8: Outstanding Liabilities to GSDP and Interest to Revenue Receipts of Tamil Nadu. (1996-97 to 2020-21)

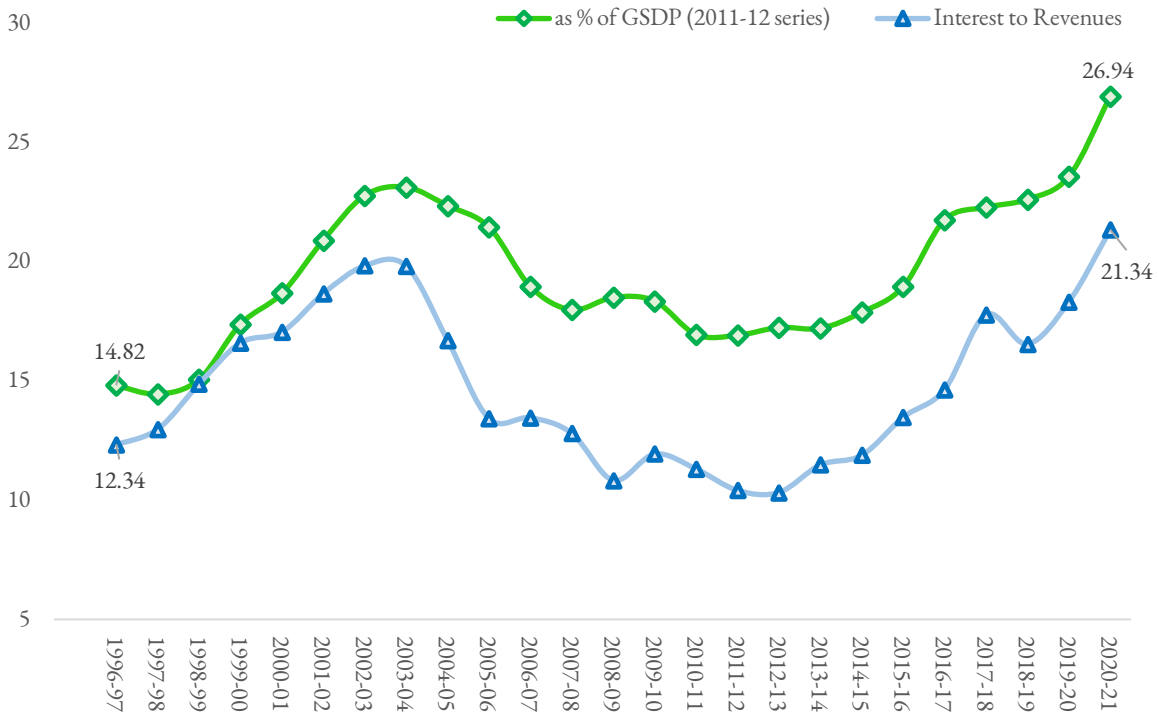
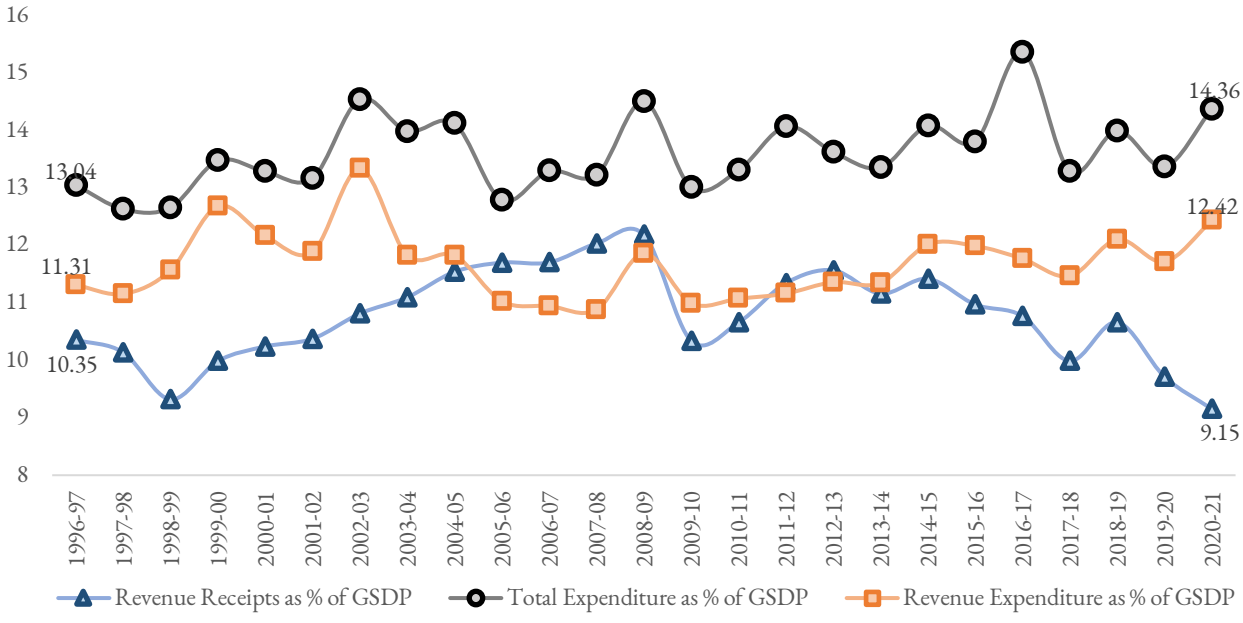


Figure 9: Revenue Receipts, Revenue Expenditures and Total Expenditures Relative to GSDP of Tamil Nadu (1996-97 to 2020-21)



Since 2013-14, the revenue expenditure relative to GSDP continuously exceeded the revenue receipts relative to GSDP and the gap between them widened. The gap between total expenditure and revenue receipts also widened. This was the period where the debt-GSDP ratio started increasing continuously.

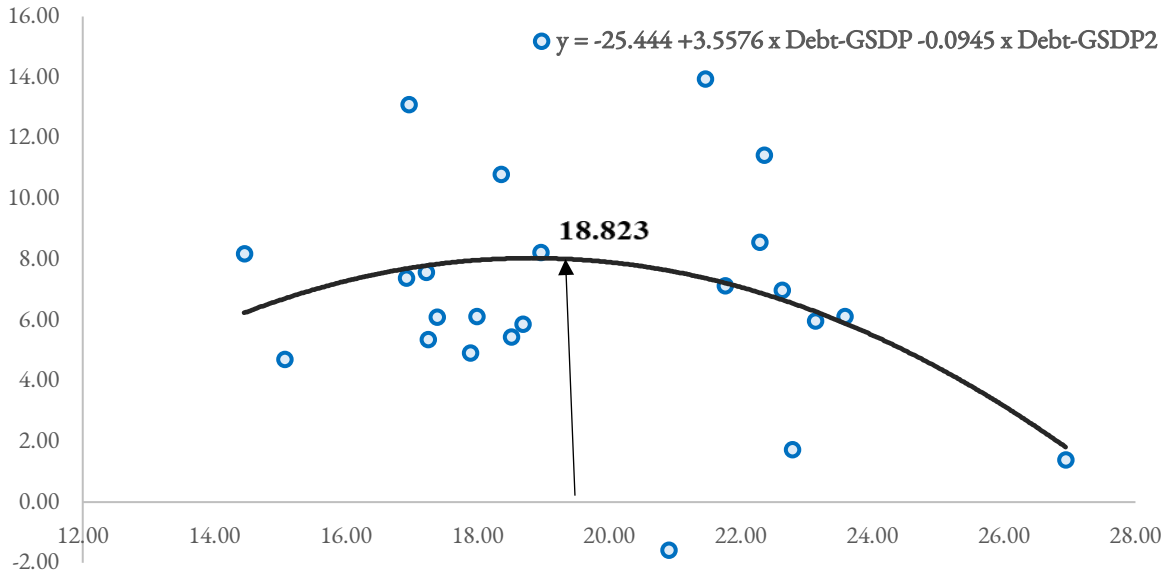
Examining Debt-Growth Relationship: We examine the impact of debt-GSDP ratio on (real) growth of economy by regressing the growth rate (in percentage terms) on debt-GSDP and its squared term. This non-linear form is also useful to find out the debt threshold -- the value up to which debt-GSDP ratio is growth-inducing, and beyond which it is growth-reducing.

Figure 10 depicts the non-linear relation between growth (y_t) and debt-GSDP for Tamil Nadu from 1997-98 to 2020-21. The debt-GSDP coefficient is positive, while its squared term's coefficient is negative.

The threshold level is computed using the formula: threshold = Coefficient of Debt-GSDP / 2 x Coefficient of Debt-GSDP^2 = (3.5576/2*0.0945) = 18.82%.

Beyond the debt-GSDP ratio of 18.82%, the debt is growth-reducing. The current level of debt - GSDP ratio of Tamil Nadu government obviously hits its own economic growth. Therefore, the government needs to reduce its debt-GSDP to the threshold (sustainable) level.

Figure 10: Debt Threshold for Tamil Nadu (1997-98 to 2020-21)



Simulation Exercise to Attain the Debt Threshold Target: It is well known that the debt-GSDP ratio (d_t) at the end of a fiscal year depends on

i. fiscal deficit-GSDP ratio (f_t),
ii. previous year's debt-GSDP ratio (d_{t-1}) and
iii. nominal growth rate (g_t).

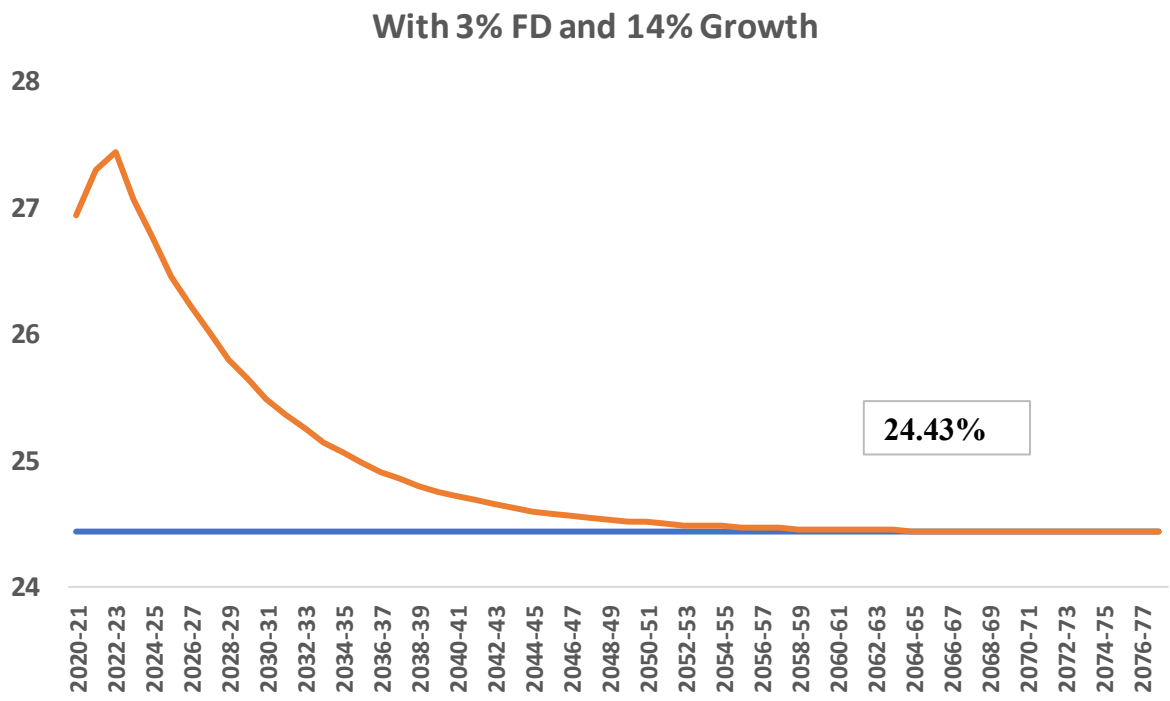
The change in debt-GSDP ratio between two successive years is given by: $(d_t - d_{t-1}) = f_t - d_{t-1}(g_t/(1+g_t))$.

Using this standard debt dynamic formula, we 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}). Initially, we have done an exercise with following values on debt-to-GSDP ratio, fiscal deficit, and nominal growth of Tamil Nadu economy:

i. debt-to-GSDP ratio for 2020-21: 26.94%;
ii. fiscal deficit for 2021-22: 3.79%
iii. Fiscal deficit for 2022-23: 3.49% (as announced in the budget)
iv. Fiscal deficit for 2023-24 onwards: 3% (FRBM norm);
v. nominal growth for 2021-22: 14.5%;
vi. Nominal growth for 2022-23 onwards: 14% (the target rate) throughout our simulation period.

Simulation results indicate that debt-GSDP ratio will rise to 27.4% in 2022-23; it starts declining continuously to 24.71% in 2040-41, and then will stabilise at 24.5% from 2047-48. That is, it will never reduce to 18.82% even after 100 years (Figure 11).

Figure 11: Simulation Results of Debt-GSDP Ratio, given f_t, g_t and d_{t-1}



- With 15% growth assumption from 2022-23, other things remaining the same, the debt-GSDP ratio will stabilize at 23.01% from 2063-64.
- Even when we use a higher growth of 16% from 2022-23, the debt-GSDP ratio will continuously decline to reach 21.8% in 2049-50 and thereafter it will stabilise at that level.

- Above 14% growth is highly ambitious, given the historical growth path. Therefore, alternatively we assume 2% fiscal deficit target, along with 14% (target) growth and find that the debt-GSDP ratio will reach the threshold (sustainable) level in 2034-35 (Table 9).
- If we assume 15% growth and 2% fiscal deficit, the threshold level will be attained in 2031-32.
- Further, if we assume 13% growth and 2% fiscal deficit scenario, the threshold level will be reached only in 2039-40 (not shown).

Given the above results, and ensuring 14% nominal (i.e., 9% real) growth of economy, the state should target for a revenue surplus of 1% from 2023-24 onwards and fiscal deficit of only 2% level to obtain the sustainable threshold debt level of about 18% in 2034-35 (2034-35). This will enable the state to invest 3% of GSDP. Alternatively, the state can have revenue balance (i.e., zero revenue deficit), but contains its fiscal deficit to only 2%. In this case, the state can invest only 2% of GSDP.

If the state is able to ensure 15% nominal growth, it will achieve the debt target of 18% in 2031-32. The relevant policy strategy for the state to obtain threshold debt level is to increase its own revenue-GSDP ratio by 0.75% and contain its revenue expenditures by 0.75%, so that the state will reduce its fiscal deficit to 2% from 2023-24.

Table 9: Simulation Results to achieve the Sustainable Debt-GSDP ratio

	with 15% growth & 2% ft					with 14% growth & 2 % ft			
Year	ft	dt	g	1+g	dt-dt-1	dt	g	1+g	dt-dt-1
2020-21	4.6	26.9	0.059	1.059		26.9	0.059	1.059	
2021-22	3.8	27.3	0.146	1.146	0.367	27.3	0.146	1.146	0.367
2022-23	3.5	27.2	0.15	1.15	-0.072	27.4	0.14	1.14	0.137
2023-24	2	25.7	0.15	1.15	-1.552	26.1	0.14	1.14	-1.370
2024-25	2	24.3	0.15	1.15	-1.35	24.9	0.14	1.14	-1.202
2025-26	2	23.2	0.15	1.15	-1.174	23.8	0.14	1.14	-1.054
2026-27	2	22.1	0.15	1.15	-1.021	22.9	0.14	1.14	-0.925
2027-28	2	21.3	0.15	1.15	-0.888	22.1	0.14	1.14	-0.811
2028-29	2	20.5	0.15	1.15	-0.772	21.4	0.14	1.14	-0.712
2029-30	2	19.8	0.15	1.15	-0.671	20.7	0.14	1.14	-0.624
2030-31	2	19.2	0.15	1.15	-0.584	20.2	0.14	1.14	-0.548
2031-32	2	18.7	0.15	1.15	-0.507	19.7	0.14	1.14	-0.480
2032-33						19.3	0.14	1.14	-0.421
2033-34						18.9	0.14	1.14	-0.370
2034-35						18.6	0.14	1.14	-0.324

4. Concluding Remarks

Our analyses above indicate that 14% growth of nominal GSDP from 2022-23 onwards (with 2% depreciation of exchange rate) will enable the state to attain the US$1 trillion economy target by 2033-

34. Obtaining the 9% real growth rate every year till 2033-34 is not easy, given the current trend of economic growth. Efforts should be made to ensure that the primary sector would grow at 5-6% per annum, the secondary sector at 8-11% and the tertiary sector at 8-10% per annum till 2033-34.

The government's strategies of increasing Tamil Nadu's export to $100 billion and attracting an investment of ₹23 trillion by 2030 will also help, to some extent, to meet the target. Along with these strategies, the government needs to implement the sector-specific recommendations of the High-Level Committee on Medium-Term Policy Response Related to COVID-19, in order to achieve the sector-specific growth targets suggested in appendix 1.

In particular, the state needs to shift towards the cultivation of highly-remunerative and less water-intensive crops. The food processing industry needs to be given priority attention, to prevent excess production from going to waste. With respect to industry and services, we need to identify the emerging sectors (biotechnology, pharmaceuticals, logistics, advanced information technology etc.) and chalk out detailed plans. The infrastructure needs, particularly in power, will also expand.

As the current level of public debt is unsustainable and growth-reducing, the state should target for a revenue surplus of 1% from 2023-24 onwards, to obtain the sustainable threshold debt level of about 18% in 2034-35 at 14% nominal growth (or 2031-32 at 15% nominal growth).

What we have presented in this paper can be described as the arithmetic of achieving a Trillion Dollar economy by Tamil Nadu. We have shown what the required rate of growth would have to be under various assumptions. What can happen a decade from now depends upon a number of factors, and therefore any projection over such a long period has to be conditional. Our own conclusion is that the most likely scenario is a nominal growth of 14% per annum over the next ten years, which will take Tamil Nadu to become a trillion-dollar economy by 2033-34.

We have spelt out the implications of this scenario for the composition of output, growth rates of various sectors, export growth, and the fiscal balance. Fiscal stability is critical for sustained growth. A nominal growth rate of 14% can provide enough elbow room, not only to keep the fiscal deficit low, but also provide for adequate expenditure on capital account and social infrastructure.

As mentioned earlier, Tamil Nadu's economic performance also depends on India's growth and global scenario. The global environment for trade is becoming increasingly a matter of concern, with OECD and others forecasting a secular slowdown in growth in developed economies. Environmental considerations can also act as a damper on the growth path of even developing countries.

India is a large country. Despite global concerns, there may be enough space for India and Tamil Nadu to maintain high growth. A strong real growth of 9% will enable the government to provide various social safety nets. This paper spells out some implications of what this journey to achieve a high growth will demand.

Appendix 1: Sector Specific Recommendations

Primary Sector

i. Efforts should be taken to shift towards the cultivation of highly remunerative and less water intensive crops to increase the farmers' income;
ii. Procurement mechanism for crops other than paddy needs to be streamlined to make the minimum support price effective.
iii. Modern seed storage godowns, seed processing units and Government sale outlets at vantage points may be established.
iv. Support to purchasers and producers to enter into legal contract farming is needed;
v. Government should bring suitable amendments to the Tamil Nadu Land Reforms Act to include more crops within the purview of plantation crops;

Secondary and Tertiary Sectors

i. TIIC can be restructured and strengthened to expand lending to industries by infusing capital of ₹ 1000 crores over three years;
ii. Developing integrated townships with social infrastructure facilities in the growth centres would provide a big advantage for the state in attracting investments. This could be integrated with Smart City Mission.
iii. There is a need to develop industrial parks of about 2000 to 2500 acres with a single window clearance system.
iv. A standard capital subsidy and location based subsidy can be provided to incentivize industries in backward districts by promoting private industrial parks with plug and pay facilities.
v. Constitute an Empowered Committee to review the investment proposals and take decision of granting in principle approval within 15 days for 7 basis clearances to set up a manufacturing unit on a trust and verify basis while other clearances could be provided through single window facility in parallel.
vi. Develop sectoral policies to reduce regulatory procedures for automobile, pharmaceutical, textiles, leather and electronics and mining industries to attract new investments.
vii. A state level credit guarantee scheme and an MSME fund could be established to take advantage of the Government of India's MSME fund of funds to increase credit flows for MSMEs.
viii. The concept of land banks should be implemented with clearly demarcated space for MSMEs and effective allocation of land must be made within SIPCOT estates in addition to SIDCO estates.
ix. Encourage tourism development programmes that include benefits for and utilizations by community residents;

Further the state should give priority to the emerging and innovative sectors like biotechnology sector, pharmaceutical sector, logistic sector and information technology. The following key recommendations of the High-Level Committee relating to these innovative sectors may be useful:

i. Tamil Nadu State Biotechnology Board needs to be constituted to promote accelerated growth of this sectors;
ii. Special focus is needed on the (a) biosimilar, (b) diagnostics and AI based diagnostic imaging; (c) bioprocess and (d) AI based start-ups.
iii. Promoting vaccine development manufacturing;
iv. Promote establishment of bio-incubators in various public and private universities by providing special funds for setting up;
v. Similar to iSTEM Bangalure, upgrade the Stem Cell Research Centre at Stanley Medical College;
vi. Promote Contract Analytical Services to support Biologics Analytics characterisation in Tamil Nadu;
vii. There is a need to develop a separate Pharma Policy
viii. The state should take advantage of the Bulk Pharma Park Scheme of the Central Government which provides a grant of ₹ 1000 crore for a pharma park of 1500 acre size;
ix. The state needs to develop at least three pharma parks of the spanning 250 acres range in the state and needs to encourage private industrial parks developers to set up pharma parks;
x. The Industrial Policy of the state must recognize pharma as a sector for providing incentives;
xi. Availability of chemicals and other raw materials is a pre-requisite to enable the growth of pharma industry. Steps to be taken to facilitate entry of chemical industry majors into API and other focused areas;
xii. The exists a need to immediate start to Medipark near Chengleput with focusing on diagnostic imaging and IV diagnostics and immediately develop additional Mediparks near Chennai, Coimbatore, Trichy and Tuticorin.
xiii. Medical devices industry must be given special treatment in terms of incentives in the industrial policy.
xiv. A comprehensive mapping of existing and projected freight flows across main Origin-Destination stretches in Tamil Nadu needs to be carried out to identify the scope for potential multinational logistics parks. Explore the possibilities of coastal shipping along with coast of Tamil Nadu
xv. Special focus on effective agri-logistics involving access to cold chain, packaging and other post-harvest management techniques. Focussed effort to be taken to ensure the turnaround time at ports be brought to less than 36 hours from the current rate of over 72 hours;
xvi. There are too many toll gates causing inordinate delay. There is a need to standardize the optimum distance between toll gates.

xvii. Effective technology solutions such as FASTag must be deployed on a widespread basis to reduce delays.

xviii. Establish the Tamil Nadu IT advisory council;

xix. Outline a strategy for facilitating the creation of Small Office Space across Tier 2&3 cities which can be used by the employees of the IT companies based in major towns to make use as their meeting points.

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Notes

[1] From 2005-06 to 2011-12, Tamil Nadu was fifth fastest growing state amongst 29 Indian states. But it ranked 10th during 2012-13 to 2020-21.

[2] However, the 15th Finance Commission indicated the debt path wherein the debt to GSDP ratio can be up 29.3% in 2022-23 and 29.10% in 2023-24.

[3] **CPI and GDP Deflator Based Inflation: Tamil Nadu (TN) and India**

Inflation (%)		2014-15	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22	Avg.
CPI	India	5.97	4.91	4.52	3.53	3.48	4.66	6.24	5.38	4.84
	TN	6.19	5.69	3.92	4.87	3.67	5.64	6.68	6.17	5.35
GDP Deflator	India	3.33	2.28	3.24	3.97	3.88	2.39	5.60	9.97	4.33
	TN	5.56	1.33	3.33	3.57	3.99	3.87	4.39	6.22	4.03

Source (Basic Data): RBI website, EPW Research Foundation and NSO, MOSPI.

A similar study by EY India (July 2019) uses 4% inflation to examine whether the Indian economy becomes a US$5 trillion economy in 2025.

[4] The assumption of 2% depreciation of exchange rate every year may be questioned. One may also argue that in the last few months the Indian rupee depreciates at a faster rate. It is noted that, once the economy revives and capital flows increase, the rate may moderate. If we apply the rupee depreciation of ₹. 2.36 every year, the required growth rate will become 18.95%.

[5] With zero depreciation of exchange rate as in Table 1, the target is achieved in 2031-32 with 14 (or 15)% nominal growth rate (S3); it is achieved in 2032-33 with 13% (S2); reaching the size of US$1 trillion would be delayed even further to 2033-34 with growth rate of 11.5% (S1).

[6] The Hodrick-Prescott (HP) filter is a data smoothing technique. It removes short-term fluctuations associated with the business cycle. Removal of these short term fluctuations reveals long term trend. An estimate shows that between 2005-06 and 2011-12, Tamil Nadu's long-term average trend (potential) rate ranged between 8.24% and 8.79%.

[7] However, regressing TN's GSDP growth (nominal) on nominal growth of exports, we find the coefficient of 0.597 which is statistically significant at 1% level, indicating that 1% increase in nominal growth of exports leads to 0.6% increase in nominal GSDP growth in Tamil Nadu. The simulation using this result indicates that when the export is increased to US $ 100 billion and other things remaining the same, the GSDP (nominal) will increase to about US $700 billion (and not 1 trillion).

[8] However, one may argue that the exports are not the sole determinant of growth which may depend on various factors. Including other determinants may change the above results (i.e., exports may turn out be a significant factor).