WPS3947

Subnational Fiscal Sustainability Analysis:
What Can We Learn from Tamil Nadu?

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Abstract

In the late 1990s the Indian state of Tamil Nadu experienced an unprecedented fiscal deterioration, which was part of the widespread fiscal deterioration in Indian states. This deterioration was troubling because current expenditure outgrew total revenue, leaving little fiscal space for infrastructure spending. The paper presents a framework for subnational fiscal sustainability analysis and applies it to Tamil Nadu where subsequent fiscal adjustment has been ambitious and politically challenging, but has promised to put state finance on a sustainable path and create fiscal space for infrastructure investment. The paper emphasizes the differences between fiscal sustainability analysis at the national and subnational levels, attempts to take into account uncertainty, and discusses the key components of the state's fiscal accounts and how they respond to reforms and shocks. Risks to Tamil Nadu's fiscal outlook include interest rate shocks, pressures on the primary balance, and contingent liabilities. Though the state's efforts to remove constraints to economic growth, minimize recurrent expenditures and maximize its revenue potential will be critical for fiscal sustainability, national policies feature prominently in subnational fiscal adjustment. Tamil Nadu's quest for fiscal sustainability is relevant for other countries. Decentralization has given subnational governments in developing countries significant spending and taxation responsibilities, and the capacity to incur debt. The fiscal stress of the Indian states echoed the fiscal crises of subnational governments in several other major emerging economies.

1. Introduction

In the late 1990s Tamil Nadu, an Indian state with a population of 62 million, experienced an unprecedented fiscal deterioration. Its consolidated fiscal deficit rose dramatically. In two years it jumped from 2.2 percent of gross state domestic product (GSDP) in 1997/98 to 6.7 percent in 1999/2000, and remained high at 7.2 percent of GSDP in 2001/02[1] (Figure 1). Its debt stock as a share of GSDP rose from 16.3 percent in 1997/98 to 25 percent in 2001/02 (Figure 2). After accounting for state guarantees backing the market borrowing of loss-making state-owned enterprises, government liabilities stood at 30 percent of GSDP in 2001/02.

Why would one be concerned about the rising level of fiscal deficit and debt in Tamil Nadu? Was the fiscal crisis in Tamil Nadu an isolated event or a part of widespread fiscal deterioration experienced by other Indian states and reflecting systemic weaknesses? How did the government of Tamil Nadu manage to stabilize its fiscal position and embark on a sustainable path after 2001? What are the major risks that could derail Tamil Nadu from this path? What are the key constraints to subnational fiscal adjustment? Can we draw broad lessons from the experience of Tamil Nadu? These are some of the questions that motivated this study.

As our analysis would show, the rapidly rising fiscal deficit and debt levels in Tamil Nadu, and other Indian states, were troubling because the new borrowing over the period was used to finance revenue deficits (Figure 3),[2] crowding out fiscal space for infrastructure investment.[3] The fiscal crisis in Tamil Nadu was part of the widespread fiscal deterioration experienced by other Indian states in which current expenditure outgrew total revenue, while infrastructure investment remained low.

The experience of Tamil Nadu in its quest for fiscal sustainability is relevant for subnational governments in other countries. Decentralization has given subnational governments in developing countries significant spending and taxation responsibilities, and the capacity to incur debt. Unsustainable fiscal policy at the subnational level jeopardizes service delivery, the safety of the national financial system, and macroeconomic stability.

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[1] In 2001/02, the consolidated fiscal deficit (cash) was 5.2 percent of GSDP and 7.2 percent including arrears.
[2] Revenue deficit is the amount of current expenditure (such as wages, pension outlays, subsidies, transfers, and operation and maintenance) net of total revenues.
[3] Many European countries and U.S. states have enacted fiscal laws requiring long-term borrowing only for capital investment. A number of middle income countries, such as Russia, Mexico, Brazil, Columbia, and Peru among others, have recently adopted the same principle.

Figure 1. Fiscal Deterioration in Tamil Nadu
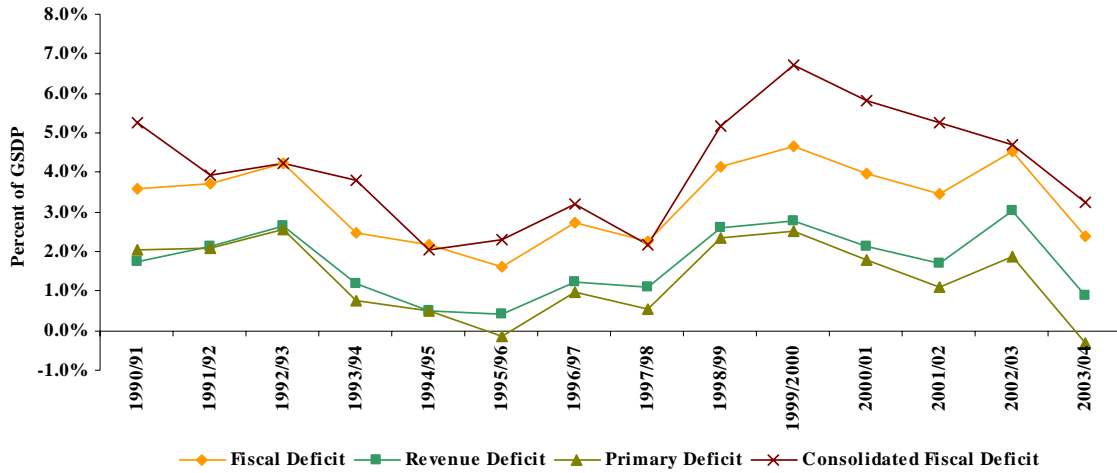
Source: Government of Tamil Nadu's Budget documents.
Note: The deficits in 2000/01 and 2001/02 underestimate the actual levels because they do not account for non-pension arrears equaling 1.7 percent of GSDP in 2000/01 and 2 percent of GSDP in 2001/02. The deficit (revenue and fiscal) in 2002/03 and 2003/04 includes partial clearance of Rs.30.62 billion in payment arrears accumulated from the late 1990s.

The fiscal stress of Indian states echoed the fiscal deterioration or crises of subnational governments in several other emerging economies. Examples include the three subnational debt crises in Brazil in the 1980s and the 1990s, the subnational defaults associated with the financial crisis in Mexico in 1994-1995, and the defaults by close to two-thirds of Russian subnational governments in 1998-1999. Subnational governments in countries such as Hungary, Colombia, and South Africa also experienced varying degrees of fiscal stress in the 1990s.

Since subnational fiscal sustainability analysis is an important, yet largely ignored, topic, the paper makes three extensions to the literature. First, it applies the standard framework for fiscal sustainability analysis presented in Burnside (2005) at the subnational level. The exposition emphasizes the differences between fiscal sustainability analysis at the national and subnational levels. Second, by conducting sensitivity analysis and discussing key fiscal risks and constraints to fiscal adjustment, the paper also attempts to take into account the effects of uncertainty – one aspect of fiscal sustainability analysis that has been largely ignored in the traditional literature. Finally, we do not limit the analysis to calculations of

Figure 2. Debt and Guarantees as Percentage of GSDP

Source: Government of Tamil Nadu's Budget documents.

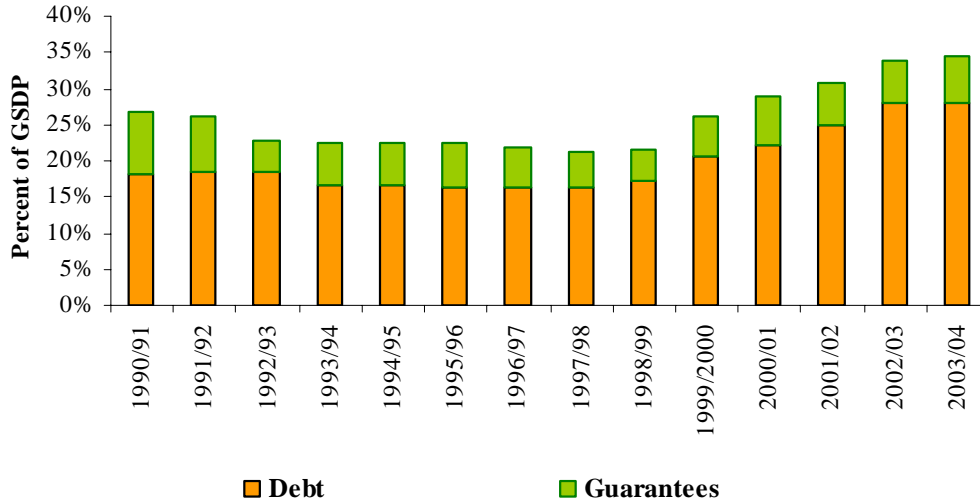**Figure 3. Revenue Deficit as Percentage of Fiscal Deficit**
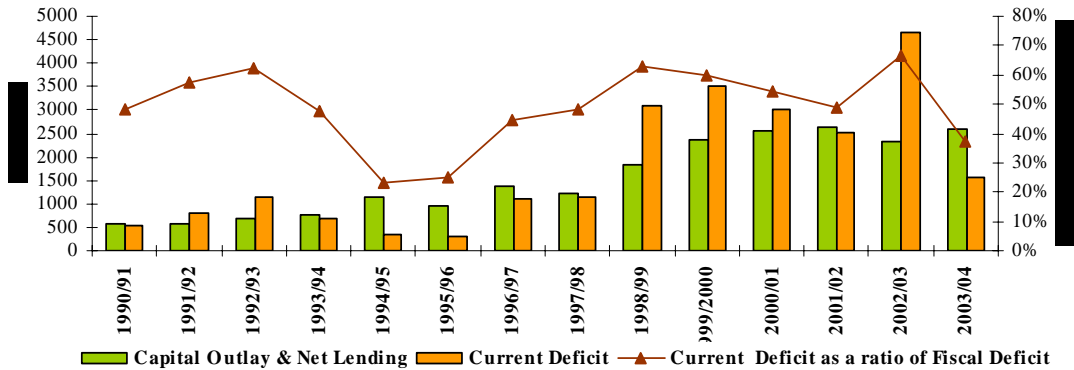
Source: Government of Tamil Nadu's Budget documents.
Note: The deficits in 2000/01 and 2001/02 underestimate the actual levels because they do not account for non-pension arrears equaling 1.7 percent of GSDP in 2000/01 and 2 percent of GSDP in 2001/02. The deficit (revenue and fiscal) in 2002/03 and 2003/04 includes partial clearance of payment arrears accumulated from the late 1990s.

fiscally sustainable, threshold government balances, but discuss all key components of the state's fiscal accounts and the inter-government revenue-sharing system impacting the primary balance of the state. We believe that the methodology presented in this paper is applicable to any subnational entity.

The paper is structured as follows. Section 2 presents the analytic framework for fiscal sustainability analysis at the subnational level, and emphasizes the differences between subnational and national fiscal adjustments. Section 3 discusses the fiscal deterioration in Tamil Nadu in the late 1990s and analyzes the key components of the state's fiscal accounts. The section also discusses the outcomes of the fiscal reforms promoted in response to this deterioration. Section 4 constructs a baseline scenario which promises a sustainable debt path for Tamil Nadu, explores the potential for increases in infrastructure investment without negative consequences for fiscal sustainability, and analyzes various risk factors which could derail the government's progress along this path. Section 5 presents concluding remarks, caveats, outlines directions for future work and draws policy lessons relevant for other developing countries.

2. Framework for Subnational Fiscal Sustainability Analysis

Fiscal sustainability has been defined in many ways (Burnside 2005).[4] In this paper the concept of sustainability refers to the ability of the subnational government to sustain its fiscal policies in the long run while remaining solvent.[5] The fiscal policy of the subnational government is considered unsustainable if when indefinitely maintained it would lead to insolvency. Governments often avoid default by changing their fiscal policy when it becomes clear that it is unsustainable. Thus, the focus of fiscal sustainability analysis is not on default itself, but on the feasibility, types and consequences of fiscal policy reforms needed to avoid default on subnational government debt in the future.

The inter-temporal financing constraint of the subnational government:

$$B_t - B_{t-1} = n_t B_{t-1} - X_t \tag{1}$$

is the fundamental building block for studying subnational debt dynamics both in a historical and forward looking mode and the first step in deriving its lifetime budget constraint of the subnational government. In equation (1), B_t is the outstanding public debt of the state, measured at the end of period t, X_t is primary fiscal balance in period t, and n_t denotes the domestic interest rate in period t. Time is discrete, debt matures in one period, and financing and interest payments take place evenly throughout the year. Debt should be net of comparable assets, while interest payments should be net of any receipts. For the budget constraint to hold the primary balance should include all flows that affect the debt level (e.g., privatization revenue).

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[4] For an in-depth discussion of fiscal sustainability in theory and practice see Burnside (2005).
[5] Solvency refers to the government's ability to service its debt without an explicit default.

For the purpose of practical fiscal sustainability analysis, it is important to represent debt and the subnational government budget constraint in percentages of gross state domestic product (GSDP):[6]

$$b_t - \frac{b_{t-1}}{Z_t} = i_t - x_t, \tag{2}$$

where Y_t and P_t denote output and the price level at period t, $b_t = \frac{B_t}{P_t Y_t}$, $Z_t = \frac{P_t Y_t}{P_{t-1} Y_{t-1}}$, $x_t = \frac{X_t}{P_t Y_t}$, and $i_t = \frac{n_t B_{t-1}}{P_t Y_t}$. Solving for the change in debt in equation (2) and using

$\frac{Y_t}{Y_{t-1}} = 1 + g_t = G_t$, $\frac{P_t}{P_{t-1}} = 1 + \pi_t = \Pi_t$, and $Z_t = G_t \Pi_t = (1 + g_t)(1 + \pi_t)$, in order to disentangle the growth and inflation effect on indebtedness we obtain:

$$b_t - b_{t-1} = i_t - x_t - \frac{g_t}{Z_t} b_{t-1} - \frac{\pi_t}{\Pi_t} b_{t-1}. \tag{3}$$

where g_t is the real annual growth rate, and π_t is the annual inflation rate. The terms on the right-hand side of equation (3), in order, are the interest rate, the primary balance, the growth effect, and the inflation effect on domestic debt.

With a consistent set of projections for interest rates, primary balance, growth and inflation rates, we can assess debt sustainability under different scenarios using:

$$b_t = \frac{(1 + r_t)}{(1 + g_t)} b_{t-1} - x_t, \tag{4}$$

where r_t is the real interest rate defined as $r_t = (n_t + 1)/(\pi_t + 1) - 1$. The budget constraint (4) shows that the sustainability of the subnational government's fiscal policies depends on the primary balance, the real interest rate, which in turn depends on nominal interest rates and inflation, and subnational economic growth. See Appendix A for a discussion of steady state conditions.

Although national and subnational debt dynamics are alike, subnational fiscal sustainability analysis differs from national fiscal sustainability analysis in a number of important ways, implying that care must be used when applying the sustainability model at the subnational level.

The first key difference between a government at the subnational level and the central government is that subnational governments generally do not have the power to issue their own currency. As a result, seigniorage plays no role in government finance and the state government's *life-time budget constraint*, just as in a Ricardian regime,[7] suggests that for

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[6] This is done by dividing both sides of (1) by $Y_t P_t$.

[7] In a Ricardian regime the government issues debt to cover deficits, but never issues money.

debt to be sustainable the outstanding stock of debt should not exceed the present value of all current and future primary surpluses:[8]

$$B_{-1} = \sum_{i=0}^{\infty} D_{0t} X_t \qquad\qquad (5)$$

where B_{-1} is the stock of initial total public debt of the state, and $D_{0t} = (1+n_0)^{-1}...(1+n_t)^{-1}$. Application of the no-Ponzi scheme condition implies that the present value of net government debt in the indefinite future converges to zero, or that the geometric average growth of nominal debt is smaller than the nominal interest rate on the debt.

The present value approach incorporates the creditors' incentives in determining the financing options facing the government. Under this approach, creditors lend to the government only if they deem the government policies to be sustainable. If the policies seem unsustainable, then additional borrowing will dry-off and may be restarted only by reducing debt or adjusting the policy stance, i.e., past and current primary deficits imply future primary surpluses in present value terms. This is based on the assumption that credit risk plays a role in the subnational financing system. In the presence of public sector dominance of subnational lending, however, lending rates could be subsidized, bank lending to the public sector including subnational entities could exceed the statutory requirements, and credit risk concerns could be compromised. In countries such as Brazil, China, and India, public financial institutions dominate lending to subnational entities.

Another key difference between subnational and national fiscal sustainability is that foreign exchange risk may not directly affect subnational finance, as in the case of India, China and Peru where subnational governments are prohibited from external borrowing and all external borrowing needs approval and guarantee from the national government with the central government bearing the foreign exchange risk. In cases where subnational entities are allowed to borrow in foreign currency, the model would need to be modified to include the analysis of foreign exchange risks. Examples, which illustrate the importance of this type of risk, include Brazil's debt crisis in the 1990s and Russia's financial crisis in 1998. However, even if subnational governments are prohibited from borrowing externally, currency risks can indirectly impact the sustainability of subnational governments' fiscal policy through real interest rate shocks as in the case of the Mexican crisis in 1994-1995.

Since monetary policy is at the purview of the central government in almost all countries, the nominal interest rate n_t is arguably outside the influence of a single subnational government, as long as the subnational entity is small. While the subnational government cannot set the interest rate at which it borrows (at least not in a competitive bond market), the spread it pays over the central government's rate is presumably linked to its own creditworthiness. In many developing countries, however, subnational governments cannot affect the interest rates on their debt as capital markets are underdeveloped. In India, for example, interest rates on government bonds are set by the Reserve Bank of India (RBI) and are the same for all states independent of their creditworthiness. RBI requires creditors

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[8] To derive equation (5) we start from equation (1) at period 0 and iterate forward N periods.

to buy a mix of state bonds, including bonds of states perceived to be less creditworthy. This practice implies that the better managed states cross-subsidize the poorly managed ones and weakens the incentives for prudent fiscal behavior.

There are legal constraints to the ability of subnational governments to raise their own revenue – a key determinant of the primary balance X_t. In many countries these legal constraints are set by their respective constitutions and legislation. In India, a country with a long-standing and well-established federal framework, the Constitution limits the power of states in setting tax policy for major categories of taxation. In countries where the legal framework for fiscal decentralization is still evolving, the ability of subnational governments to raise own revenue can change over time. For example, while prior to 2005 personal income tax was levied and retained by Chinese provinces, currently personal income tax is shared equally between China's central government and the provinces.

Furthermore, transfers from the central government are an important source of subnational revenues, although the dependency of subnational governments on fiscal transfers varies significantly across countries. In India, fiscal transfers from the center were on average about 37 percent in 2003/04 of total revenue in major states,[9] while in Mexico, these transfers are between 85 to 95 percent of total state revenue.

The intergovernmental revenue system dictates the transfers from the center to subnational governments[10] and the predictability of transfers depends on how the transfer system is set up. In India, the constitutionally mandated Finance Commission convenes every five years to determine the sharing of revenues between the center and the states based on a formula using non-constant weights for various relevant factors such as population, income disparity, area, tax effort and fiscal discipline. In China, the revenue sharing system between the center and the provinces has evolved continuously since the 1980s.

There are many other ways in which central governments affect the fiscal balance and the growth prospects of the subnational economy. Examples include the central government's policies on wages and pensions in Brazil and India, and the ceilings on debt services and debt stock set by the central government in Colombia, Peru, Russia and Mexico. In India, many projects and policies that affect the growth potential of the subnational economy, such as investment in major infrastructure, investment and labor policies and regulation, are largely or exclusively within the purview of the central government.

Finally, expected bailouts by the central government influence significantly subnational debt dynamics. Market participants may tolerate unsustainable fiscal policy of a subnational government if past history backs their perception that the central government implicitly guarantees the debt service of the subnational government. Central government's

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[9] In India fiscal transfers are set to increase to 39% in 2005/06, following the Twelfth Finance Commission's award, and could reach 46% including the central government debt write-off described later. The sample excludes small special category states.

[10] In countries with a three-tier system (federal – state – provincial levels), the third-tier government receives transfers from the second-tier government (such as in India) or also from the central government (such as in South Africa).

guarantees for local government bailouts were perceived to be contributing factors for widespread subnational defaults in Russia in the late 1990s and in Mexico in the mid-1990s.

3. Fiscal Adjustment: Case of Tamil Nadu[11]

3.1 Origin of fiscal crisis

In 1998/99 Tamil Nadu experienced an unprecedented fiscal crisis. Revenue, primary, fiscal and consolidated deficits grew rapidly (Figures 1 and 3), as well as debt and contingent liabilities (Figure 2).[12] In 2001/02 the debt stock as share of GSDP was 30 percent of GSDP after including state guarantees to back the market borrowing of loss-making, state-owned enterprises. Debt accumulation led to an increase in interest expenditure to about 20 percent of revenue receipts – a threshold used by the central government to identify "debt stressed" states (Figure 4).

Figure 4. Interest Expenditure as Percentage of Revenue Receipts
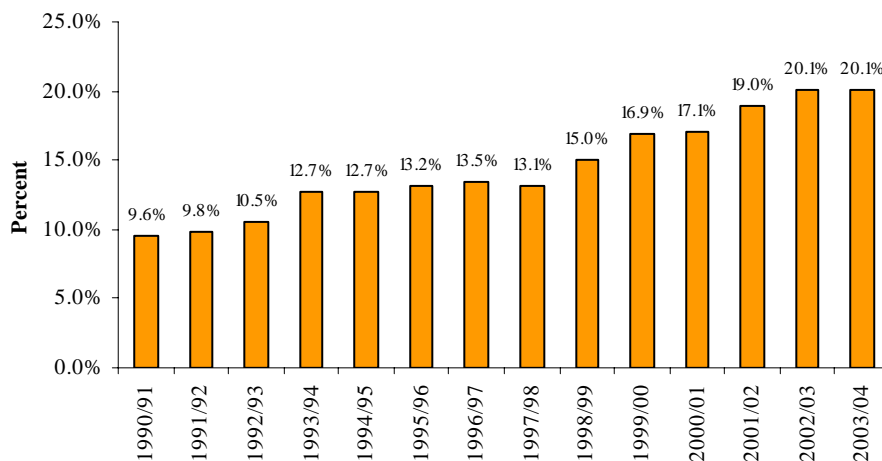
Source: Government of Tamil Nadu's Budget documents.

The growing deficit and debt were worrisome because recurrent expenditure rapidly outgrew revenues. As a result, a high and growing portion of the government net borrowing was used to finance consumption. While a growing fiscal deficit itself may not be a source of concern if the deficit is to finance capital expenditure, a large and growing

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[11] For a more detailed account of fiscal crisis and reforms, see World Bank (2005a).

[12] Revenue deficit is the amount of current expenditure (such as wages, pension outlays, subsidies, transfers, and operation and maintenance) net of total revenues. Consolidated fiscal deficit captures off-budget activities and hidden liabilities, including off-budget borrowing serviced by the state government, capital works executed in the Public Account but financed by off-budget borrowings deposited in the Public Account, and the financial accounts of the state power utility.

revenue deficit, particularly one driven by current consumption, is a concern because it does not augment the productive capacity of the economy.

Expenditure composition also worsened with stagnation of maintenance and capital spending and a big increase in expenditure on wages, pensions and subsidies (Figure 5). Since the 1990s Tamil Nadu's capital outlay to GSDP ratio has been on average 1.6 percent. This ratio has been much lower than that of comparable states where annual capital outlays to GSDP varied between 2 and 3 percent. It has been lower compared to other countries too as India in general has had lower capital outlay than, for instance, China where infrastructure investment has stayed around 8-10 percent of GDP per annum for the last 15 years.

Figure 5. Expenditure Composition
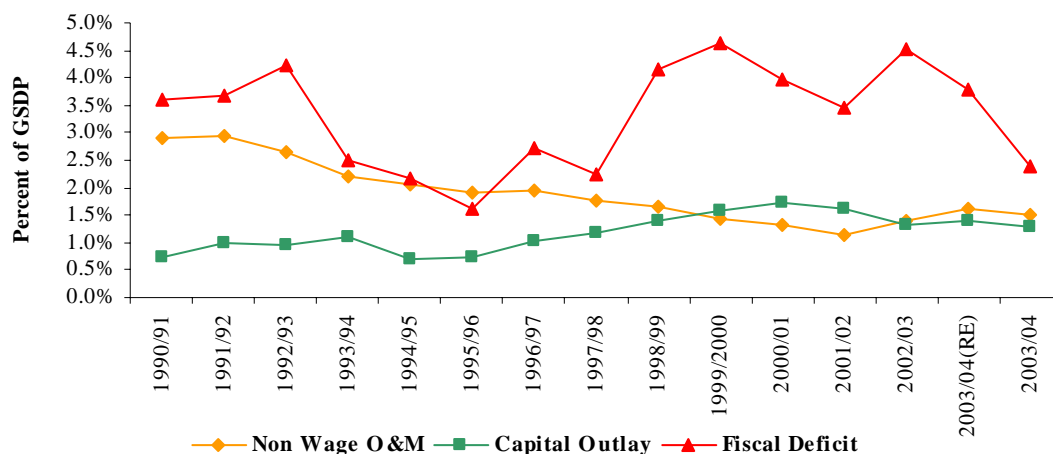
Source: Government of Tamil Nadu's Budget documents.
Note: The deficits in 2000/01 and 2001/02 underestimate the actual levels because they do not account for non-pension arrears equaling 1.7 percent of GSDP in 2000/01 and 2 percent of GSDP in 2001/02. The deficit in 2002/03 and 2003/04 includes partial clearance of accumulated pension liabilities.

The traditional measure of the fiscal deficit does not capture the quasi-fiscal activities of state-owned public enterprises (SOEs). The budget does capture grants, capital outlays and loans extended by the government to SOEs, but it does not capture their financing gaps, which are covered by market borrowing and direct government subsidies. Since most SOEs in Tamil Nadu, and other Indian states,[13] incur losses,[14] and hence, are not

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[13] There are three types of SOEs in Indian states. The first type is public sector undertakings (PSUs) covering agriculture, housing construction, finance, manufacturing, mining, trading, passenger transport and drug procurement, among others. The second type is Statutory Boards formed under independent legislative acts. These are mostly in utilities and infrastructure, from electricity to maritime transport. The third type is cooperatives in which the government owns equity. All three types of SOEs have suffered financial losses.

[14] The accumulated losses of PSUs in Tamil Nadu were Rs.28.24 billion as of end 2001/02. The outstanding guarantees issued to PSUs amounted to Rs.120.04 billion as of March 31, 2002. The 18 State Transport Units, with 120,000 employees and an accumulated loss of Rs.20.9 billion as of March 2002, accounted for about 70 percent of employment and 73 percent of accumulated losses of all PSUs in 2001/02. Tamil Nadu's Electricity Board (TNEB), with a total employment of 94,000, accounted for 80 percent of total employment,

creditworthy, their borrowings are backed by government guarantees. In India, the financial losses of the state electricity boards pose the most significant fiscal threat (World Bank, 2005b). Although Tamil Nadu's Electricity Board (TNEB)[15] has been relatively efficient, compared to the electricity boards in other Indian states, its financial losses rose steadily beginning in the late 1990s (Figure 6). The losses were attributed to large and increasing subsidies to agriculture and domestic consumers and a rapid increase in supply costs.

To capture the impact of TNEB's financial losses on the budget, the TNEB's accounts were consolidated with the state government's fiscal accounts. The resulting consolidated deficit, defined as the sum of the non-power fiscal deficit of the government and the Board's total financing requirements,[16] increased by as much as 1.5 percentage points of GSDP following the crisis in 1998/99.

Ideally, the consolidated fiscal deficit needs to include all public sector units that have financial transactions with the state. It also needs to include cooperatives in which the government has controlling shares or is financially involved through guarantees or budget support. The consolidated finance also needs to include local governments, defined as third-tier governments by the 74th amendment to the Constitution in 1993. Local governments' financial activities are regulated by the state government and their impact on the consolidated accounts is expected to be small. Producing a completely consolidated budget however is time consuming due to data constraints. In the case of Tamil Nadu, the consolidation of the power sector finance took care of a dominant source of off-budget liabilities.

Tamil Nadu's fiscal deterioration mirrored the fiscal deterioration across Indian states started in the late-1990s. The combined fiscal deficit of the states rose from 2.9 percent of GSDP in 1997/98 to 4.3 percent of GSDP in 2003/04, when the states accounted for about one-half of India's general fiscal deficit. The pattern of the fiscal deterioration, characterized by rising revenue deficits, government guarantees, and significant off-budget activities, was similar across Indian states, though there were variations across states. In relative terms, Tamil Nadu's fiscal performance was better than that of most other states.

While the debt to GSDP ratios of Indian states were not high (average was 25 percent of GSDP in 2001/02) compared to that of the national government (65 percent GDP in 2001/02), Tamil Nadu's ability to meet debt service obligations was eroding. Interest payments as a share of revenue rose from 9.8 percent in 1991/92 to 20.1 percent on average in 2003/04, and outstanding liabilities as a share of revenue increased from 114 percent in 1990/91 to 212 percent in 2003/04.

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and dominated the balance sheets of all nine Statutory Boards. Its financial losses have increased steadily over the years. Net losses before subsidies almost doubled from the level in 2000/01 to an estimated Rs.25.24 billion in 2001/02. Eighteen cooperative spinning mills and sixteen cooperative sugar mills, with total employment of about 20,000, dominated the financial losses incurred by the cooperative sector. The accumulated losses reached Rs.9.55 billion as of March 31, 2002.

[15] TNEB, with 120,000 employees, is the state monopoly on transmission and distribution of electricity. It also produces and procures power from other sources.

[16] The consolidation was based on joint work of the World Bank with the state government.

Figure 6. Financial Performance Trend of Tamil Nadu Electricity Board
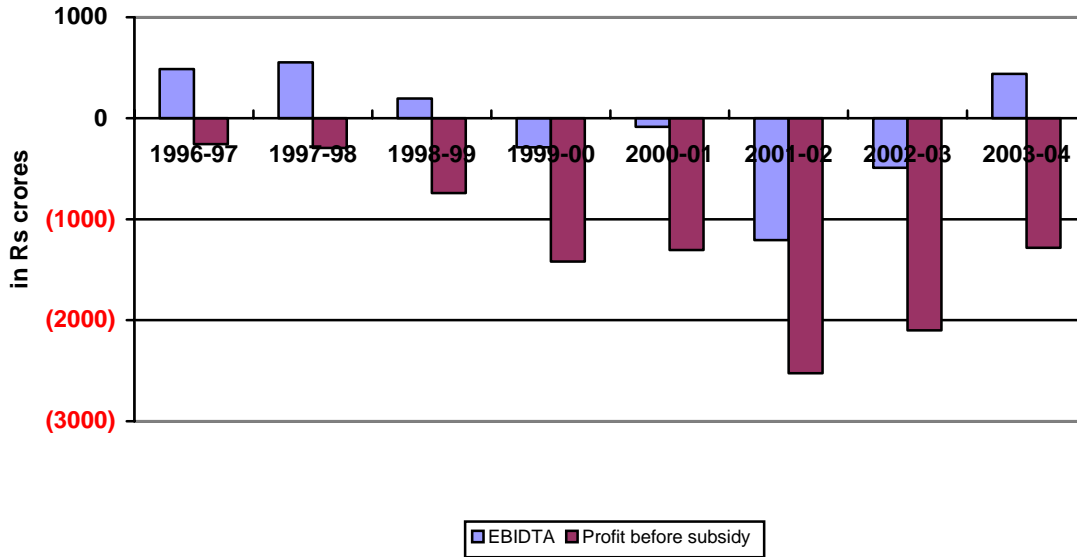
Source: Government of Tamil Nadu.

Figure 7. Average Annual Growth in Budget Components, 1998/99 to 2002/03
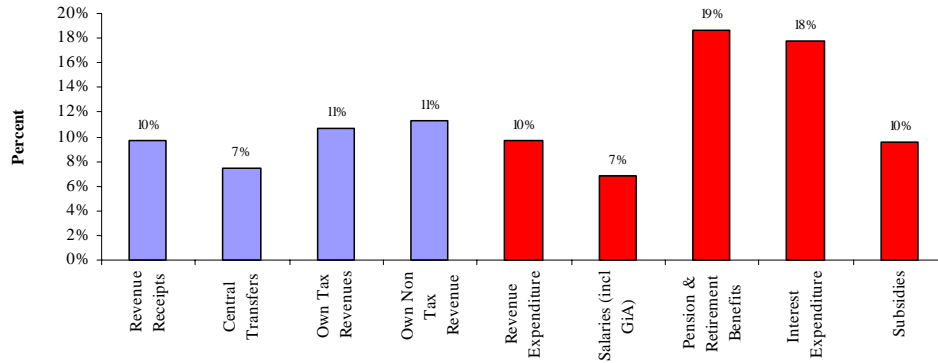
Source: Government of Tamil Nadu budget documents
Note: The salary and pension growth rates of 19 percent and 26 percent still underestimate growth in real liabilities owing to a postponement of salary and pension payments in 2000/01 and 2001/02.

The rapid fiscal deterioration was attributed to a number of reasons, common to all states with varying degree. Expenditures on salaries, retirement benefits, and pensions grew rapidly following the implementation of the Sixth State Pay Commission award along the lines of the Central Fifth Pay Commission's award.[17] Subsidies, particularly food subsidies, grew rapidly (Figure 7). Tamil Nadu's share in central tax devolution declined further following the Eleventh Finance Commission's award. Successive Finance Commissions had reduced the share of Tamil Nadu in the devolution of central taxes from 8.05 percent by the Seventh Finance Commission to 6.64 percent by the Tenth Finance Commission, and further to 5.39 by the Eleventh Finance Commission.[18] New borrowing to support the growing revenue deficit added to the debt and interest burden. Finally, growth in contingent liabilities associated with fiscal support to the public sector units, cooperatives, and the statutory boards increased the fiscal risks.

Although these systemic factors were prevalent even before the crisis, the implementation of the Sixth State Pay Commission's recommendations in April 1998 triggered the fiscal crisis because of the large payouts for back wages and revised salaries. Consequently, the annual, average growth of salary and pension expenditure accelerated from 14.5 percent during 1990/91-1997/98 to 26.7 percent during 1997/98-1999/2000.

Table 1. Debt Dynamics – Case of Tamil Nadu (Percent of GSDP)

	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Stock of debt (b)	16.6	16.4	16.3	16.3	17.3	20.5	22.2	24.9	28.0	27.8
(A) Actual change in debt (db)		-0.2	-0.1	0.0	1.1	3.2	1.7	2.6	3.2	-0.3
Decomposition of change in debt										
(1) Interest payments (i)		1.8	1.8	1.7	1.8	2.1	2.2	2.4	2.7	2.8
(2) Primary balance (x)		0.2	-1.0	-0.6	-2.3	-2.5	-1.8	-1.1	-1.9	0.3
(3) Growth effect (gb/Z)		-0.5	-0.7	-1.2	-0.7	-1.0	-1.4	0.5	-0.6	-1.4
(4) Inflation component ($\pi b/\Pi$)		-1.5	-1.3	-1.1	-1.3	-0.1	-0.7	-0.8	-1.2	-1.2
(P) Predicted change in debt*		*-0.4*	*0.7*	*0.0*	*2.1*	*3.5*	*1.8*	*3.2*	*2.7*	*-0.2*
(A)-(P) Residual term**		*0.2*	*-0.8*	*0.0*	*-1.1*	*-0.3*	*-0.2*	*-0.6*	*0.5*	*-0.1*
Effective interest cost (% of GSDP)		0.2	0.5	0.6	0.5	2.0	1.5	1.6	1.5	1.5
As a percentage of debt		1.4	2.8	3.7	2.8	11.7	7.1	7.3	6.1	5.4

*Predicted change in debt is computed by the authors' following equation (3) as (1)-(2)+(3)+(4).
** Data sources: World Bank and the government of Tamil Nadu.
Note: The years shown in the table denote fiscal years, e.g., 1994 stands for fiscal year 1994/95.

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[17] Every 10 years the Indian government appoints a Central Pay Commission which recommends a wage structure for central government employees. States either adopt the Commission's recommendations to maintain parity with central government pay scales or set up their own individual Pay Commissions that recommend a wage structure for their civil servants after factoring in the Central Pay Commission's recommendations. The previous state government in Tamil Nadu implemented the award in 1998 with retroactive effect to 1996.

[18] Constitutionally mandated Finance Commission convenes every five years to determine the revenue sharing between the center and the Indian states. Finance Commissions – from the Sixth to the Eleventh – gave increasing weights to redistributional factors.

A more in-depth analysis, based on equation (3) in section 2, identifies the key determinants of state debt in Table 1. Growth in state government liabilities reflected both growth in fiscal deficits and accumulation of interest payments on outstanding debt, while growth and inflation were offsetting factors. The small residual terms – below 1 percent of GSDP in all years except 1998 – suggest that the model in section 2 (equation (3)) captures well the actual debt dynamics in Tamil Nadu.

## 3.2 India's subnational borrowing regime

The Indian Constitution forbids states from borrowing abroad and requires them to obtain central permission for domestic borrowing. The central government places informal limits on states' borrowing through the annual discussions with states on financing state development plans. While limiting explosive growth of state debt, the central government has not succeeded in preventing the states' fiscal deterioration as indicated by high levels of debt and debt service over revenue in many states. Bargaining between the center and the states has often prompted the center to give additional loans or relax borrowing limits. Furthermore, since the late 1990s, many states have circumvented the borrowing limits by accumulating arrears or issuing guarantees to public enterprises' market borrowing or newly-created special purpose vehicles.

The state borrowing regime in India is complex. There are multiple borrowing channels – each channel with its own rules. The states can obtain market financing, loans from the central government, and financing from employees' provident fund (Figure 8).[19] Although market borrowing, from the bond market, national small savings fund, and negotiated loans with public-sector financial institutions, has increased in importance, accounting for more than half of subnational borrowing, market discipline is absent. Market loans in India are not pure market-based lending for two reasons. First, market loans are dominated by public commercial banks which have persistently exceeded the statutory requirement of holding government bonds, effectively crowding out private investment. Commercial banks' holding of government securities grew from 14 percent of combined liabilities of the consolidated government to 25 percent between 1991 and 2004.

Second, interest rates on government bonds are the same for all states independent of creditworthiness. States typically approach the market together, and the Reserve Bank of India (RBI) reportedly pushes creditors to buy a mix of state bonds with the better-managed states subsidizing the worse-managing states. In 1999, RBI allowed market borrowing up to 35 percent of a state's total market borrowing allocation. But in reality, state-specific auctions are declining not increasing (World Bank, 2005b).

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[19] The Provident Fund is a cash balance retirement benefit account operated under the Employees Provident Fund Scheme 1952. All employees of a notified establishment under the Act have to be enrolled as members. Employees and employers contribute to the fund at the rate of 12% of monthly wages payable to employees. A member of a Provident Fund can withdraw the full amount at credit in the Fund on retirement from service or after attaining the age of 55 years.

Figure 8. Source of Debt for Tamil Nadu and Indian States
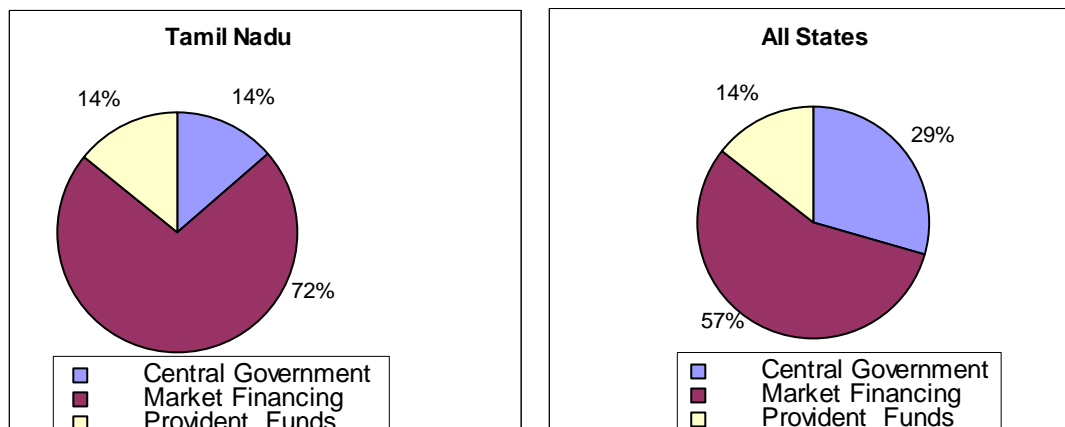
Source: Government documents.

3.3 Fiscal reform and outcome

Reversing fiscal deterioration and putting a state on a sustainable fiscal path is not about finding a magic threshold of debt over GSDP ratio. Instead, it is about reforms aimed at realigning major expenditures in support of economic growth, eliminating structural deficiencies in the tax system, which may not improve primary balance but can accelerate growth and increase the state's ability to service debt. It is also about managing key fiscal risks including contingent liabilities.

The fiscal reform program of the Government of Tamil Nadu, launched in late 2001, was aimed at controlling recurrent expenditures, improving the efficiency of the tax system, restructuring the SOEs, and improving fiscal transparency. Substantive reforms were undertaken from late 2001/02 to 2003/04. [20] A framework for reform was articulated in the government's medium-term fiscal framework. The framework aimed to achieve a primary balance, eliminate the revenue deficit and reduce the consolidated fiscal deficit to 2 percent of GSDP (Table 2).[21] While reducing the consolidated fiscal deficit, the framework expected further re-orientation of expenditure from salaries, pensions, and subsidies to non-wage O&M and capital investments and deepening tax reform.

Fiscal adjustment would be illusionary without addressing the presence and impact of hidden and contingent liabilities. In India, the main hidden liabilities include those associated with pension liabilities, the power sector cross subsidy financing, off-budget borrowing, and guarantees issued to back the market borrowing of loss-making public enterprises. Tamil Nadu's medium-term fiscal plan explicitly incorporated important off-

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[20] The new government of Tamil Nadu was elected in 2001 and launched an ambitious fiscal reform program. The government's White Paper of August 2001 analyzed the systemic causes of the fiscal deterioration and articulated the need for fiscal reform and stabilization in the state. For a more detailed analysis of Tamil Nadu's reform program, see World Bank (2004a, 2004b, 2005a).

[21] The first medium-term fiscal plan was presented to the state legislature in February 2004, along with the state's budget for 2004/05. Since then it has been updated annually.

budget activities and other hidden and contingent liabilities into the multiyear adjustment framework. Off-budget borrowing serviced by the state government, which constituted 2 percent of GDP in 2002/03, was integrated with the state's public debt.[22] Capital works executed in Public Account but financed by off-budget borrowings deposited in the Public Account were fully integrated within the fiscal framework. Comprehensive and robust estimation of accrued pension liabilities and emerging cash flow needs based on the inherent demographics of the workforce replaced the incremental cash budgeting.[23] Finally, the accounts of the state power utility were consolidated with the fiscal account, given the significant amount of the utility's implicit liabilities.

Table 2. Primary, Revenue, Fiscal and Consolidated Deficits as a Percent of GSDP

	1997/98	1998/99	1999/00	2000/01*	2001/02*	2002/03*
Primary Balance	-0.6%	-2.3%	-2.5%	-1.8%	-1.1%	-1.9%
Revenue Deficit	1.1%	2.6%	2.8%	2.1%	1.7%	3.0%
Non Power Deficit (1)	1.4%	4.0%	5.1%	4.1%	3.2%	3.1%
Budgetary Support to Power (2)	0.9%	0.2%	-0.4%	-0.1%	0.2%	1.4%
Budgetary Fiscal Deficit (1+2)	2.3%	4.1%	4.6%	4.0%	3.5%	4.5%
Power Sector Financing Requirement (3)	0.8%	1.2%	1.6%	1.7%	2.0%	1.7%
Consolidated Fiscal Deficit (1+3)	2.2%	5.2%	6.7%	5.8%(a)	5.2%(a)	4.8%(a)
	2003/04*	2004/05	2005/06**	2006/07**	2007/08**	2008/09**
Primary Balance	0.3%	-0.3%	-0.5%	-0.1%	0.5%	0.8%
Revenue Deficit	0.9%	0.9%	0.7%	0.6%	0.3%	0.0%
Non Power Deficit (1)	2.1%	2.5%	2.5%	2.5%	2.2%	1.9%
Budgetary Support to Power (2)	0.3%	0.6%	0.5%	0.1%	0.1%	0.0%
Budgetary Fiscal Deficit (1+2)	2.4%	2.9%	3.0%	2.6%	2.3%	1.9%
Power Sector Financing Requirement (3)	1.1%	1.2%	1.5%	0.6%	0.2%	0.1%
Consolidated Fiscal Deficit (1+3)	3.3%	3.7%	4.0%	3.1%	2.4%	2.0%

Source: The government of Tamil Nadu MTFP (September, 2005).
* The deficits in 2000/01 and 2001/02 underestimate the actual levels because they do not account for non-pension arrears equaling 1.7 percent of GSDP in 2000/01 and 2 percent of GSDP in 2001/02. The deficits in 2002/03 and 2003/04 include partial clearance of Rs.30.62 billion in payment arrears accumulated from the late 1990s.
** Indicates projections.
Data for 2002/03 include clearance of arrears equal to 2 percent of GSDP. Deficits for 2003/04, 2004/05, and 2005/06 include clearance of pension arrears from 1999/00.

On the expenditure side, efforts were made at controlling the growth of pensions and wages, reducing major subsidy programs and improving their targeting. Figure 9 summarizes annual growth of key expenditure components for three distinct periods: pre-crisis, crisis period, and reform period. As the figure shows the reform efforts resulted in a slowdown of growth in pensions, subsidy, salaries and interest expenditure whereas

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[22] The ratio was small relative to that of other states. However, this practice increased the transparency of the budget and ensured that any future growth in these types of borrowing will be monitored closely.
[23] The authors were part of the World Bank team that worked with the state government to incorporate off-budget liabilities into the fiscal framework.

expenditure on non-wage operations and maintenance expenditure and transfers grew because the state could better utilize resources under central schemes.

The state government has four major sources of revenue – own tax and non-tax revenue, transfers from central taxes, and plan and non-plan grants received from the Government of India (GoI) (Figure 10).[24] The vast proportion of Tamil Nadu's own tax revenue has come from a state sales tax (69 percent), a state excise tax (10 percent), stamp duties and registration fees (8 percent), and motor vehicle taxes (6 percent). With own tax revenue of 9.3 percent as a share of GSDP in 2003/04, Tamil Nadu's revenue performance ranked high compared to other Indian states.

A major tax reform effort was aimed at improving the efficiency of the sales tax system which suffered from multiple layers of taxes and a complex rate structure, cascading, frequent and ad hoc changes, and extensive exemptions. The state has been preparing for a value-added tax (VAT) which is expected to resolve many problems associated with the sales tax system. The state has also reformed its stamp duty system. In an effort to reduce tax evasion, the government lowered the tax rate on property transactions, and improved its administration. On the non-tax side, the government's efforts to increase cost recovery have had some success but have been limited due to political considerations.

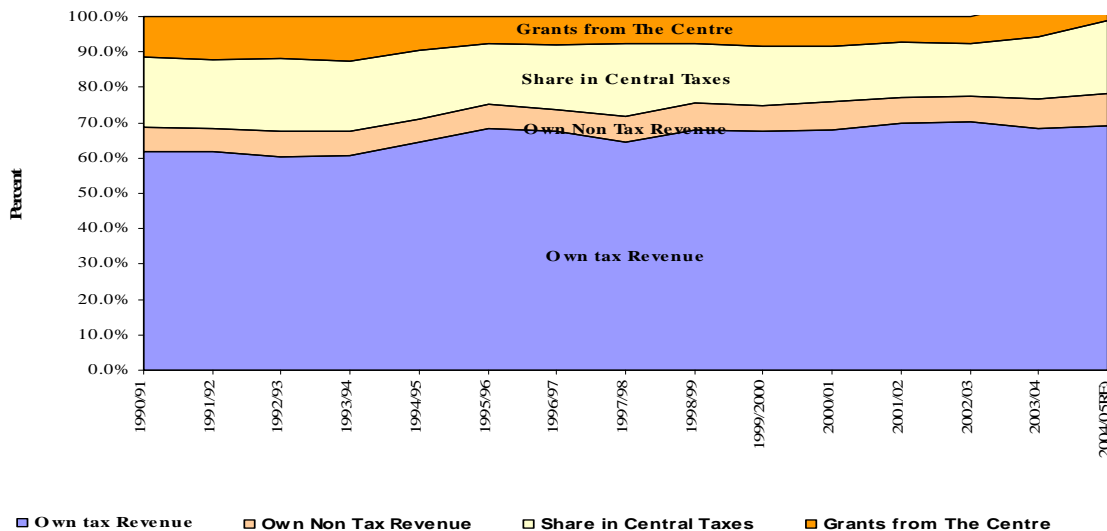**Figure 9. Recurrent Expenditure Components (Cumulative Growth)**
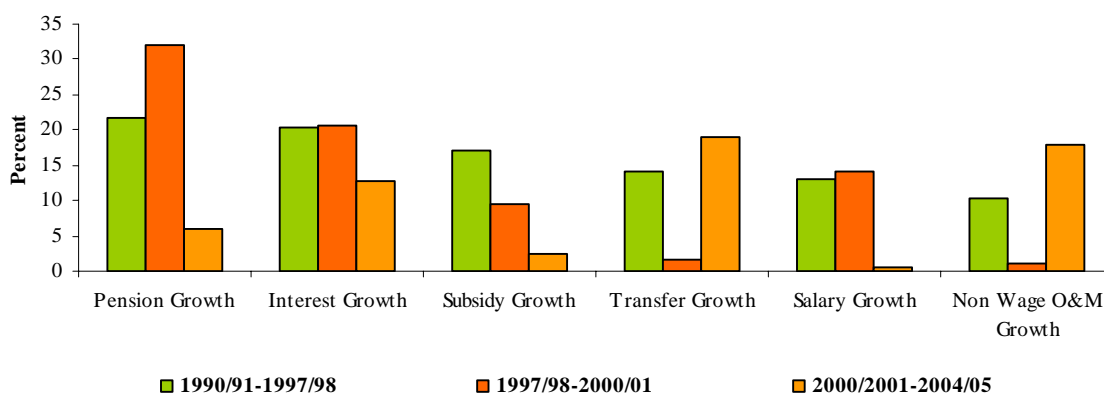
Source: Government of Tamil Nadu Budget Documents.

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[24] Grants under the Fiscal Reform Facility of the GoI and certain technical up-gradation grants come as non-plan grants.

Figure 10. Share of Revenue Sources in Total Receipts

Source: Government of Tamil Nadu budget documents.

Tamil Nadu achieved a number of positive outcomes since the reform launch in the late 2001. A large portion of arrears (2 percent of GSDP) was cleared in 2002/03. Furthermore, the consolidated fiscal deficit was reduced from the peak of 6.7 percent of GSDP in 1999/00 to 3.3 percent in 2003/04 (Table 2).[25] The fiscal adjustment was largely attributed to an increase in the ratio of the state's own tax revenue to GSDP (from 8.6 percent in 1999/00 to 9.4 percent in 2003/04) and a reduction in the ratio of salaries to GSDP (from 6.5 percent in 1999/00 to 4.7 percent in 2003/04). Unfortunately, capital outlays and net lending suffered a reduction equal to 0.4 percent of GSDP due largely to lack of financing.

The financial performance of the state power utility also improved mainly due to improvements in operational efficiency, bill collection, and anti-theft measures. Estimates suggest that the earnings before interest, taxes, depreciation and amortization (EBIDTA) improved from negative Rs.12.07 billion in 2001/02 to negative Rs.4.98 billion in 2003/04 and the net loss before subsidy decreased from Rs.18.54 billion to Rs.3.90 billion over the same period. The financial performance of the state transport units also improved, with their net loss reducing by 98.6 percent between 1999/00 and 2002/03. Outstanding guarantees fell from 7.5 in 1999/00 to 6.4 percent of GSDP in 2003/04, lower than those of many Indian states.

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[25] The consolidated deficits in 2000/01 and 2001/02, which were respectively 5.8 percent and 5.2 percent of GSDP, underestimated the real deficits as they did not reflect the accumulation of non-pension arrears equivalent to 1.7 percent of GSDP in 2000/01 and 2 percent of GSDP in 2001/02.

Since April 2004 some critical reforms have been rolled back,[26] revealing the structural risks to fiscal adjustment and sustainability.[27] Strong revenue growth has enabled the state to absorb the current expenditure impact of the reform reversals momentarily. In 2004/05, overall revenue was greater than originally projected by the government. The increase was driven by stronger than anticipated growth in state's own tax revenue, due to a strong upturn in the state's economy, and much more robust devolution from the center. On the expenditure side, higher than projected subsidies and transfers due to the reform rollbacks were more than compensated by lower than projected outlays on salaries and pensions as the government withheld inflation-indexed salary and pension increases.

4. Subnational Fiscal Sustainability Analysis

This section analyzes the sustainability of Tamil Nadu's fiscal policy using the framework in section 2. We analyze debt dynamics and fiscal sustainability scenarios in the context of India's macroeconomic policies and intergovernmental revenue-sharing system. We keep unwarranted optimism in check by discussing key risks to subnational fiscal sustainability and examining the sensitivity of the baseline projections to changes in the underlying baseline assumptions.

4.1 Baseline analysis

We start by assessing fiscal sustainability in a baseline covering the period 2003/04-2026/27, based on World Bank projections of real interest and inflation rates in India, and the state government's projections for real GSDP growth rates and primary fiscal balances as specified in the state government's Medium-Term Fiscal Plan as of September 2005 (see Box 1).

The results suggest that Tamil Nadu has embarked on a fiscally sustainable path. Government debt is projected to decline from 28 percent of GSDP in 2003/04 to 16 percent of GSDP by 2026/27. The projected continuation in the state's fiscal adjustment, strong economic performance and favorable macroeconomic conditions, as manifested in relatively low real interest rates, are the main reasons for reducing Tamil Nadu's projected debt burden (Table 3). The analysis suggests that Tamil Nadu's fiscal policy promises to be sustainable in the long-run (after year 2021/22).

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[26] The rollback included restoring free power to all farmers, reducing power tariffs for domestic consumers, restoring free/subsidized bus services to private schools and college students, withdrawing income ceiling for public distribution system access, and eliminating rice coupons.

[27] The exogenous shock to the state from the Tsunami in 2004 has been cushioned mainly through grants from the central government, hence it has had little impact on the borrowing requirement of the state.

Box 1. Assumptions Underlying Debt Sustainability Projections

The **initial level of the state government debt** is 27.8% of GSDP, its level at the end of 2003/04.

The **primary deficit** of the state government would deteriorate from 0.3% of GSDP in 2004/05 to 0.5% of GSDP in 2005/06, after which it will gradually improve to 0.1% of GSDP in 2006/07, turning into a surplus of 0.5% of GSDP in 2007/08 and widening this surplus to 0.8% of GSDP in 2008/09. It is assumed that the surplus will stay at 0.5% of GSDP thereafter.

The **real interest rate** of 5.5% comes from the macroeconomic projections of the World Bank's Indian Development Policy Review (World Bank 2004c) report. After 2007/08 the real interest rate declines to 5% and stays at this rate thereafter.

The **inflation rate** is assumed to remain at 5% on the basis of the macroeconomic projections of the World Bank's Indian Development Policy Review (World Bank 2004c) report.

The **real economic growth rate of the state** is assumed to be 8.5%, 6.5%, 6.0% for years 2004/05 through 2006/07 and staying at 6% for six more years, then gradually declining to 4.5% in 2021/22 and staying at this rate thereafter.

Note: Nominal interest rate is calculated as: $r\_n = (1+r\_r)(1+pi)-1$, where pi is inflation, r_r is real interest rate.

Table 3. Baseline Simulation with Fiscal Reform as Proposed in the MTFP

Assumptions*	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Real interest rate (r)		5.5	5.5	5.5	5.5	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Real growth rate (g)		8.5	6.5	6.0	6.0	6.0	6.0	6.0	6.0	6.0	5.8	5.7
Primary surplus (x)		-0.3	-0.5	-0.1	0.5	0.8	0.5	0.5	0.5	0.5	0.5	0.5
Debt dynamics **												
Debt (% of GSDP) (b)	27.8	27.3	27.5	27.5	26.9	25.8	25.1	24.4	23.7	23.0	22.3	21.7

	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026
Real interest rate (r)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Real growth rate (g)	5.5	5.3	5.2	5.0	4.8	4.7	4.5	4.5	4.5	4.5	4.5	4.5
Primary surplus (x)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Debt dynamics **												
Debt (% of GSDP) (b)	21.1	20.5	20.0	19.5	19.0	18.6	18.2	17.8	17.4	17.0	16.6	16.2

*Assumptions on interest and inflation rates are based on the World Bank projections in the India Development Policy Review (World Bank 2004c). The assumptions on growth and the primary balance are based on the government of Tamil Nadu MTFP and, after 2009, authors' estimates.
** Source: Authors' simulation based on equation (4).
Note: The years shown in the table denote fiscal years, e.g., 2003 stands for fiscal year 2003/04.

4.2 Sensitivity analysis

One of the main shortcomings of the simple analytical models for assessing fiscal sustainability in general is that they seldom take into account the effects of uncertainty. Most of the fiscal sustainability studies use modeling frameworks without uncertainty (Burnside 2004). This can introduce bias in the policy recommendations. For instance, one might conclude that a policy is sustainable or not, but little is said about the probability with which a government might become insolvent or the risks to fiscal sustainability.

Recent studies propose different methods for bringing uncertainty into the analysis (Barnhill and Kopits, 2003; IMF, 2002 and 2003; Xu and Ghezzi, 2003; Mendoza and Oviedo 2004 among others). The model by Barnhill and Kopits (2003) and that by Xu and Ghezzi (2003) measure the government's net worth as an explicitly stochastic process and assess the probability of government default. Mendoza and Oviedo (2004) construct an explicitly stochastic model to explain the apparent inability of governments in emerging markets to borrow as much as governments in industrial countries.

Burnside (2004) reviews these papers and asserts that while there are important lessons to be learned from the proposed methods qualitatively, critical problems with each method suggest no major improvements of the forecasting power of quantitative fiscal sustainability exercises. He argues that only IMF (2002) provides a thorough discussion that can be of use to practitioners, while IMF (2003) formalizes the sensitivity analysis and offers a method for computing confidence intervals around the debt path by estimating a VAR model and using Monte Carlo or bootstrap procedures. However, while the IMF approaches to dealing with uncertainty are easily applied, they too suffer from specific flaws as alternative scenarios draw only loosely on the past distribution of variables that matter in the simulation.

A recent paper by Celasun, Debrun and Ostry (2006) proposes a probabilistic approach to public debt sustainability analysis using "fan charts" which depict the magnitude of uncertainties affecting debt projections. Their simulation algorithm for the path of public debt combines the effects of economic disturbances, the endogenous policy response to these, and the possible shocks arising from the fiscal policy itself. Lack of historical time series data however impedes the application of the VAR technique in IMF (2003) and the one in Celasun, Debrun and Ostry (2006).

We therefore proceed by following the method in IMF (2002). We compliment the analysis with an in-depth discussion of key fiscal risks and constraints to fiscal adjustment. First, we set key parameters at their historical averages for the period 1991-2001. This allows us to illustrate the ambitiousness of the baseline projection relative to historical experience, including, for instance, whether the adjustment envisaged in the baseline projection far exceeds the state's historical norm. The historical averages, including the impact of the fiscal crisis in the late 1990s, are the outcome of national and subnational policies. Risks inherent in these policies are not completely eliminated, which could exert negative influence on the debt path.

We consider also the impact of an adverse two-standard deviations combined shock to all key parameters, lasting for two consecutive years. Although we undertake scenarios in which one of the variables moves away from its historical average by two standard deviations while the others remain constant, Burnside (2004) considers such scenarios extremely improbable. Highly unlikely are also scenarios in which inflation and interest rates move in opposite directions. Thus, we consider the joint impact of a change in the real interest rate and a negatively correlated change in the primary balance and the real GSDP. We set the real interest rate at its historical average for the period 1991-2001 plus one standard deviation, while the GSDP and the primary balance are at the historical

average minus one standard deviation.[28] The standard deviation and the averages are computed based on historical data for Tamil Nadu.

The first sensitivity test sets the real effective interest rate, the real growth rate and the primary balance after 2006/07 at their historic averages for the period 1990/1991-2000/01. Strong economic performance in the 1990s[29] and low real interest rates[30]– a result of government controlled interest rates in the first part of the 1990s before economic liberalization – allow the government to run a primary deficit that is more than twice the deficit assumed in the baseline without increasing significantly its debt burden. The debt to GSDP ratio grows from 27.8 percent in 2003/04 to around 34.6 percent in 2026/27. This debt burden is however twice the size of the debt burden in 2026/27 in the baseline implying that the fiscal adjustment program of the state government is ambitious by historical standards.

Since the government of India liberalized interest rates in the second part of the 1990s, the historic average for the real interest rates is no longer relevant. Therefore, the second sensitivity test sets the real interest rate at 5 percent after 2007/08 as in the baseline, while leaving the real growth rate and the primary balance after 2006 at their historic averages for the period 1990/91-2000/01. Comparing the paths of the debt to GSDP ratio in Table 3 and Table 4, one clearly sees the costs of loose fiscal policy. Persistent primary deficits of 1.3 percent of GSDP imply that Tamil Nadu's debt burden will rise to 50.4 percent as a share of GSDP by 2026/27 - a debt burden that is more than 3 times the one in the baseline, while its debt service will be 20 percent of revenue – a threshold which the central government considers an indicator of fiscal stress.[31]

Unexpected, adverse shocks of nonpermanent nature do not threaten long-run fiscal sustainability. For instance, a negative shock of two standard deviations from the historic mean, in either, the real interest rate, the real growth rate or the primary balance, which occurs in two consecutive years (2005/06 and 2006/07), will not increase the debt burden of the state. However, a combined negative shock of one standard deviation from the historic means in the real effective interest rate ($\mu_r + \sigma_r$ =6 percent),[32] the real growth rate ($\mu_g - \sigma_g$ =1.3 percent), and the primary deficit ($\mu_x - \sigma_x$ =-2.2 percent) that occurs in two consecutive years (2005/06 and 2006/07) will nearly double the debt burden expected in

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[28] It is difficult to determine the likelihood of a one standard deviation shock without knowing the probability distribution. Assuming a normal distribution, the probability of a one-standard deviation, combined shock to the primary balance, real interest and growth rate is 15.9 percent if the shocks are perfectly correlated. If the shocks are perfectly uncorrelated, the probability declines to 0.4 percent.

[29] The average, annual real GSDP growth in Tamil Nadu in the 1990s was 6.4 percent.

[30] The average, real interest rate in Tamil Nadu in the period 1991-2001 was 2.3 percent.

[31] We assume that revenue will grow so that its share of GSDP remains at 12.5 percent, its projected value for 2008/09 in the MTFP.

[32] The implied standard deviation from the historical mean of the real interest rate is 3.76 percentage points. It is large as it reflects the impact of interest rate liberalization in India in the 1990s.

Table 4. Sensitivity Analysis – Historic Perspective

Assumptions*	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Real interest rate		5.5	5.5	5.5	5.5	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Real growth rate		4.0	5.0	5.7	5.7	5.7	5.7	5.7	5.7	5.7	5.7	5.7
Primary surplus		-0.3	-0.5	-0.1	-1.3	-1.3	-1.3	-1.3	-1.3	-1.3	-1.3	-1.3
Debt dynamics** Debt (% of GSDP)	27.8	28.5	29.1	29.2	30.4	31.5	32.6	33.7	34.8	35.9	37.0	38.0
	2015	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**	**2026**
Real interest rate	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Real growth rate	5.7	5.7	5.7	5.7	5.7	5.7	5.7	5.7	5.7	5.7	5.7	5.7
Primary surplus	-1.3	-1.3	-1.3	-1.3	-1.3	-1.3	-1.3	-1.3	-1.3	-1.3	-1.3	-1.3
Debt dynamics** Debt (% of GSDP)	39.1	40.2	41.2	42.3	43.3	44.3	45.4	46.4	47.4	48.4	49.4	50.4

*Primary fiscal balance set at its average value for the period 1991-2001. Interest rates set as in Box 1.
**Authors' simulation based on equation (4).
Note: The years shown in the table denote fiscal years, e.g., 2003 stands for fiscal year 2003/04.

2026/27 compared to the baseline, but will not threaten fiscal sustainability. The probability of such an event happening is less than 16 percent.[33]

An unexpected, adverse combined shock of a more permanent nature (low growth, high real interest rates and large primary deficits over a period of 5 to 10 years) will have grave consequences and eventually require a major fiscal adjustment. If the combined negative shock persists for 10 years debt service as a share of revenue will climb to 31 percent and the debt to GSDP will climb to 65 percent of GSDP by 2015/16. To avoid further increases in debt as a share of GSDP the state government will need to run large surpluses – between 2 and 3 percent of GSDP – in the years to come unless growth improves and real interest rates decline. This is unlikely to be feasible given the constraints to fiscal reform discussed above.

4.3 Capital investment and fiscal space

The baseline results suggest that, if the economy evolves as presented in Table 3, Tamil Nadu could reduce debt to GSDP ratio from 27 percent in 2006/07 to 16 percent in 2026/27. This implies that there may be scope for improving the low level of infrastructure investment without derailing the state from its sustainable debt path. Tamil Nadu's rate of economic growth surpassed the national average GDP growth rates of 5.6 percent in the 1990s. This has placed the state among the best performing states in India. However, its potential economic growth is hindered by infrastructure deficiencies. Although the IT

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[33] Assuming a normal distribution, the probability of a one-standard deviation shock to the real interest rate is 15.9 percent. However, it is very likely that the interest rate shock will trigger negative shocks to the real growth and the primary deficit. If the shocks are perfectly correlated, the probability of the combined shock is 15.9 percent. If they are perfectly uncorrelated, the probability is negligible.

sector has performed well, infrastructure-dependent sectors such as heavy and light industries have been constrained by the poor state of infrastructure (World Bank and Confederation of Indian Industry 2002, 2005; World Bank 2004b).

Numerous authors have argued the positive impact of infrastructure investment on economic growth in developed and developing counties (Aschauer 2000, Estache and Liu 2003, Canning and Bennathan 2000; Briceno *et al*. 2004, Easterly and Serven, 2003). In this paper, we are interested in knowing to what extent Tamil Nadu can accelerate infrastructure investment without increasing its debt service payments above the debt stress threshold of 20 percent of revenue and its debt burden above its level in 2006/07.

Public infrastructure investment by Indian states has stayed below 3 percent of their GSDP since the 1990s. In Tamil Nadu capital expenditure was lower than 3 percent varying between 1.5 and 2 percent of GSDP over the same period. We therefore simulate the impact of an increase in Tamil Nadu's capital expenditure to 3 percent of GSDP starting in 2008/09. We assume that real economic growth and interest rates will remain as in the baseline, and there will be no effect on the state's revenue. We abstract from questions about the efficiency and effectiveness of public expenditure on infrastructure investment that are critical to economic growth.[34]

We find that under these assumptions, the debt to GSDP ratio will gradually climb from 27 percent in 2008/09 to 39 percent by 2026/27, but its debt service payments will increase to only 15.9 percent of revenue over same period – an indicator that is below the debt stress ratio of 20 percent (Figure 11). This suggests that there is "fiscal space" for Tamil Nadu to increase capital investment through additional borrowing without jeopardizing its debt service capacity.

Tamil Nadu may even avoid the increase in the debt burden,[35] if its annual real economic growth accelerates to 7.6 percent – an increase of 1.6 percentage points from its expected growth rate in 2008/09.[36] Evidence suggests that such an increase in real economic growth is possible. Estimates indicate that states such as Tamil Nadu could gain as much as 1.5 percentage points per annum in real growth from improving investment climate, particularly infrastructure (World Bank and Confederation of Indian Industry 2002). This implies that there may be "macroeconomic space" for Tamil Nadu to increase capital investment without jeopardizing its fiscal sustainability.

4.4 Key fiscal risks to sustainability

Although the baseline points to a sustainable debt path for Tamil Nadu, there are significant risks that may derail the state's progress along this path. Key risks are potential increases in real interest rates, constraints to primary balance adjustment, and sudden realization of contingent liabilities.

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[34] Public infrastructure investment is increasingly perceived as a complement, rather than a substitute to private sector infrastructure investment.

[35] In other words, it may manage to keep its debt burden at its 2006/07 value of 27.5 percent of GSDP.

[36] This simulation does not take into account any positive effects on state revenue. If these effects are taken into account, the required increase in growth will be smaller than 1.6 percentage points.

Figure 11. Impact of Increased Investment
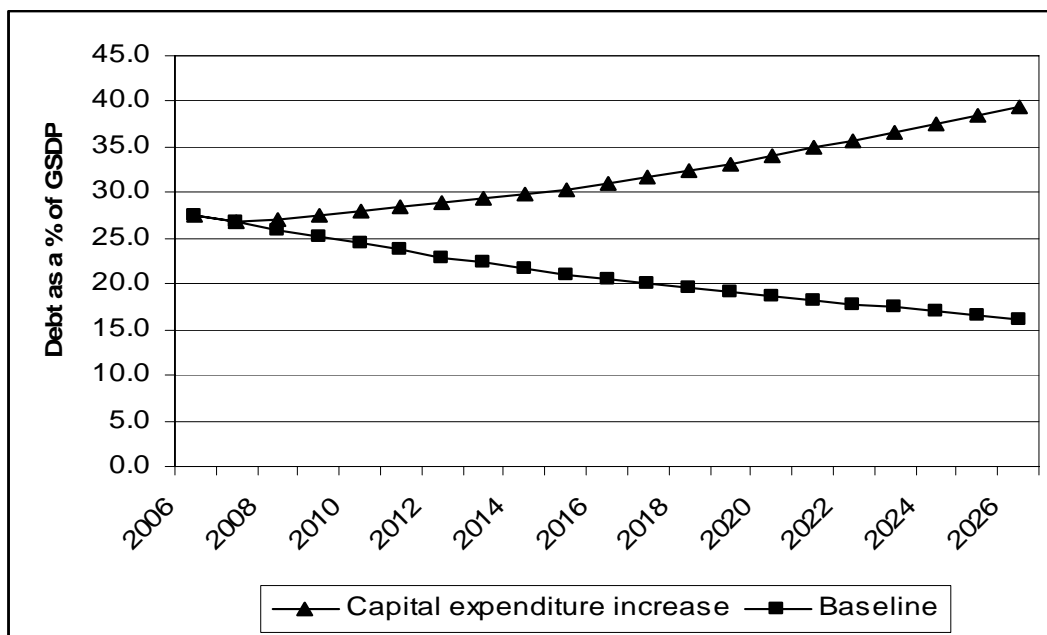
Source: Authors' simulation based on equation (4). Investment increases to 3 percent of GSDP from 2008/09 onwards, while all other assumptions remain as in baseline. Note: Tamil Nadu's debt service payments increase to only 15.9 percent of revenue over the same period – an indicator that is below the debt stress ratio of 20 percent.

4.4.1 Interest rate risk

In 2002/03 interest expenditure reached the debt stress level of 20 percent of revenue. Rising interest expenditure contributed to the increase of the fiscal deficit (accounting for over 60 percent of the fiscal deficit in some years), which itself increased almost seven times in absolute terms over the period. The result was an increase in borrowing and debt accumulation at an average borrowing cost[37] that escalated from 9.7 percent in 1991/92 to 12.5 percent in 2000/01, due to high interest rates on some forms of borrowing.

Interest rates have declined since 2000/01 as a result of changes in monetary and fiscal policy and the decline in international interest rates. These have led to deliberate reductions in bank and risk-free interest rates.[38] The cuts in nominal interest rates have reduced the average borrowing cost of the Government of Tamil Nadu to 10.7 percent in 2003/04 and stabilized interest expenditure at 20 percent of revenue. Together with other measures of expenditure restructuring, decline in interest expenditure has helped reduce the fiscal deficit and the borrowing requirement.

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[37] Average borrowing cost is defined as the share of interest expenditure in the outstanding debt stock.

[38] The risk free interest rate on tax saving instruments such as the national small savings scheme has been gradually lowered from 9.5 percent in 2001 to 8 percent in 2003. The bank rate, which is the lending rate of the Reserve Bank of India, has been gradually reduced from 8 percent in 2000 to 6 percent in 2003. The cash reserve ratio for commercial banks has also declined from 8.25 percent in 2000 to 5 percent in 2004. This has had the effect of increasing the liquidity in the banking system.

However, the risk of rising interest rates is real. The persistent combined central and states deficit (8.3 percent of GDP in 2004/05), especially the combined revenue deficit (2.6 percent of GDP in 2004/05),[39] is the most significant macroeconomic risk in India. Since the late 1990s, the pressure of government borrowing has not translated into higher interest rate due to expansionary monetary policy and sluggish investment demand from the private sector. However, the recent recovery of the manufacturing sector and higher overall economic growth could lead to increased demand for credit. Rising interest payments can compel the government to resort to inflationary finance, which will then raise interest rates and damage macroeconomic credibility. As long as public debt remains high, the sustainability of the fiscal stance is vulnerable to an increase in interest rates.

The interest rate risk has also increased following an upturn in international interest rates. Interest rates in India have already begun moving up with the weighted average interest rate on state government securities increasing by 30 basis points in 2004/05 compared to 2003/04. An exogenous shock to domestic interest rates could hurt economic growth, resulting in adverse debt dynamics and threatening fiscal sustainability. For example, a hypothetical 3 percentage point increase in the real interest rate in India after 2005/06 will more than double the debt burden of Tamil Nadu expected in 2026 compared to the baseline and bring debt service spending as a share of revenue above the stress level of 20 percent.

The debt maturity structure has important bearing on rollover risks. One trigger of the Mexican debt crisis in the mid-1990s was the short maturity of subnational debt - 6.6 years on average at the end of 1994, which led to an increasing share of principal payments from subnationals' annual shared revenue. The short maturity structure, combined with floating interest rates, constituted the main vulnerabilities of Mexico's subnational debt structure. A rapid currency depreciation, a sharp rise in interest rates, and a sharp contraction in the pool of shared revenues eventually triggered massive subnational debt defaults.

In Tamil Nadu, and other Indian states, disaggregate data on debt maturity are not yet readily available. However, the rollover risks for Tamil Nadu are low because interest rates are fixed and maturities of different types of debt are long. The debt owed to the GoI (14 percent of total debt as of 2004/05) and the liabilities of the provident fund (14 percent of total debt as of 2004/05) have maturities of 10 to 20 years. Market financing (72 percent of debt as of 2004/05) which includes government bonds, small savings borrowing and institutional loans, also has relatively long maturity. The original maturity for government bonds is about 10 years. Institutional loans have a maturity between 5 and 10 years depending on source. National small savings loans have a maturity of 25 years with a moratorium of 5 years.

4.4.2 Challenges in primary balance adjustment

The sustainable debt path as depicted in the baseline scenario assumes continuation of the fiscal adjustment launched since 2000. However, the forces that triggered the fiscal crisis

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[39] The reported fiscal and revenue deficits do not account for arrears, off-budget liabilities of public sector units, and contingent liabilities.

in the late 1990s could operate again and threaten the state's fiscal sustainability. Moreover, the Twelfth Finance Commission, which mandates the states to eliminate revenue deficits and reduce fiscal deficits, does not spell out the compliance and enforcement mechanism of the process[40] thus leaving open questions about the quality of fiscal adjustment.

On the expenditure side, the risk is that the next central pay commission may increase wages and pensions. The fifth pay commission's decision directly contributed to the rapid increase in wages and pensions without accompanying reduction in civil service employment. The sixth central pay commission has been announced but has not yet begun work on determining civil servants' salaries. Since the central pay commission's decisions have been historically emulated by states, we assume that a hypothetical 20 percent increase in civil servants' salaries will translate into a 20 percent increase in Tamil Nadu's wage bill after 2008/09. Assuming strong growth and moderate borrowing costs, as in the baseline, and no corresponding downward adjustment in employment, the wage shock will increase the debt burden in 2026/27 by 60 percent compared to the baseline, but not the debt service as a share of revenue.

Political impulse could also push up the number of civil servants and backtrack or slow down pension reform. The magnitude of pension liabilities is a major concern for Indian states as it is difficult to reduce these liabilities due to the long-term nature of pension policies, the acquired rights of existing employees, the aging civil servants, and the need for the government to contribute to a new defined contribution scheme.

Another source of expenditure pressure comes from various subsidies. For example, such pressure would intensify if cost recovery for public utilities continues to be politically difficult. If distortions in the public power sector persist, more industry groups may exit the public power grid, thus intensifying the power company's financial problems, which will put further pressure on the state to extend assistance to the power company.

The potential for increasing substantially the state's tax revenue is limited in the medium to long term, and in part depends on the evolution of the intergovernmental finance system. Tamil Nadu's own tax revenue effort is already among the highest compared to other Indian states, about 10 percent of GSDP. Moreover, India's Constitution restricts the taxation power of states. The central government reserves the right to tax the service sector, which is the fastest growing sector in Tamil Nadu. In general, India's Constitution limits the power of states in setting tax policy for major categories of taxation which are all in the domain of the central government. Finally, successive central Finance Commissions had reduced Tamil Nadu's share in the pool of net shareable central taxes from 8.0 percent (Seventh Finance Commission) to 5.4 percent (Eleventh Finance Commission). Consequently, the contribution of central taxes to Tamil Nadu's revenue declined from 21 percent in 1992/93 to 15 percent in 2002/03.

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[40] The Twelfth Finance Commission details the incentives for restructuring central government debt of states and annual write-offs of debt repayments to the center.

The experience of other states suggests that the introduction of a VAT does not affect negatively tax revenue collection. During the first seven months of VAT implementation from April to October 2005, sales tax revenue in the 25 VAT implementing states showed an increase of 14 percent which is higher than the compound annual growth rate of these states in the last 5 years.

The Twelfth Finance Commission has increased the incentives for responsible sub-national fiscal behavior. The major reform initiative that underpins the Twelfth Finance Commission's award is debt consolidation and waiver scheme for fiscally responsible states. Its twin recommendations provide an incentive for fiscally responsible behavior by relating the annual write-off of state government debt to the amount of reduction in the current deficit. To get access to the debt write-off scheme states are required to enter into an agreement with the central government based on a medium-term fiscal policy that seeks to eliminate the current deficit and reduce the overall fiscal deficit to 3 percent of GSDP by 2008/09. Tamil Nadu, for instance, can have as much as Rs. 17.17 billion of central government debt written off between 2005 and 2009. The potential write-off is Rs. 322 billion for all states. It is unclear, however, if the incentive offsets the effect of a parallel deficit grant distribution which has been gap-fill in nature, and has affected adversely the incentives for prudent fiscal policy at the subnational level.

The Twelfth Finance Commission has also departed from its long-standing tradition of giving greater weight to equity than economic performance.[41] For Tamil Nadu, this implies reversing the past trend of diminishing state's share in the pool of sharable tax revenue. Nonetheless, it is unclear how the future Finance Commissions will decide on the distribution of sharable revenues in light of growing economic disparities among Indian states. Fiscal sustainability of Tamil Nadu may be affected negatively if the Finance Commission starts increasing the weight on equitable distribution of sharable tax revenue.

We assume that revenue stagnation, a decrease in central devolution, and an increase in subsidies (food, power, and SOEs) may constrain fiscal balances and result in a primary deficit of 0.5 percent of GSDP after 2006/07. Assuming strong growth and moderate borrowing costs, as in the baseline, this hypothetical fiscal deterioration implies that the debt burden will slowly increase to 37 percent of GSDP in 2026/27.

Individually, the policy risks discussed in section 4 may not threaten fiscal sustainability, but their combined effect may have serious consequences for debt sustainability. A thought experiment which involves a 3 percentage point increase in the baseline real interest rate, a percentage point decline in the baseline real GSDP growth, and a deteriorating primary balance, reflecting revenue stagnation, decrease in central devolution, subsidy increases after 2005/06, and the wage shock after 2008/09, will result in dramatically worsened debt dynamics.[42] Under this scenario the debt service payments are expected to be 56 percent of

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[41] The Twelfth Finance Commissions, reduced the redistributive factor in the formula for allocation of shared taxes from 70 percent to 50 percent, increased the fiscal incentive factor from 12.5 percent to 15 percent, and increased the distribution neutral factor from 17.5 percent to 35 percent.

[42] Under this scenario the primary deficit is expected to deteriorate from 0.5 percent of GSDP in 2007/08 to above 1 percent of GSDP between 2008/09 and 2018/19, before it returns to 0.9 percent of GSDP after 2018/19.

revenue – a ratio that is nearly three times the debt stress threshold of 20 percent, while the debt burden is expected to be nearly 90 percent of GSDP in 2026/27 (Figure 12).

Figure 12. Policy Risks in Tamil Nadu
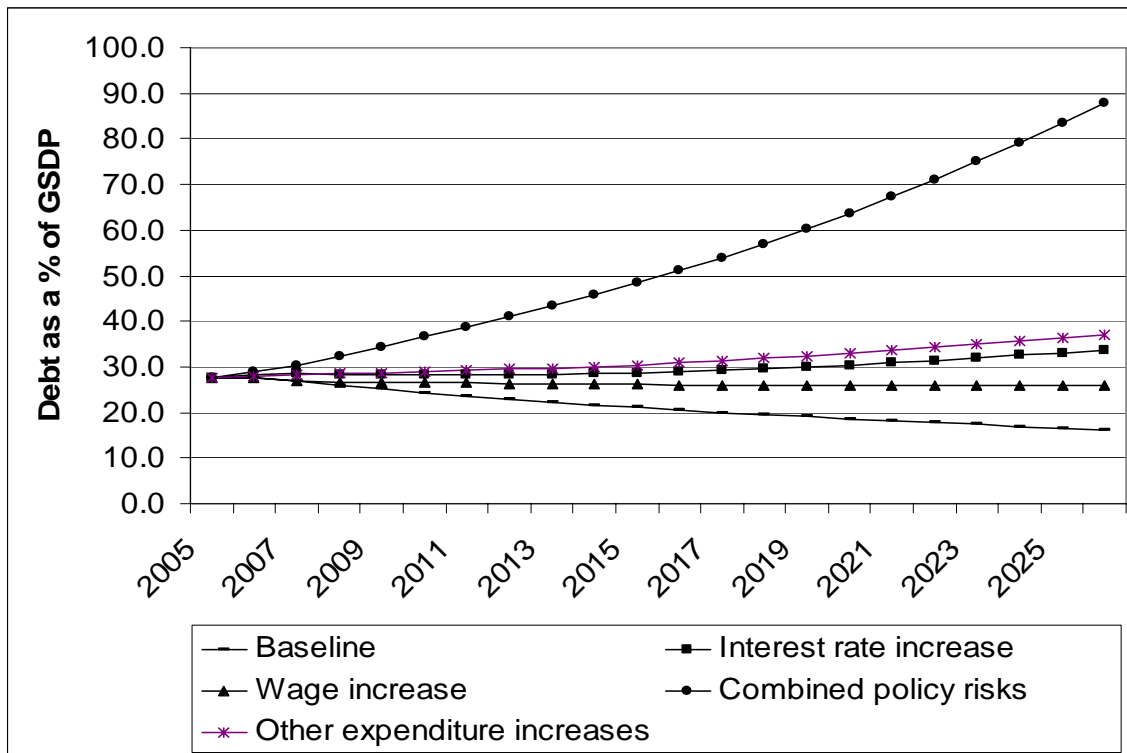
Source: Authors' simulation based on equation (4).

4.4.3 Contingent liabilities

Although the maximum contingent liabilities as a share of GSDP are lower in Tamil Nadu than in some other Indian states, they constitute a risk to the state's long-term fiscal sustainability. In 2002/03, the government's guaranteed debt was estimated at 8 percent of GSDP.[43] An unexpected realization of these contingent liabilities would not only augment government debt, but could also lead to rising effective borrowing costs, and possibly to a fall in real output.

Suppose state liabilities as a share of GSDP jump by 8 percentage points in 2006/07 as a result of realized contingent liabilities from government guaranteed debt.[44] Suppose that this jump in state liabilities triggers an increase in nominal effective interest rates by 2 percentage points and a 1.5 percent drop in real growth rates.[45] Our simulations suggest that in this case the government will need to run a surplus of 1.2 percent of GSDP in order

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[43] Source: Government of Tamil Nadu.
[44] We assume in this experiment that the government assumes responsibility for all of its government guaranteed debt.
[45] Unless it is a part of widespread fiscal deterioration affecting many Indian states, this scenario is unlikely to occur since all states pay the same premium regardless of risk.

to ensure that state debt will not rise above 35 percent of GSDP. If government liabilities are risk weighted, the contingent liabilities at risk of default will decrease to about 3.4 percent of GSDP.[46] This suggests a smaller required surplus of about 1.1 percent of GSDP.

5. Concluding Remarks

Assessing fiscal sustainability is a complex task as it requires one to form a view about how much fiscal adjustment is politically and socially feasible in the future, and how the outstanding stocks of liabilities are going to evolve over time. These, in turn, depend on macroeconomic and financial market developments that are uncertain by nature.

Debt sustainability at the subnational level is further complicated by the respective legislative mandates of central vis-à-vis subnational governments and the intergovernmental finance system. Unable to issue their own currency, subnationals cannot use seigniorage finance. Subnationals cannot freely adjust their primary balance due to legal constraints on raising own revenue, dependence on central government transfers, and central government influences on key expenditure items such as wages and pensions. In the presence of public sector dominance of subnational lending, lending rates could be subsidized, bank lending to subnational entities could exceed the statutory requirements, and credit risk concerns could be compromised. Many policies that affect the economic growth and the fiscal health of the subnational economy are designed largely or exclusively by the central government. Finally, subnational debt dynamics can change significantly if there are expected bailouts by the central government.

The paper presents a framework for analyzing subnational fiscal sustainability and applies it to the case of Tamil Nadu - an Indian state where fiscal adjustment has been ambitious and politically challenging, but has promised to put state finance on a sustainable path. The analysis suggests that the fiscal adjustment in Tamil Nadu has left fiscal space for increases in infrastructure investment which may be achieved without threatening fiscal sustainability.

Risks to the fiscal outlook include interest rate shocks, fiscal pressures on the primary deficit through wage shocks, subsidy increase, or decline in central revenue transfers. Although individually these shocks may not threaten the fiscal sustainability, their combined effect may have serious consequences for debt sustainability. Contingent liabilities constitute an additional source of concern. Finally, though the state's efforts to remove constraints to growth, minimize recurrent expenditures, and maximize its revenue potential will be critical for fiscal sustainability and the quality of fiscal adjustment in the long run, national policies feature prominently in subnational fiscal adjustment as they influence wages and pensions, interest rates, tax policy, fiscal transfers and the borrowing regime.

A number of caveats are important. This paper is a first attempt to discuss subnational finance issues and is subject to all the caveats pertaining to fiscal sustainability analysis at

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[46] This is a World Bank estimate based on state government data.

the national level. The paper identifies the main pieces of information one needs to have in order to undertake such analysis and builds on a wealth of information from the government of Tamil Nadu. One missing piece of publicly available information is the maturity structure of government debt in Tamil Nadu. We did not have this information at the time of analysis but in the case of Tamil Nadu this is not a problem because of the relatively long maturity of and fixed interest rates on state public debt. We chose not to estimate the elasticities that determine the evolution of revenue receipts. These elasticities are difficult to estimate because the estimation methodology assumes constant revenue and tax policies, whereas tax and revenue policies in India, or developing countries in general, are not constant.

Finally, while we wanted to compare Tamil Nadu with subnational governments in other countries, we decided not to embark on this task as comprehensive subnational finance data are not available yet and key fiscal data are not defined in a consistent way across countries. For example, national governments monitor carefully the debt service ratio of subnational entities, but they define it differently. Brazil defines the debt service as a share of current revenue net of transfers (Brazil 2001). Colombia records it as a share of operational savings (Colombia 1997). Peru defines it as a share of current income including transfers (Peru 2003), while Russia denotes it as a share of total budgetary expenditures (Russia 1998). We however think that such comparisons based on comprehensive data and a consistent framework are important and merit further work.

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Appendix A
Steady state conditions

For basic long-run fiscal sustainability analysis we use a steady state version of the budget constraint (4). In the steady state the debt to GDP ratio, the primary balance, the real interest rate, and the growth rate are all constants. Thus, the steady state version of the budget constraint is:

$$\bar{x} = \left(\frac{\bar{r} - \bar{g}}{(1 + \bar{g})} \right) \bar{b} = \left(\frac{\bar{n} - \bar{g}}{(1 + \bar{g})(1 + \bar{\pi})} \right) \bar{b} \,. \tag{A.1}$$

This equation determines the size of the fiscal balance that is consistent with the government's outstanding debt, and other economic indicators such as real growth, inflation and interest rates.

Rearranging equation (A.1) we obtain the condition for debt sustainability:

$$\bar{b} = \left(\frac{1 + \bar{g}}{\bar{r} - \bar{g}} \right) \bar{x} = \left(\frac{Z}{1 + \bar{n} - Z} \right) \bar{x} \,. \tag{A.2}$$

The right hand side of equation (A.2) gives the net present value of future streams of budget surpluses, while the left hand side variable is the initial debt to GDP ratio. If the right hand side is greater than or equal to the left hand side, fiscal policies can be considered sustainable since the discounted future net income streams of the government would cover the initial debt level. However, if the right hand side falls short of the left hand side, then the fiscal policy stance could be considered unsustainable and policies would need to be adjusted.[47]

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[47] Note that if (A.2) is to make sense the real interest rate must be larger than the real growth rate.