Fiscal Deficits and Government Debt in India: Implications for Growth and Stabilisation

C. Rangarajan*
and
D.K.Srivastava**

Abstract

This paper examines the long term profile of fiscal deficit and debt relative to GDP in India, with a view to analysing debt-deficit sustainability issues along with the considerations relevant for determining suitable medium and short-term fiscal policy stance. The impact of debt and fiscal deficit on growth and interest rates that arises from their effect on saving and investment are critical in any examination of sustainability of debt and deficit. It is argued that large structural primary deficits and interest payments relative to GDP have had an adverse effect on growth in recent years. The Fiscal Responsibility and Budget management Act (FRBMA) of the central government has certain positive features. While the fiscal deficit target has been defined, it should be considered in conjunction with a target debt-GDP ratio. Further, the central FRBMA should be supplemented by state level fiscal responsibility legislations and an effective hard budget constraint on sub-national borrowing. There is a clear need to bring down the combined debt-GDP ratio from its current level, which is in excess of 80 percent of GDP. The process of adjustment can be considered in two phases: adjustment phase and stabilisation phase. In the adjustment phase,

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* Chairman, National Institute of Public Finance and Policy, New Delhi.
** Senior Fellow, National Institute of Public Finance and Policy, New Delhi.
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fiscal deficit should be reduced in each successive year until revenue deficit, and correspondingly, government dissaving, is eliminated. In the second phase, fiscal deficit could be stabilised at 6 percent of GDP. The debt-GDP ratio would eventually stabilise at 56 percent. In this process, the ratio of interest payments to revenue receipts will fall, enabling a progressively larger amount of primary revenue expenditure to be incurred on the social sectors.

Fiscal Deficits and Government Debt in India: Implications for Growth and Stabilisation

Fiscal deficits are like obesity. You can see your weight rising on the scale and your clothing size increasing, but there is no sense of urgency in dealing with the problem.

Martin Feldstein

Address to Reserve Bank of India, January 12, 2004

Introduction

High levels of fiscal deficit relative to GDP tend not only to cause sharp increases in the debt-GDP ratio, but also adversely affect savings and investment, and consequently growth. The usability of fiscal policy as a tool of countercyclical intervention is also compromised when fiscal deficit is high and structural in nature. This paper examines the long term profile of fiscal deficits in India, its impact on growth that arises from its impact on savings and investment, which may occur directly or through its effects on interest rates and inflation. It also looks at relevant considerations for determining levels of debt and deficit relative to GDP at which these should be stabilised in India, given the current configuration of key determinants like the revenue to GDP ratio and public and private saving rates consistent with the objective of achieving higher growth.

The combined fiscal deficit of the centre and states stood at 9.3 percent of GDP in 1990-91. There was a clear improvement in the early nineties. After falling to 6.26 percent in 1996-97, the fiscal deficit to GDP ratio started rising again and was around 10 percent in 2001-02 and 2002-03. Although only marginally higher than that in 1990-91, this level of fiscal deficit was qualitatively much different because it was accompanied by much higher levels of the debt-GDP ratio, the ratio of interest payments to revenue receipts, and the share of revenue deficit in

fiscal deficit. The debt-GDP ratio has risen from 61.7 percent in 1990-91 to about 76 percent in 2002-03, when external debt is considered at historical exchange rates and liabilities of states on account of reserve funds and deposits are not included. When these are included and external debt is evaluated at current exchange rates an upward adjustment of about 9 percentage points of GDP is called for, consisting of 3 and 6 percentage points for the two factors, respectively, taking government liabilities to about 85 percent of GDP at the end of 2002-03.

This paper is divided into seven sections. Section 2 gives a summary of the theoretical perspectives that provide an insight into ways in which fiscal deficits can affect some of the important macro variables of the economy. Section 3 summarises the main issues in the Indian context. Section 4 looks at the conditions of sustainability of fiscal deficits and its relationship with growth, primary deficits and interest rate in the context of the dynamics of debt accumulation and examines the growth of the debt-GDP ratio in India in a long term perspective. Section 5 looks at the saving and investment performance in India and empirically investigates certain critical relationships describing the impact of fiscal deficit on saving and investment that have a bearing on the growth prospects in India. Section 6 distinguishes between structural and cyclical deficits and the role of discretionary policy for macroeconomic stabilisation. Section 7 provides concluding observations.

II. Theoretical Perspectives

There is no agreement among economists either on analytical grounds or on the basis of empirical results whether financing government expenditure by incurring a fiscal deficit is good, bad, or neutral in terms of its real effects, particularly on investment and growth. Among the mainstream analytical perspectives, the neo-classical view considers fiscal deficits detrimental to investment and growth, while in the Keynesian paradigm, it constitutes a key policy prescription. Theorists persuaded by Ricardian equivalence assert that fiscal deficits do not really matter except for smoothening the adjustment to expenditure or revenue shocks. While the neo-classical and Ricardian schools focus on the long run, the Keynesian view emphasises the short run effects.

The Neo-Classical View

The component of revenue deficit in fiscal deficits implies a reduction in government saving or an increase in government dis-saving. In the neoclassical perspective (*see*, e.g. Bernheim, 1989), this will have a detrimental effect on growth if the reduction in government saving is not fully offset by a rise in private saving, thereby resulting in a fall in the overall saving rate. This, apart from putting pressure on the interest rate, will adversely affect growth. The neo-classical economists assume that markets clear so that full employment of resources is attained. In this paradigm, fiscal deficits raise lifetime consumption by shifting taxes to the future generations. If economic resources are fully employed, increased consumption necessarily implies decreased savings in a closed economy. In an open economy, real interest rates and investment may remain unaffected, but the fall in national saving is financed by higher external borrowing accompanied by an appreciation of the domestic currency and fall in exports. In both cases, net national saving falls and consumption rises accompanied by some combination of fall in investment and exports. The neo-classical paradigm assumes that the consumption of each individual is determined as the solution to an inter-temporal optimisation problem where both borrowing and lending are permitted at the market rate of interest. It also assumes that individuals have finite life spans where each consumer belongs to a specific generation and the life spans of successive generations overlap.

Citing recent evidence in the US context, Gale and Orszag (2002), observe that a reasonable estimate is that a reduction in the projected budget surplus (or increase in the projected budget deficit) of one percent of GDP will raise long-term interest rates by 50 to 100 basis points. In their view, fiscal discipline promotes long-term growth primarily because budget surpluses are a form of national saving.

Keynesian View of Fiscal Deficits

The Keynesian view (*see*, e.g., Eisner, 1989), in the context of the existence of some unemployed resources, envisages that an increase in autonomous government expenditure, whether investment or consumption, financed by borrowing would cause output to expand through a multiplier process. The traditional Keynesian framework does not distinguish between alternative uses of the fiscal deficit as between government consumption or investment expenditure, nor does it

distinguish between alternative sources of financing the fiscal deficit through monetisation or external or internal borrowing. In fact, there is no explicit budget constraint in the analysis. Subsequent elaborations of the Keynesian paradigm envisage that the multiplier-based expansion of output leads to a rise in the demand for money, and if money supply is fixed and deficit is bond financed, interest rates would rise partially offsetting the multiplier effect. However, the Keynesians argue that increased aggregate demand enhances the profitability of private investment and leads to higher investment at any given rate of interest. The effect of a rise in interest rate may thus be more than neutralised by the increased profitability of investment. Keynesians argue that deficits may stimulate savings and investment even if interest rate rises, primarily because of the employment of hitherto unutilised resources. However, at full employment, deficits would lead to crowding out even in the Keynesian paradigm. In the standard Keynesian analysis, if every one thinks that a budget deficit makes them wealthier, it would raise the output and employment, and thereby actually make people wealthier. Unlike the loanable funds theory, the Keynesian paradigm rules out any direct effect on interest rate of borrowing by the government.

Ricardian Equivalence Perspective

In the perspective of Ricardian equivalence (e.g. Barro, 1974, 1976, 1979, 1987, 1989), fiscal deficits are viewed as neutral in terms of their impact on growth. The financing of budgets by deficits amounts only to postponement of taxes. The deficit in any current period is exactly equal to the present value of future taxation that is required to pay off the increment to debt resulting from the deficit. In other words, government spending must be paid for, whether now or later, and the present value of spending must be equal to the present value of tax and non-tax revenues. Fiscal deficits are a useful device for smoothening the impact of revenue shocks or for meeting the requirements of lumpy expenditures, the financing of which through taxes may be spread over a period of time. However, such fiscal deficits do not have an impact on aggregate demand if household spending decisions are based on the present value of their incomes that takes into account the present value of their future tax liabilities. Alternatively, a decrease in current government saving that is implied by the fiscal deficit may be accompanied by an offsetting increase in private saving, leaving the national saving and, therefore, investment unchanged. Then, there is no impact on the real interest rate. Ricardian equivalence requires the

assumption that individuals in the economy are foresighted, they have discount rates that are equal to governments' discount rates on spending and they have extremely long time horizons for evaluating the present value of future taxes. In particular, such a time horizon may well extend beyond their own lives in which case they save with a view to making altruistic transfers to take care of the tax liabilities of their future generations.

The economic universe of these alternative schools of thought also is characterised by individuals who differ in their behavioral responses in critical respects. The Keynesian world is inhabited by myopic, liquidity constrained individuals who behave under money illusion, and have a high propensity to consume out of current disposable income. The Ricardian equivalence people conceive of a universe of farsighted, fully informed, altruistic individuals. The neo-classical world is inhabited by rational individuals who respond to real changes in their wealth portfolios, and who are farsighted enough to plan consumption over their life-cycle. Table 1 summarises the main differences in these alternative paradigms.

Table 1: Fiscal Deficits and the Economy: Salient Features of Alternative Paradigms

	Neo-Classical	Ricardian	Keynesian
Consumers	Finite, life-time horizon	Infinite time perspective through altruistic transfers	Myopic, liquidity constrained
Effects of a deficit based tax cut on private saving	Private saving would fall	Private saving remains unaffected	Aggregate demand increases
Employment of resources	Full employment	Full employment	Resources not fully employed
Effect on interest rate	Interest rate increases	No effect	Interest rate increases
Contention	Fiscal deficits detrimental	Fiscal deficits irrelevant	Fiscal deficits beneficial

In reality, an economy may be populated by all the three types of consumers. Depending on which group is relatively larger, one or the other theory may be found to be more relevant in different contexts.

The 'Tax and Spend' Hypothesis

A fourth hypothesis formalised by supply side economists, is sometimes called the "tax and spend" hypothesis. An exposition of the hypothesis is given in Vedder, Gallaway, and Frenze (1987). In their view, raising taxes with a view to cutting down deficits would not work because it would only encourage the politicians to spend more. The result would be that while the deficit would remain the same, in the long run the size of the private sector would be cut down. In their view, a tax cut, which puts pressure for contraction of government spending leaving deficits and national savings unchanged, and which leads to an increase in private consumption, should be considered more desirable. The main problem is that when government expenditure does not fall, it has to run a deficit, which raises interest payments and causes total government expenditure including interest payments to rise as a share of GDP.

III. Debt and Fiscal Deficit: Issues in the Indian Context

The issue of fiscal deficit assumed importance in India in the late eighties when the fiscal deficit to GDP ratio rose to levels above 7 percent. In the early nineties, it was above 9 percent, and after some improvement, it started rising again, crossing the threshold of 10 percent of GDP in 2001-02. In the context of fiscal deficits in India, several distinct sets of issues have been examined from time to time. Some of the important issues that have been noted in the literature are listed below:

- whether fiscal deficits of the central and state governments, considered together, and separately are sustainable;
- whether these governments are solvent, given their debt and deficit levels;

- whether the presence of high levels of structural fiscal deficits has constrained the usability of fiscal policy as a tool of stabilisation in respect of output as well as prices;
- whether there is a meaningful asymmetry between accumulation of fiscal liabilities by the central and state governments;
- whether there is potential for additional seigniorage in the system for financing fiscal deficits;
- whether there is need to formulate rules and targets to stabilise debt and deficits, and how should these targets be derived;
- whether, apart from the size, the quality of fiscal deficit has progressively become more of a problem and, in particular, whether the rising share of revenue deficit in fiscal deficit, i.e. government dis-savings have resulted in a fall of the overall saving rate, thereby adversely affecting growth;
- whether fiscal deficits have crowded out private investment by putting pressure on interest rates, thereby adversely affecting growth;
- whether continued high levels of fiscal deficits, resulting in growing interest payments, have crowded out government capital expenditure; and
- whether public investment financed by fiscal deficits has the potential of crowding-in private investment, thereby positively affecting growth.

These issues are interdependent as the impact of fiscal deficits on growth affects its sustainability. Although the major focus of this study is on the implications of fiscal deficits for growth and stabilisation, some of the extant literature on the above issues is briefly reviewed here under different heads.

Fiscal Stance: Inflation and Output Stabilisation

One set of issues concerns whether the fiscal policy as a policy instrument has been used to obtain the appropriate fiscal stance, expansionary or otherwise, given the prevailing economic conditions (e.g. Joshi and Little, 1994; and RBI, 2002). In this context, reviewing the situation over the period 1974-75 to 1989-90, Joshi and Little (1994) had observed that there was a clear tendency in India for fiscal contraction

when inflation was above the trend, and fiscal expansion when inflation was below the trend. They found that in 19 out of 29 years during 1970-71 to 1989-90, this tendency was clearly visible. On the other hand, the fiscal stance was much less responsive to stabilising output. They observed that *prima facie* fiscal policy was destabilising in no less than 22 out of the 29 years under review in their study. In some of these years, when output was below trend, the fiscal authorities were inhibited from adopting an expansionary fiscal policy either by inflation or by balance of payment difficulties. In the pre-1990 situation, in their view, inflation was the main consideration guiding India's fiscal policy. Writing at the beginning of 90s they observed "there would have been more room for fiscal policy to be devoted to (stabilising output), if the economy had possessed greater stocks of foreign exchange reserves and commodities, specially food grains, the use of which would have reduced inflation by increasing supplies, and would have either ameliorated or financed a deterioration in the balance of payments". In recent years, these constraints have ceased to be binding, with a comfortable position in regard to the foreign exchange reserves, stocks of food grains and balance of payments. There is therefore a case for aligning better the fiscal stance to make it more responsive to output stabilisation. The Reserve Bank of India (2002) in its Report on Currency and Finance for 2001-02, provides estimates of structural and cyclical fiscal deficits. In their estimates, fiscal deficits in India are predominantly structural in nature and the cyclical component is very small in magnitude ranging between a deficit of 0.12 percent of GDP and a surplus of 0.21 percent of GDP. Automatic stabilisers exist if revenues respond more to output changes than expenditures. The RBI estimates that the elasticity of receipts of the combined government sector is 1.07 whereas that for combined non-interest expenditure is 1.06. Since the difference between the two magnitudes is small, even if there is an automatic stabiliser, it is likely to be weak. Discretionary fiscal measures are therefore required for stabilisation.

Impact on Saving, Investment, and Growth

The link between fiscal deficit and growth, saving and investment rates, inflation and current account deficits have also been examined in many studies. The relationship between fiscal deficit and interest rate and the existence of crowding out are important considerations in determining the advisability of deficit-financed expansionary fiscal policies. Authors like Sunderarajan and Thakur (1980); Pradhan *et. al*.,

(1990); and Parker (1995) had earlier examined the issue of crowding out in the Indian context. More recently, Chakraborty (2002) finds that fiscal deficit does not put upward pressure on the interest rate while Goyal (2004), using monthly data argues that there is a two-way causality between fiscal deficit and interest rates. In his view, interest rates did not rise in recent years in spite of high fiscal deficits because of larger liquidity available to the system. RBI (2002) has noted that raising public sector investment to boost aggregate demand in the economy crowds-out both private consumption and investment with no long-lasting impact on output. On the other hand, infrastructure investment by the public sector crowds-in private investment while public investment in manufacturing crowds-out private investment.

Solvency of the Public Sector

In the accounting approach to public sector solvency, Buiter [1985, 1988] suggests that sustainable deficit levels can be financed without raising debt levels relative to GDP under feasible rates of growth, real interest, and inflation. Following the neo-classical solvency approach, Buiter and Patel (1992) observe that the relevant criterion for the no-ponzi game condition on public debt is to judge it by comparing the rate of growth of public debt relative to GDP with the real interest rate. If the debt ratio systematically grows faster than the real interest rate, the public sector is insolvent.

Buiter and Patel (1992) examined the issue of solvency of the Indian public sector by studying trends in debt, primary budget surplus, and seigniorage. Solvency requires that, with a finite time horizon, public debt in the last period becomes non- positive, i.e., no debt is left for further servicing. If the time horizon is infinity, the existing debt should be serviceable by current and future primary surpluses and future seigniorage. This implies that, at any time, the present value of future public debt becomes zero in the limit. If it becomes less than zero, it indicates a situation of 'super-solvency'. The requirement of present value of debt to be zero or less holds as long as the economy is not dynamically inefficient, i.e. it is not the case where interest rate is below growth rate forever. For a dynamically inefficient system (where growth rate is higher than the interest rate forever) Ponzi games can be viable. Buiter and Patel contend that while interest rate can be below the growth rate for extended finite periods of time, the Indian economy is not dynamically inefficient over the long run, and that "there are no social

free lunches to be earned by increasing the public debt". Calling the build up of public debt in India, 'this remarkable fiscal high wire act', they contend that continuation of existing patterns of behaviour will eventually threaten the solvency of the government. They also observe that solvency is a very weak criterion with which to evaluate the sustainability of fiscal and financial policy. They observe that a government can remain solvent even though its debt relative to GDP grows unbound, if the long run growth rate of the debt-GDP ratio, while positive, is less than the long run value of the excess of the interest rate over the growth rate. Thus, unbounded debt-GDP ratios can still be consistent with solvency. The issue of solvency could be important in the context of external debt, but this does not appear to be much of a concern in the Indian context. The issue of sustainability and its link with growth is more relevant.

Implications for Sustainability

The issue of sustainability of debt should be considered as distinct from that of solvency. Sustainability can be seen as the capacity to keep balance between costs of additional borrowing with returns from such borrowing, which could be in the form of higher growth that results in higher government revenues that can be used for servicing the additional borrowing. Sustainability issues should be viewed for combinations of debt and fiscal deficit, and not in isolation for either debt or fiscal deficit. Thus, a fiscal deficit of 10 percent combined with say a debt-GDP ratio of 100 percent will have sustainability implications that are quite different from those of a 10 percent fiscal deficit when the debt-GDP ratio is 50 percent. Thus, sustainability should not be treated as synonymous with stability of the debt-GDP ratio at whatever level it might have reached.

The level of debt in combination with interest rate determines the level of interest payments. Fiscal deficit minus interest payments determine primary deficit. Primary deficit represents the extent of borrowing used by the government for current expenditures, revenue and capital. The remaining part of fiscal deficit is claimed by interest payments, which are transfer payments that go back into the income-expenditure stream. In particular, government interest payments add to the disposable incomes in the private sector. This has implications for government revenues as well.

At the same time, interest payments add to government's revenue expenditures leaving less of current fiscal deficit for use for government capital expenditure. Increases in revenue expenditures, *ceteris paribus*, lead to a fall in government's net savings, which has an adverse impact on the overall savings and consequently on the growth rate. However, private savings may be positively affected by a higher fiscal deficit because of a positive impact due to higher wealth in the private sector in the form of government bonds. As government capital expenditure on infrastructure and other vital public goods is increased, the growth impulse is positively affected. The impact of fiscal deficit and level of debt on savings and investment as a result of the configuration of these variables determines the impact on growth as well as interest rate. Considering the various interrelationships involved, the appropriate framework is a macroeconomic model. Such a model can also bring together the monetary side influences on interest, growth rate, and inflation rates. Even while recognising that growth and interest rates are endogenously determined, a large literature is devoted to sustainability analytics treating growth and interest rates as exogenous. This approach can be considered useful only as a frame of reference. It is relevant to consider the impact of fiscal deficit and debt on the growth and interest rates.

Debt would become unsustainable, if fiscal deficits follow a course that leads to a self-perpetuating rise in the debt-GDP ratio, which affects negatively the growth rate and positively the interest rate, such that the existing levels of primary government expenditures cannot be sustained, given the configuration of growth and interest rates. A sustainable debt-deficit combination would be stable in terms of debt-GDP ratio and fiscal-deficit GDP ratio consistent with the permissible levels of primary expenditures.

An alternative method by which the sustainability issues have been examined in the literature is to look at the growth and interest rates as stochastic processes. Although such an analytical framework does not help directly in designing fiscal policy, it helps ascertain whether debt and deficits show signs of unsustainability. In a recent contribution, Papadopoulos and Sidiropoulos (1999) show that a test for sustainability should check for the cointegartion of government expenditures and revenues. If these are cointegrated with the cointegrating vector of (1, -1), the necessary condition for sustainability of debt is satisfied. Jha and Sharma (2004) have carried out empirical tests to ascertain whether

government expenditures and revenues are cointegarted in India using long time series data. They find, on the basis of a sample period starting in the early fifties, that if structural breaks are taken into account, government expenditures and revenues were cointegrated and, therefore growth in government debt in India has been consistent with the requirements of sustainability. An implication of the presence of cointegration is that adjustments in revenues and expenditures take place such that these move together. Thus, for example, if interest payments to GDP ratios increase, adjustments in other components of expenditure, notably, government capital expenditure which, by itself, may not be desirable, would take place so that the co-movement of expenditure with revenues is maintained.

Financing Deficits by Alternative Channels

The fourth issue, that has received attention, relates to the relative merits of financing fiscal deficits by domestic borrowing, external borrowing, or borrowing from the central bank. In theory, financing by external debt would lead to pressure on the exchange rate. Financing domestic debt by monetisation would put pressure on inflation and that by domestic borrowing, on interest rates. For example, Moorthy *et.al*., (2000), while examining the issue of bond-financing versus monetisation, in the context of debt stabilisation, conclude that the emphasis on market borrowing rather than borrowing from the RBI as part of economic reforms in India in the nineties has proved to be beneficial. In Rangarajan, Basu, and Jhadav (1994), the inter-temporal budget constraint was used to study the dynamic inter-linkages between government deficits and alternative modes of financing these. In particular, given the set of revenue and expenditure parameters, relevant for the late eighties, it was shown that the bond-financing scenario led to an explosive growth in the debt-GDP ratio, and the monetary-financing scenario led to an unacceptably high inflation rate within a short span of time[1].

Asymmetry in Central and Sub-National Debt

Another dimension that has received attention relates to the desirability of asymmetric treatment of central and sub-national debt and deficits on grounds of different degrees of endogeneity of interest, growth and other relevant variables. For example, Chelliah (2001) has argued that ‘we must recognise that the state is borrowing largely from outsiders

and paying interest to them' and that 'state governments do not have access to created credit'. In his view, the constraints on sub-national deficits must be stronger than those pertaining to the central government. The interest rates applicable to the borrowing by the states, both average rates and marginal rates are higher as compared to those for the centre, implying the need for more stringent norms for the same rates of growth of GDP.

Controlling Debt and Deficit: Rules and Targets

Borrowing by the government often appears to be a softer option than increasing taxes or reducing expenditures. That is why, as established by international experience also, it is important to provide exogenous limits on borrowing by governments, whether central or sub-national. Such limits can be exercised through fiscal responsibility legislations, or other institutional arrangements like the Australian Loan Council and the Maastricht Treaty for member countries of the European Economic Community. The Maastricht Treaty on Economic and Monetary Union, for example, has two convergence conditions for the members of the European Monetary Union: (i) country's overall budget deficit for each fiscal year must be equal to or below 3 percent of the GDP and (ii) a country's stock of public debt must be equal to or less than 60 percent of the GDP. The 3 percent limit is not meant to be exceeded in 'normal' economic downturns.

There has been a discussion in the literature as to whether deficit targeting works in practice. The main institutional reforms for controlling the growth of debt and deficit relate to (i) formal deficit and debt rules, (ii) expenditure limits, and (iii) requirements of transparency. In regard to the first, apart from the Maastricht Treaty norms, the U. K. has operated a Golden Rule since 1997 whereby borrowing is done only to finance capital spending. Several countries have deficit and debt rules at the sub national level. In the US, all states except two have laws requiring balanced budgets and limiting the states to raise debt. The provinces and territories of Canada generally have fiscal rules with balanced budgets requiring them to take on debt only for the purpose of financing investment projects. Canada has also focused on instituting a rigorous expenditure review process. Debt ceiling can serve as a useful complement to deficit rules. The main criticism of the deficit rules in general and balanced budget rules in particular is that they are invariant and therefore tend to be pro-cyclical. This is particularly important for

national governments. For this reason the deficit rules for the national government have increasingly been defined in terms of a cyclically adjusted deficit measure or as an average over the economic cycle so that the operation of domestic stabilisers and some room for discretionary policy within the cycle may be permitted.

Transparency in fiscal management has been emphasised by countries like New Zealand, Australia, and the U.K. Transparency is best served when there is an explicit legal provision for it requiring elaboration of the guiding principles of fiscal policy, clear statement of objectives of changes in fiscal policies, the need for a long term focus on fiscal policy, and requirements for providing fiscal information to the public. The U.K., U.S., and New Zealand have enacted legislations for transparency, which require statements indicating the objectives for deficits and debt. International experience also suggests that expenditure rules have often proved to be effective. These rules typically emphasise ceilings on specific areas of expenditure like discretionary expenditure as opposed to non-discretionary expenditure and in some cases with respect to particular programmes.

In the Indian context, as far the central finances are concerned, a *Fiscal Responsibility and Budget Management Act* (FRBMA) was enacted in 2003. Some states have also enacted fiscal responsibility legislations. The central government has also framed rules under the FRBMA. The *Act* and the *Rules*, as these presently stand, have provided for the elimination of the revenue deficit by 2008-09, with 0.5 percentage point of GDP as the minimum annual reduction target, and fiscal deficit to be brought to the level of 3 percent of GDP, with 0.3 percentage point of GDP, as the minimum annual reduction target. The FRBMA has some built-in flexibility in achieving revenue and fiscal deficit reduction targets as there is a provision that the specified limits may be exceeded 'due to ground or grounds of national security or national calamity or such other exceptional grounds as the Central Government may specify'. The Act has also provided that 'Reserve Bank of India may subscribe to the primary issues to the Central Government Securities' for specified reasons.

IV. Sustainability of Debt and Fiscal Deficit

In Domar's analysis of the dynamics of debt accumulation, both interest rate and growth rate are taken as exogenous. Based on this assumption, results can be derived that can serve as useful benchmarks.

Sustainability Analytics Under the Canonical (Domar) Model

In considering the dynamics of debt accumulation, the following notations will be used: b_t: debt-GDP ratio in period t; g_t: nominal growth rate in period t; i_t: nominal interest rate in period t; and p_t: primary deficit relative to GDP in period t. The standard equation for debt accumulation is written as[2]

$$b_t = p_t + b_{t-1}[(1+i_t)/ (1+g_t)] \qquad (1)$$

Equation 1 can be written as

$$b_t = p_t + x_t b_{t-1} \qquad [\text{where } x_t = (1+i_t)/ (1+g_t)] \qquad (2)$$

If $b_0 = p_0$,
we have, $b_1 = p_1 + x_1 p_0$
$b_2 = p_2 + x_2 p_1 + x_2 x_1 p_0$

Generalising, we can write

$$b_t = p_t + (x_t)\, p_{t-1} + (x_t x_{t-1})\, p_{t-2} + \ldots + (x_t x_{t-1} \ldots x_1)\, p_0 \qquad (3)$$

If it is assumed that x_t is constant, implying g and i are constant for all t,

We can write

$$b_t = p_t + x\, p_{t-1} + x^2 p_{t-2} + \ldots + x^{t-1} p_{t-1} + x^t p_0 \qquad (4)$$

The canonical model (Domar, 1944) requires the additional assumption that p's are also constant for all t. Since $x_t = (1+i_t)/(1+g_t) = x$ for all t, three cases arise (1) when g = i, (2) when g > i, and (3) when g<i.

In the first case, we can write

$$b_t = p + \sum_{i=0}^{t-1} p = (t+1)\, p \qquad (5)$$

This implies that if g=i, the debt-GDP ratio is the cumulated sum of the primary deficits in all the previous periods. In the second case, when g>i,

$$b_t = p \{1 + x + x^2 + \ldots + x^{t-1} + x^t\} \qquad (6)$$

The term within parenthesis is a geometric series with common ratio x<1. As t tends to infinity, this sum tends to x/ (1-x). Then the long run value of the debt-GDP ratio can be written as

$$b_t = p + p\, x/ (1-x) = p/ (1-x)$$

$$b_t = p\, (1+g)/ (g-i) \text{ as } t \to \infty \qquad (7)$$

In the third case, when g<i, x>1, and b_t will grow indefinitely.

Thus, a value of p>0, will eventually become unsustainable for both cases when g=i and when g<i. In the case, when g=i, the debt-GDP ratio grows linearly by the size of the primary deficit, and when g<i, the debt-GDP ratio grows explosively if the primary deficit-GDP ratio is positive.

We will now focus on the case where g>i. From (7), the long run equilibrium value of $b_t = b^*$ is given by

$$b^* = p\, (1+g)/ (g-i) \qquad (8)$$

The fiscal deficit to GDP ratio (f*) corresponding to a stable debt-GDP ratio (b*) will be:

$$f^* = p.g/ (g-i) \qquad (9)$$

Equations (8) and (9) provide a system of two equations in three unknowns, *viz*., b, f, and p, assuming values of g and i are given (g>i), and consistent with the a stable debt-GDP ratio[3]. It is indicated that high values of p will be associated with high levels of b and f. However, these equations do not provide a unique solution as the unknowns are more than the number of the equations.

Using equations (8) and (9) together, the relationship between b* and f* can be written as:

$$b^*=f^*.(1+g)/\ g \qquad (10)$$

The pair (b*, f*) gives that level of fiscal deficit-GDP ratio at which the debt-GDP ratio remains unchanged at b*. As shown in Figure 1, equation (10) gives a family of straight lines rising to the right, showing combinations of fiscal deficit-GDP ratio and corresponding stable debt-GDP ratio, for a given growth rate. This line shifts upward as growth rates are lowered.

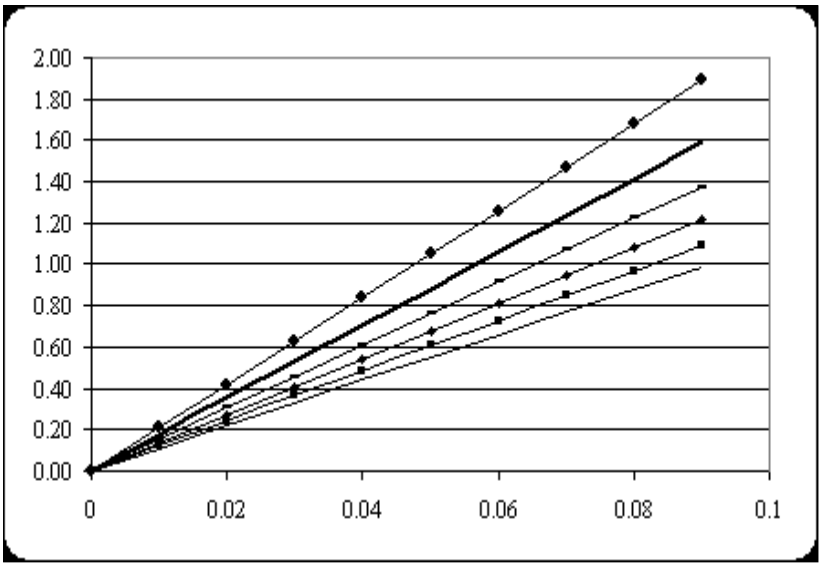

Figure 1: Stable Combinations of Debt- and Fiscal Deficit to GDP Ratios for Different Growth Rates

Vertical axis: debt-GDP ratio; Horizontal axis: fiscal deficit-GDP ratio.

For lower growth rates, the line is closer to the vertical axis; as growth rates are higher, for the same fiscal deficit ratio, debt-GDP ratios are lower.

Alternatively, the stabilisation conditions can be expressed in an equivalent way in terms of the ratio of interest payments to GDP. Defining interest payments to GDP ratio as (ip_y), we have

$$IP_t = i.B_{t-1} \text{ or } (ip_y)_t = ib_{t-1}/ (1+g) \quad (11)$$

As debt is stabilised $b_t=b_{t-1}=b^*$ and $(ip_y)_t = (ip_y)^*_t$

$$b^*= (ip_y)^* .(1+g)/i \quad (12)$$

The corresponding level of fiscal deficit to GDP ratio is given by

$$f^* = (ip_y)^* g/i \quad (13)$$

Equations (12) and (13) provide a set of two equations in terms of three unknowns, (b, f, and ip_y). Again, the system can determine unique values of any two of the three unknowns, provided one of the unknown is pre-specified. Clearly, additional information is needed to solve the system described by either (8) and (9) or (12) and (13).

The critical question is whether, when g>i, sustainability is implied for any value p>0. To address this question, it is useful to recognise that g_t and i_t are neither constant nor independent of the level of p. In particular, both g_t and i_t should be taken as stochastic processes and dependent on the levels of debt and fiscal deficit relative to GDP. At any time t, the debt-GDP ratio b_t will be higher than its previous year's level b_{t-1}, as long as the primary deficit to GDP ratio in the current period p_t satisfies the following condition:

$$p_t=b_{t-1}[(g_t-i_t)/(1+g_t)= p^s_t \quad (14)$$

Here, i_t is the average interest rate and p^s_t is called the debt-stabilising primary deficit to GDP ratio. As long as p_t in any given year is equal to or less than p^s_t for that year, debt-GDP ratio will not rise in that year compared to its level in the previous year. Since p^s_t depends on the difference between g_t and i_t, it is important to consider how should p be determined in any year since it may affect g and i in that year.

The pre-specification of either the primary-deficit to GDP ratio or the ratio of interest payments to GDP requires consideration of the appropriate fiscal stance in the medium to long term. The medium term fiscal stance should aim at achieving the maximum possible trend growth rate. Such a fiscal stance should be consistent with growth-maximising combination of stable debt-GDP ratio and a stable fiscal deficit to GDP ratio consistent with both maximum growth and stable debt-GDP ratio. The short fiscal stance should be designed to keep the economy close to the long term growth and debt-GDP ratios using temporary variations in fiscal deficit. These issues are discussed in the next section.

The main lessons from the canonical model can be summarised as follows:

- The debt-GDP ratio will rise continuously for positive values of the primary deficit relative to GDP, if the growth rate is equal to or less than the interest rate.
- If growth rate is higher than the interest rate, and both of these are unaffected by the levels of fiscal deficit and debt levels relative to GDP, the debt-GDP ratio and the fiscal deficit to GDP ratio will eventually stabilise.
- The level of fiscal deficit relative to GDP that keeps the debt-GDP ratio stable can be specified as dependent on the growth rate only.
- The system of equations implicit in the canonical model can define combinations of stable debt-GDP ratio and fiscal deficit to GDP ratio but does not determine their best or most desirable values.
- In deciding a suitable fiscal stance for the medium to long run, it is best to consider the debt-GDP ratio and fiscal deficit to GDP ratio together rather than only one of them.
- The long term fiscal stance requires additional information on the impact of debt and deficit levels on growth, and the assumption of constancy of growth and interest rates should be given up. In this case, the ratio of debt to GDP will rise progressively, even if the growth rate is higher than the interest rate, if primary deficit to GDP ratio is above a threshold level given by p^s, which can be specified as

dependent on previous year's debt-GDP ratio, growth rate and interest rate.

The following section provides an analytical framework within which the trend or structural values of a debt-stabilising and growth-maximising fiscal stance may be determined. The short-term fiscal stance can subsequently be decided around the long-run levels.

Sustainability, Optimality, and Stability

The canonical framework indicates permissible levels of primary deficits for given combinations of growth and interest rates, for different levels of the debt-GDSP ratio. It does not indicate whether, a higher or lower debt-GDP ratio may also be sustainable. It also does not indicate as to what may be the optimal ratio at which the debt-GDP ratio should be stabilised[4]. These questions require a consideration of the impact of debt and deficit on interest rates and growth rates. Since various interrelationships are involved, in effect, a macro-model with the specification of the relevant structural equations is required. However, for explaining the conceptual framework in distinguishing between stability, optimality, and sustainability, we consider first a diagrammatic framework. It is assumed that both growth rate and interest rate may be functions of fiscal deficit, among other factors, and that this relationship is non-linear in both cases. As fiscal deficit levels relative to GDP rise initially the growth rate rises up to a point. This is so because, initially, as fiscal deficit rises, government investment also increases, which crowds-in private investment and also positively affects the private savings as the bond holdings of the private sector increases. As shown in figure 1, higher levels of fiscal deficit would be associated with higher levels of debt-GDP ratio at which it can be stabilised. With the higher debt-GDP ratio, the interest payments to GDP ratio also increase. Beyond a point, interest payments become so large as to result in revenue deficit, given other parameters, particularly the ratio of revenue receipts to GDP. As revenue deficit rises, government savings and capital expenditures fall. The overall saving rate also falls, and the growth rate begins to fall.

Also, as fiscal deficit relative to GDP rises, interest rate rises slowly in the initial stages. However, at very large levels of fiscal deficit relative to GDP with the associated high levels of debt-GDP ratios, interest rates rise steeply. Figure 2 has four quadrants. In quadrant I, the growth rate curve [g=G(f,..)] shows growth rates at different levels of fiscal deficit relative to GDP under *ceteris paribus* assumptions and the

interest rate curve [i=I(f,..)] shows interest rates at different fiscal deficit to GDP ratios under similar assumptions. Both growth and interest rates are in nominal terms. The growth curve lies above the interest rate curve for the range shown by OB on the horizontal axis. Throughout this range a country can afford to have a primary deficit.

In quadrant IV, the debt-GDP ratio is shown on the vertical axis. For any given growth rate, a curve showing the debt-GDP ratio for levels of fiscal deficit ratio can be shown, capturing the relationship [b*=f*(1+g)/g]. This relationship is the same as depicted in figure 1, except that it is now shown upside down. For higher levels of growth rate, the curve will shift inward towards the horizontal axis, showing that with a higher growth, the debt-GDP ratio can be maintained at a lower level for a given fiscal deficit to GDP ratio.

The interest rate associated with any fiscal deficit to GDP ratio in the first quadrant is taken to the horizontal axis of quadrant II, through a 45^0 line. Using this and the debt-GDP ratio shown in quadrant IV, the ratio of interest payments to GDP can be shown as their product in quadrant III, that is, by the area of the relevant rectangle. As an example, two growth rates are considered: a low growth rate (g_l) and a high growth (g_h). With the high growth rate, the interest payments to GDP ratio shown by the rectangle OPRb(g_h) is much lower than that associated with the lower growth rate as shown by OQSb(g_l). Considering quadrant I again, the levels of fiscal deficit in the range BC require primary surpluses to keep the debt-GDP ratio constant. But in this range interest payments relative to GDP would have become so high as to make obtaining primary surplus very difficult. Close to the left of point B on the horizontal axis, while primary deficit may be permissible, interest payments are too large leading to government dissavings resulting in growth rates that are less than the potentially achievable levels. In effect, the optimal level of fiscal deficit is given by OA, where growth is highest obtainable, primary deficit is consistent with sustainability, and interest payments are relatively low so that government is able to make enough savings that can contribute to attaining the higher growth. Combinations of high fiscal deficit and debt relative to GDP are detrimental to growth. While it may appear that primary deficit can be maintained for a large range of fiscal deficit to GDP ratios, it is appropriate to search, in the context of a medium-to-long term fiscal stance, for the growth maximising combination of fiscal deficit and debt relative to GDP, and attempt to hold the economy around this combination.

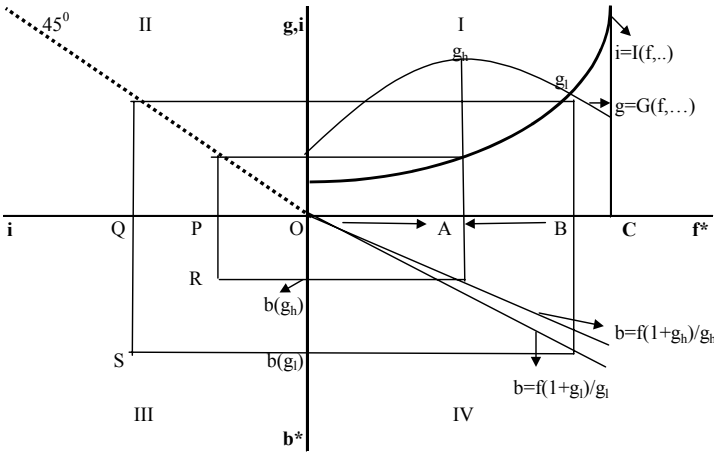

Figure 2: Aspects of Fiscal and Debt Sustainability

Analytically speaking, the issue is one of determining that level of fiscal deficit, which will stabilise the debt-GDP ratio and, at the same time, can promote growth. The question is not whether or not there should be deficit. The relevant question is the appropriate level of deficit. The preceding analytical expose is aimed at obtaining certain directional guidelines in this regard. An important consideration in deciding the appropriate level of fiscal deficit will be the existing level of debt-GDP ratio. When this ratio is adversely impacting savings and investment, fiscal deficit may have to be brought down sharply until the debt-GDP ratio reaches a level at which the overall savings ratio will be consistent with achieving the medium-term growth potential of the economy. It is also important to distinguish between long-term and short-term components of fiscal deficit. We review below the impact of high interest payments relative to GDP on saving and investment in India.

V. Fiscal Deficit, Saving, and Investment in India

An understanding of the behaviour of saving and investment by the private and public sectors is important for considering their impact on fiscal deficit and vice versa. As long as the household sector is providing enough financeable savings, these may be absorbed by the public sector without putting pressure on the interest rates. Also, it has been argued that any reduction in public saving is a loss to the overall saving rate on a one to one basis.

Trends in Saving and Investment in India

In this section, we look at the profile of the saving-GDP ratio (henceforth, saving rate) since 1950-51 and the relative contribution of the household, private corporate, and public sectors. The following symbols are used:

I = Gross domestic capital formation at current prices
I_a= Gross domestic capital formation at current prices adjusted for errors and omissions (investment)
S= Gross domestic savings at current prices(savings)
I_h= Gross domestic capital formation by the household sector
I_c= Gross domestic capital formation by the private corporate sector
I_p= Gross domestic capital formation by the public sector
S_h= Gross domestic savings by the household sector
S_{hf}= Gross domestic financial savings by the household sector
S_c= Gross domestic savings by the private corporate sector
S_p= Gross domestic savings by the public sector
D_c= Shortfall of the savings of the private corporate sector relative to its investment
D_p= Shortfall of the savings of the public sector relative to its investment
E_h= Excess of the saving of the household sector relative to its investment

Z = Excess of adjusted gross domestic capital formation over gross domestic savings
E = Errors and omissions in gross domestic capital formation
From these, the following identities can then be written:

Gross investment is the sum of investments in household, private corporate, and public sectors:

$$I_h + I_c + I_p = I \quad (15)$$

Gross capital formation minus errors and omissions gives 'adjusted' investment

$$I = I_a + E \quad (16)$$

Savings are the sum of household, private corporate, and public sector savings:

$$S_h + S_c + S_p = S \quad (17)$$
$$S + Z = I_a \quad (18)$$

The excess of public sector investment over its own saving is financed by excess of domestic sector saving over domestic investment net of the private sector investment over their saving plus the adjustment terms.

$$(I_p - S_p) = (S_h - I_h) - (I_c - S_c) + Z \quad (19)$$

or $(I_p - S_p) - (S_h - I_h) = (I_c - S_c) + Z$

or $+ D_c = E_h + Z \quad (20)$

It is the excess of household saving over its domestic investment that is being used to finance the excess of investment over saving for both the public and the private corporate sectors. It may also be seen that the financial saving of the household sector is identically equal to the excess of total saving of the household sector over its investment ($S_{hf} = S_h - I_h$).

Table A1 gives the saving-GDP ratio of the household, private corporate, and public sectors in India over the period 1950-51 to 2001-02. The public sector relative to GDP had peaked in 1976-77 at 4.9 percent. They fell marginally but had a local peak in 1981-82 at 4.5

percent. Since then there has been a steady decline. The public sector saving to GDP ratio turned negative in 1998-99 and the dis-saving relative to GDP continued to increase in magnitude reaching a level of negative 2.5 percent in 2001-02. This amounts to a fall of 7 percentage points from the level of 4.5 percent achieved in 1981-82. Chart 4 shows the profile of the saving-GDP ratio of the household, private corporate, and public sectors over the period 1951-52 to 2001-02. Starting from a level of just 6 percent of GDP, the household sector saving ratio has shown a steady rise reaching levels of 22 percent of GDP.

The saving ratio of the private corporate sector has been somewhat stagnant at below 2 percent of GDP until 1987-88 after which it steadily rose to cross 4 percent of GDP in 1995-96. Since then it has generally been above 4 percent but is not rising any further. The public sector savings, which reached a peak in 1976-77 have now become negative. Chart 5 shows the time profile of public and private investment relative to GDP since 1950-51. Until 1988-89, both of these were rising along a trend path. Since then, while private investment has continued to rise along a trend path, public investment has fallen steeply. In the latter part of the nineties, it may be noted that the private investment demand fell. In particular, the private corporate sector investment demand fell

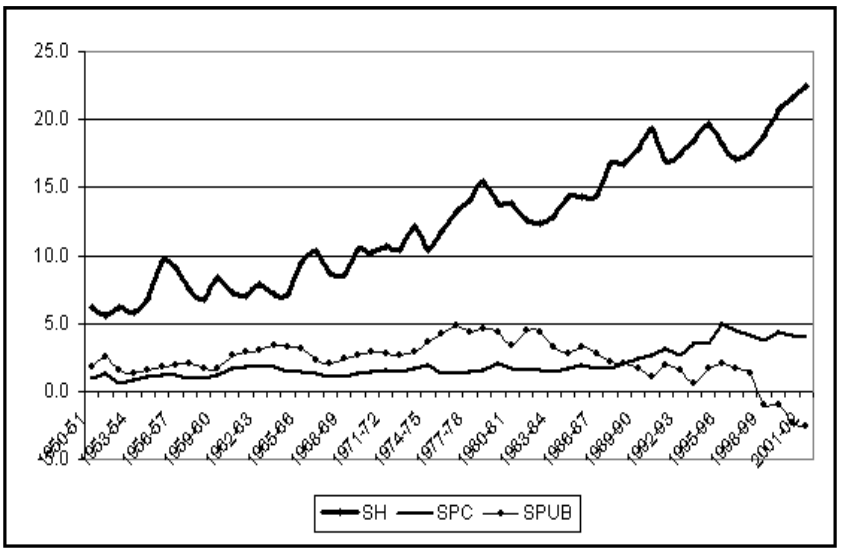

Chart 1: Savings Relative to GDP: Household, Private Corporate and Public Sector

from a peak of 9.6 percent of GDP in 1995-96 to 4.8 percent in 2001-02. Among other factors, the fall in the nominal interest rates in the latter part of the nineties is attributable to the decline in corporate investment.

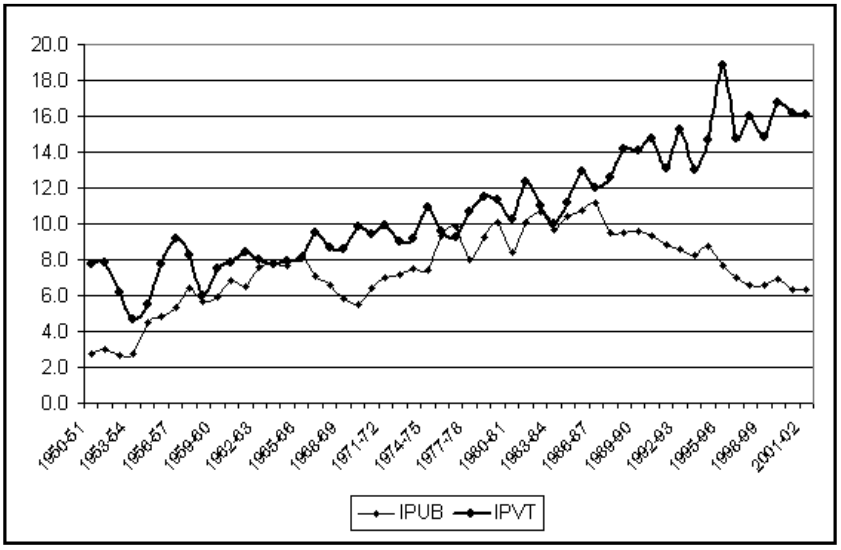

Chart 2: Investment Relative to GDP: Private and Public Sector

Within the public sector, savings and investment of administrative departments and departmental enterprises is referred to as 'government' savings and investment. These are more directly related to fiscal deficit, and its impact on growth. The remaining public sector comprises non-departmental enterprises and quasi-government bodies. Table 2 gives the saving-investment profile of the different components of the public sector. Comparing 1996-97 with 2001-02 figures, it is

apparent that the draft of the government sector (administrative departments and departmental enterprises) as measured by the excess of investment over saving has increased from 4.7 percent of GDP to 8.6 percent in 2001-02. This was clearly the result of the increase in the ratio of revenue deficit to fiscal deficit during this period. It did not lead to a rise in the interest rate because of the fall in private investment as well as government investment during this period. The key to improving the medium term fiscal stance that can sustain a higher growth rate is to reduce government dissavings and increase government capital expenditure relative to GDP. These changes can happen when the pre-emptive claim of interest payments relative to GDP falls and/or government revenues relative to GDP rise.

Table 2: Gross Domestic Saving and Capital Formation of the Public Sector Relative to GDP

(percent)

	Admn. departments	Dep. Enterp-rises	Non-depart-mental enterp-rises	Quasi-govern-ment bodies	Admn. dept. and dept. enterp-rises	Non-dept. enterp-rises and quasi-govt. bodies
Gross Domestic Saving						
1993-94	-3.16	0.86	2.79	0.14	-2.30	2.93
1994-95	-2.68	0.99	3.23	0.12	-1.69	3.36
1995-96	-2.14	0.83	3.19	0.14	-1.30	3.33
1996-97	-2.41	0.75	3.25	0.09	-1.66	3.34
1997-98	-2.92	0.68	3.45	0.13	-2.25	3.58
1998-99	-5.23	0.57	3.53	0.14	-4.66	3.67
1999-00	-5.10	0.57	3.36	0.14	-4.53	3.49
2000-01	-5.55	0.23	2.86	0.14	-5.32	3.00
2001-02	-6.22	0.04	3.29	0.14	-6.18	3.43
2002-03	-5.81	0.09	3.72	0.14	-5.72	3.87
Gross Domestic Investment						
1993-94	1.68	1.94	4.47	0.15	3.62	4.62
1994-95	1.93	1.80	4.85	0.16	3.73	5.01
1995-96	1.77	1.72	3.96	0.14	3.49	4.11
1996-97	1.66	1.54	3.71	0.12	3.20	3.83
1997-98	1.44	1.60	3.44	0.14	3.04	3.57

1998-99	1.61	1.40	3.37	0.19	3.02	3.56
1999-00	1.70	1.48	3.58	0.18	3.18	3.76
2000-01	1.70	0.11	4.30	0.18	1.81	4.48
2001-02	1.61	0.81	3.23	0.19	2.41	3.41

Table 2: Gross Domestic Saving and Capital Formation of the Public Sector Relative to GDP (contd.)

(percent)

	Admn. departments	Dep. Enterp-rises	Non-depart-mental enterp-rises	Quasi-govern-ment bodies	Admn. dept. and dept. enterp-rises	Non-dept. enterp-rises and quasi-govt. bodies
Excess of Investment over Saving						
1993-94	4.84	1.08	1.68	0.01	5.92	1.69
1994-95	4.61	0.81	1.62	0.03	5.42	1.65
1995-96	3.91	0.89	0.78	0.00	4.80	0.78
1996-97	4.07	0.79	0.46	0.03	4.86	0.49
1997-98	4.36	0.92	-0.01	0.00	5.28	0.00
1998-99	6.84	0.83	-0.16	0.05	7.67	-0.11
1999-00	6.81	0.90	0.22	0.05	7.71	0.27
2000-01	7.25	-0.13	1.44	0.04	7.13	1.48
2001-02	7.83	0.76	-0.06	0.05	8.59	-0.01

Source: National Income Accounts, CSO.

Some Empirical Relations

In the argument that high levels of debt-GDP lead to high interest payments relative to GDP, which crowd out government capital expenditure and reduce the overall saving rate, two relationships are of critical importance:

- The responsiveness of changes in the saving ratio with respect to changes in the fiscal deficit levels; and
- The responsiveness of government capital expenditure to changes in the level of interest payments.

We provide some empirical estimates of the short-term and long-term relationships, using a sample period from 1950-51 to 2001-02. With the concept of cointegration proposed by Engle and Granger (1987), it has been possible to distinguish between long-run equilibrium relations and short-term dynamics among variables. Identification conditions between cointegrated time series models or error correction models (also known as equilibrium correction models) have been explored in

Johansen (1991), and Johansen and Juselius (1995). In Hsiao (1997), it was shown that under certain conditions, virtually all the results for the stationary case also apply to structural models involving integrated variables. It is also demonstrated that the identification of long-run equilibrium relations is not independent of the short-run dynamics.

In the present analysis, the dynamics of a few key relations is studied. The estimated structural relationships should be considered as embedded in a full structural model and as preliminary findings. The variables used in this exercise are defined below. Variables in real terms are derived by deflating by the implicit price deflator of GDP at factor cost (IPDFC). In the case of interest rate, the inflation rate pertaining to the IPDFC is deducted to obtain the real interest rate. First differences are shown by prefixing a variable by D, and the second difference, by prefixing a variable by DD.

IPDFC: Implicit price deflator of GDP at factor cost
SPVR: private sector saving in real terms
PVYR: private disposable income in real terms
SPUBR: public sector saving in real terms
I3R: interest rate on deposits of 3 to 5 years
I3SR: ex-ante interest rate on deposits of 3 to 5 years obtained by deducting from I3R, the expected rate of inflation
IPVTR: private investment in real terms
ISBI: State Bank of India advance rate
RISBI: State Bank of India advance rate in real terms obtained by deducting the inflation rate
RCMRR: combined revenue receipts of the central and state governments in real terms
RCMIP: interest payments on the combined account of central and state governments in real terms
RCMCE: combined capital expenditure of the central and state governments in real terms
CMDFD: combined derived fiscal deficit

Private Savings Function: Impact of Public Savings

A critical hypothesis that requires to be tested is whether any fall in the public sector savings, implying an increase in revenue deficit, is compensated by a rise in private sector savings, and if that is so whether the compensation is full or partial and whether the effect takes place with

a lag. Real private savings appear to have a unit root not only in levels but also in first differences. It becomes stationary in second difference with intercept and trend. The explanatory variables are private disposable income(PVYR) in real terms and public sector savings (SPUBR). Both of these are obtained by deflating the corresponding nominal series by the implicit price deflator of GDP (IPDFC) at factor cost. Both of these variables are stationary in first difference with intercept and trend. A third explanatory variable is the expected real interest rate. The interest rate is represented here by the interest rates on deposits of 3 to 5 years. The corresponding interest rate is obtained by deducting from the nominal interest rate, the expected inflation rate. The inflation rate pertains to the implicit price deflator of GDP at factor cost (IPDFC) from which trend inflation rate is estimated by using the H-P filter. Accordingly a series for expected real interest rate (SI3R) is generated.

Table 3 gives results of the estimation of the error correction model [ECM], which estimates together the long-run relation and the short-term dynamics. While private savings respond positively to private disposable income, the effect of public saving is negative, implying that a fall in public savings is associated with a rise in private saving but the compensation is partial. The effect is negative both in the level and the first difference. The positive sign and the magnitude of the lagged dependent term show that the long-term effect is higher than the short-run effect.

Table 3: Dependent Variable: SPVR

Sample (adjusted): 1953 2002
Included observations: 50 after adjusting endpoints

Variable	Coefficient	Std. error	t-Statistic	Prob.
C	-18068.6	4053.9	-4.457	0.000
PVYR	0.154422	0.030	5.085	0.000
SPUBR	-0.294430	0.111	-2.661	0.011
DSPUBR(-1)	-0.514448	0.210	-2.448	0.018
DPVYR(-1)	0.094398	0.076	1.245	0.220
SPVR(-1)	0.496261	0.111	4.459	0.000
R-squared	0.996579	Mean dependent var		94558.22
Adjusted R-squared	0.99619	S.D. dependent var		94033.24
S.E. of regression	5804.129	Akaike info criterion		20.28269
Sum squared resid	1.48E+09	Schwarz criterion		20.51214

Table 3: Dependent Variable: SPVR (contd.)

Sample (adjusted): 1953 2002
Included observations: 50 after adjusting endpoints

Variable	Coefficient	Std. error	t-Statistic	Prob.
Log likelihood	-501.0673	F-statistic		2563.459
Durbin-Watson stat	1.73141	Prob (F-statistic)		0

Fiscal Deficit and Government Capital Expenditure

It has been argued in an earlier section that as interest rates increase relative to current revenues of the government, a process of adjustment starts in government expenditure. This may lead to a reduction in public investment, particularly, government investment relative to GDP. We look at the relationship between government capital expenditure, interest payments and revenue receipts with reference to the combined account of central and state governments. These are converted into real terms by deflating with the GDP deflator. All the three series are stationary in first difference. Table 4 gives the estimated relationship within the ECM framework. It is seen that while interest payments in real terms affect negatively the real government capital expenditure, revenue receipts in real terms have a positive impact.

Table 4: Dependent Variable: RCMCE

Method: Least squares
Sample (adjusted): 1953 2002
Included observations: 50 after adjusting endpoints

Variable	Coefficient	Std. error	t-Statistic	Prob.
C	824.1816	1008.755	0.817028	0.4182
RCMIP	-0.452654	0.110548	-4.094651	0.0002
RCMRR	0.237316	0.053105	4.468815	0.0001
DRCMRR(-1)	-0.103212	0.09703	-1.063706	0.2931
RCMCE(-1)	0.545986	0.096808	5.639866	0
R-squared	0.951796	Mean dependent var		25509.16
Adjusted R-squared	0.947511	S.D. dependent var		13173.31
S.E. of regression	3018.071	Akaike info criterion		18.95726
Sum squared resid	4.10E+08	Schwarz criterion		19.14847
Log likelihood	-468.9316	F-statistic		222.1319
Durbin-Watson stat	1.941086	Prob(F-statistic)		0

VI. Growth in Combined Debt of Centre and States: A Historical Perspective

The decision as to the appropriate level of fiscal deficit in the current period has to take into account the levels of the accumulated debt relative to GDP, particularly in view of the impact it has on interest liabilities. In an earlier contribution, we had looked at the experience of debt accumulation in respect of central debt-relative to GDP [Rangarajan and Srivastava, 2003]. In this paper, we look at the growth of the combined debt-GDP ratio and examine the relative contribution of cumulated primary deficits and the cumulated effect of the excess of growth rate over interest rate over the period 1951-52 to 2001-02. Interest rate in this discussion refers to the effective interest rate of the central and state governments, calculated as the ratio of interest payments in a year to the outstanding liabilities at the beginning of the year. Throughout the forty-five year stretch from 1955-56 to 1999-00, the growth rate was in excess of the interest rate. Since 2000-01, for three consecutive years, the growth rate has been less than the interest rate both in real and nominal terms. During the nineties, even when the GDP growth rate remained in excess of the interest rate, the gap between the two has been narrowing.

The standard specification of the equation describing debt dynamics with discrete time periods is given by equation (1) [$b_t = p_t + b_{t-1} \{(1+i_t)/ (1+g_t)\}$]. As discussed in Rangarajan and Srivastava (2003), writing $z_t = b_t - b_{t-1}$, equation (1) can also be written as

$$z_t = p_t - b_{t-1} [(g_t - i_t) (1+g_t)^{-1}]$$

or
$$p_t = z_t + b_{t-1} [(g_t - i_t) (1+g_t)^{-1}] \qquad (21)$$

Summing up over any two benchmark years 1 and T, we have

$$\Sigma p_t = \Sigma z_t + \Sigma b_{t-1} [(g_t - i_t) (1+g_t)^{-1}] \qquad (t=1,\ldots, T) \qquad (22)$$

The term

$$A1= \Sigma z_t / \Sigma p_t \qquad (t=1,\ldots T) \qquad (23)$$

shows the extent to which the cumulated primary deficits translate into accumulation of debt. On the other hand, the term

$$A2=\Sigma\, b_{t-1}\ [(g_t - i_t)(1+g_t)^{-1}]\ /\Sigma\, p_t \qquad (t=1,\ldots T) \qquad (24)$$

shows the extent to which the impact of cumulated primary deficits is absorbed by the excess of growth over interest rate. For the purpose of the historical review, debt includes external debt evaluated at historical exchange rates and state debt does not include reserve funds and deposits.

According to available information, the combined debt-GDP ratio of the central and state governments at the end of 1950-51 was 29.6 percent. During 1951-52 to 1959-60 a little less than 13 percentage points were added to the debt-GDP ratio. An additional accretion of about 4 percentage points took place in the sixties. In the seventies, there was hardly any change in the debt-GDP ratio. It was in the eighties and nineties (up to 2002-03) that there was an increase respectively of 14.7 percentage points for each period in the debt-GDP ratio. Table 5 and chart 3 show the relative effects of the cumulated primary deficits and the factor reflecting the effect of growth-interest rate differential in the process of accumulation of combined debt of the central and state governments since 1951-52. The Indian experience shows that a significant part of the pressure of primary deficit could be absorbed by the excess of growth over interest rates. In particular, it was able to absorb nearly 72 percent of the cumulated primary deficits. Had this cushion not been available, cumulated primary deficits through 1951-52 to 2002-03 would have added about 169 percentage points to the combined debt to GDP ratio.

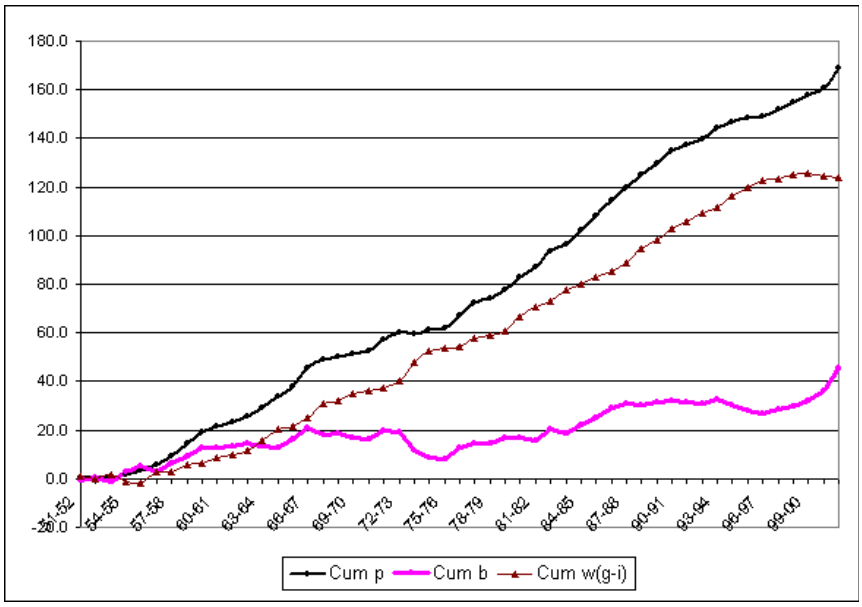

Chart 3: Growth of State Debt Relative to GDP: Relative Roles of Cumulated Primary Deficits and Excess of Growth Over Interest Rates

Key:
Cum p: Cumulated primary deficit to GDP ratio
Cum b: Cumulated debt to GDP ratio
Cum w (g-i): Cumulated effect of weighted excess of growth over interest rate

The decade-wise picture indicates that in the fifties, 33.5 percent of the impact of cumulative primary deficit was absorbed by the growth-interest rate differential. The remaining 66.4 percent of the cumulated primary deficit of 19.4 percentage points resulted in an increase in the debt-GDP ratio of 12.9 percentage points. In the sixties, the pressure put by the cumulated primary deficit was relatively larger (32.2 percentage points). However, 88 percent of this was absorbed by the differential of growth over interest rate, resulting in only a small increase of 3.9 percentage points in the debt-GDP ratio. During the seventies,

nearly hundred percent of the impact of cumulated primary deficit was absorbed by the growth/ interest rate differential leading to a negligible increase in the debt-GDP ratio. In the eighties and the nineties (up to 2002-03), about 72 and 62 percent respectively of the pressure of cumulated primary deficit could be absorbed by the (g-i) differential. Chart 3 also shows how the accumulated primary deficit was the most persistent factor in causing the debt-GDP ratio to rise and how the growth-interest differential was able to absorb a significant portion of it in several stretches of time.

Table 5: Decadewise Decomposition of Debt Accumulation Relative to GDP

	Cumulated changes in			Relative impact of cumulated primary deficit	
	Debt-GDP ratio	Primary def-GDP ratio	Growth & interest rate differential	Increase in debt-GDP ratio	Absorption by growth-interest differential
				D/p	W(g-i)/p
1951-52 to 1959-60	12.89	19.39	6.50	66.47	33.53
1960-61 to 1969-70	3.87	32.18	28.31	12.03	87.97
1970-71 to 1979-80	0.07	26.18	26.12	0.25	99.75
1980-81 to 1989-90	14.71	52.09	37.38	28.24	71.76
1990-91 to 2002-03	14.67	39.09	24.42	37.53	62.47
1951-52 to 2002-03	46.21	168.94	122.73	27.82	72.18
Memo:					
1996-97 to 2002-03	19.55	19.77	0.22	101.14	1.13
Debt-GDP Ratio at the end of--					
1950-51	29.6				
2002-03	75.8				

Source: (Basic Data): Indian Public Finance Statistics, Ministry of Finance, Government of India, and National Income Accounts, CSO.

However, for three consecutive years, *viz*., 2000-01, 2001-02, and 2002-03, the nominal growth rate fell below the effective interest rate. In these years, instead of absorbing the impact of primary deficits, the growth-interest differential, being negative, worked in the reverse by adding to the debt-GDP ratio. Further, since this effect depends on the previous year's debt-GDP ratio, its impact became progressively larger for the same shortfall in the growth rate relative to the interest rate. At the

end of 2002-03, the combined debt-GDP ratio stood at 76 percent when external debt is evaluated at historical exchange rates and, for the states, reserve funds and deposits are not included. If these adjustments are made, the combined debt-GDP ratio at the end of 2002-23 is estimated to be about 85 percent of GDP.

VII. Medium and Short Term Fiscal Policy Stance

The management of fiscal deficit needs to distinguish between the long term or trend growth after adjusting for the cyclical component of growth and correspondingly between structural or cyclically neutral deficit and transitory deficit. The structural deficit must be determined within a sustainability framework aiming at maximising trend growth rate. The short-term component of fiscal deficit should be used to minimise the impact of cyclical changes while keeping the economy along its long term growth path. The use of discretionary expenditure to stimulate the economy when it is below potential output and contain inflationary pressure when prices are above trend levels is meant to serve the objective of macroeconomic stabilisation. The neo-classical analysis argues about the deleterious effect of high permanent deficits on savings and suggests stabilising fluctuations around the equilibrium path with high rather than low level of national savings.

In the *Maastricht Treaty* (MT) norms read with the *Pact on Growth and Stability* (PSG), it is provided for the member countries that under normal circumstances the structural balance should be zero and, when facing a slow-down, the net budget deficit could be up to a maximum of 3 percent of GDP[5]. On a long-term basis the debt-GDP ratio should not be allowed to exceed 60 percent of GDP. It is only under an exceptional down turn or recession that the budget deficit may be allowed to exceed the 3 percent reference value[6].

Measuring Structural and Cyclical Components of Deficit

Several methods have been used in the literature for estimating structural deficit. Considering actual fiscal deficits as the sum of structural and cyclical components, if one of the two components is

estimated, the other can be derived as a residual. There are three main methods that have been used in the literature: (a) constant elasticities method, where the cyclical component is estimates first based on estimated of revenue and expenditure elasticities with respect to income; (b) smoothed-ratio approach where the structural fiscal deficit is estimated first by smoothening the revenue and expenditure ratios to GDP; and (c) structural time series approach where time-varying elasticities are used and the cyclical component is estimated first. There are some difficulties with each of these approaches. The more traditional approach of constant elasticities used by OECD, among others, involves a three-step procedure. First, the output gap is calculated by taking the difference between potential output and actual output; secondly, response of revenue and expenditure categories to changes in the output gap are calculated by estimating the relevant elasticities, providing an estimate of the cyclical component of deficit; and finally, the structural deficit is calculated as a residual. As shown by Barrel *et.al*., (1994), and Bradner, Diebalk, and Schuberth (1998), estimates of structural balances are highly sensitive to the method of estimating trend output and uncertainty surrounding the output-elasticities of expenditure and revenue categories. The structural time series approach, as suggested by Jaeger (1990), also has some problems. In particular, the variances of the parameters are not well defined. It has been shown by Harvey (1989) that in such models, the exogenous variables must be bounded from above and non-stochastic. Url (1997) has pointed out that nominal potential output cannot be regarded as bounded from above. The smoothed-ratio approach, suggested by Cano and Kanutin (1996) provides a direct and simpler method of calculating the structural deficit. In this approach, revenues and expenditures, expressed as ratios to GDP, are decomposed into a structural and residual component by using a Hodrick – Prescott (H-P) filter[7].

Let r_s and e_s be the trend ratios of revenues and expenditures relative to GDP (these can be disaggregated categories also), and r_c and e_c be corresponding cyclical components. Then the structural deficit to GDP ratio is derived directly as

$$f_s = e_s - r_s \qquad (25)$$

The cyclical deficit f_c is obtained as a residual. Bradner, Diebalk, and Schuberth (1998) argue that this method has several advantages. The H-P filter is relatively judgment free since only one parameter,

namely the length of the business cycle, has to be fixed. As a direct method, it is able to exclude transitory non-cyclical events. The linearity of the H-P filter also facilitates using a disaggregated approach since the disaggregated structural components add to 1. This method is also not very demanding in terms of data requirements. One disadvantage however, is that it cannot capture the impact of fiscal policy changes if these are located at the end-points of the sample.

Trends in Structural and Cyclical Deficits

In this analysis, a distinction is made between structural fiscal deficit and structural primary deficit by calculating the trend ratios of primary expenditure (pe_s) and interest payments relative to GDP ip_s separately. Thus,

$$f_s = (pe)_s - r_s + (ip)_s \text{ and } f_c = f - f_s \quad (26)$$

$$\text{Thus, } f = p_s + (ip)_s + f_c \text{ where } p_s = (pe)_s - r_s \quad (27)$$

The fiscal deficit to GDP ratio thus has three components: primary structural deficit, structural interest payments relative to GDP, and cyclical fiscal deficit. Table 6 shows the structural and actual fiscal deficits since 1990-91. Clearly, structural fiscal deficits account for a large part of actual fiscal deficit in the nineties. The corresponding estimates for the years since 1951-52 are given in table A2. Structural interest payments to GDP ratio has increased continuously from 4.3 percent in 1990-91 to 5.9 percent in 2001-02, amounting to an increase of 2.6 percentage points. Structural primary deficit can be seen to have fallen from the peak of 4.14 percent in 1990-91 to 2.75 percent in 1997-98, before it started rising again. Although both factors have contributed to structural fiscal deficit, the impact of structural interest payments has been larger in the nineties and also more persistent.

Table 6: Combined Central and State Finances: Structural and Cyclical Deficits Relative to GDP

(percent to GDP)

	Actual fiscal deficit	Structural fiscal deficit	Cyclical fiscal deficit	Structural primary deficit	Debt-stabilising primary deficit	Actual interest payments	Structural interest payments
1990-91	9.383	8.433	0.950	4.144	4.4757	4.397	4.288
1991-92	7.162	8.302	-1.140	3.822	3.2284	4.746	4.480
1992-93	7.240	8.171	-0.931	3.516	2.9542	4.792	4.656
1993-94	9.824	8.059	1.765	3.243	2.8343	4.953	4.816
1994-95	6.945	7.975	-1.030	3.012	4.3319	5.128	4.963
1995-96	6.778	7.947	-1.169	2.846	3.8711	4.962	5.101
1996-97	6.081	7.993	-1.912	2.757	2.5044	5.111	5.236
1997-98	7.660	8.118	-0.459	2.748	0.5467	5.159	5.370
1998-99	8.227	8.309	-0.083	2.801	1.9892	5.318	5.508
1999-00	9.002	8.548	0.453	2.899	0.3002	5.682	5.650
2000-01	8.792	8.816	-0.024	3.022	-1.1835	5.727	5.794
2001-02	10.557	9.099	1.458	3.159	-0.4902	6.098	5.939

Source (basic data): Indian Public Finance Statistics and National Income Accounts.

Structural Primary Gap

The structural 'primary gap' is defined as the difference between actual structural primary deficit and the debt-stabilising primary deficit (p^s) defined as $\{b_{t-1}*(1+g_t)/(g_t-i_t)\}$. Table 6 also shows that the primary deficit has been higher than the 'debt-stabilising' primary deficit, in most of the years in the nineties except 1990-91, 1994-95, and 1995-96. The structural primary balance has been used in the literature to assess the medium-term fiscal stance. The large values of the structural primary balance since the late nineties clearly indicate that the current medium-term fiscal stance is not sustainable.

The profile of structural and debt-stabilising primary deficit is compared in chart 4 since 1951-52. The structural primary deficit is shown by the bolder line. There are long stretches towards the end of the eighties and the latter part of the nineties that the structural primary

deficit has been much higher than the debt-stabilising primary deficit. These are the episodes in time where large accretion of debt relative to GDP took place. This led to larger structural interest payments relative to GDP. Together, structural primary deficit and structural interest payments have caused structural fiscal deficits to be large.

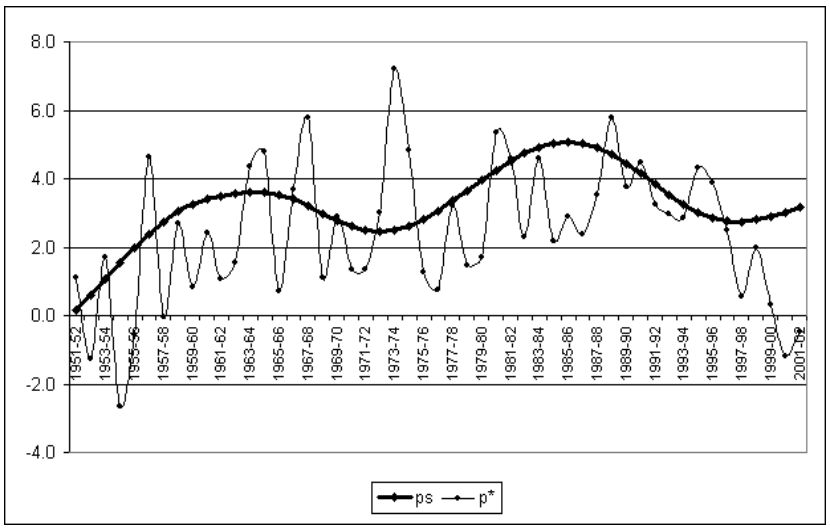

Chart 4: Comparison of Structural and Debt-Stablising Primary Deficit

In view of the large structural fiscal deficit, the role that cyclical deficit can play has become extremely limited in periods of recession. Table A3 shows estimates of cyclical deficit against the difference between actual growth rate and trend growth rate. It is expected that a suitable short-term fiscal stance would show opposite signs between cyclical deficit and departures of actual growth from trend growth, that is, when actual growth is below trend, the cyclical deficit should be positive and *vice versa*. It would be seen that throughout the period from 1965-66 to 1987-88, the short-term stance was in the correct direction. It is in the period since 1988-89 that the short-term stance has not been robust except in the mid-nineties.

Policy Options

In considering the policy options for India at the current juncture, it may be noted that the debt-GDP ratio, according to available information, is estimated to be in excess of 80 percent of GDP at the end of 2004-05. This includes reserve funds and deposits for both the centre and states but external debt is evaluated at historical exchange rates. Also, liabilities of the market stabilisation fund are not included against which an equivalent asset in the form of cash reserves is held with the RBI. Ruling out any further increase in the debt-GDP as undesirable, the policy option is whether to stabilise the debt-GDP ratio at its present level or bring it down before stabilising. From the viewpoint of a suitable medium-term fiscal policy stance, a combination of high fiscal deficit, high debt, and high-interest payments relative to-GDP will negatively impact on the trend-growth rate by keeping the saving-GDP ratio below its potential. By reducing the debt-GDP ratio, interest payments relative to GDP will also be reduced such that, in combination with feasible levels of revenue receipts relative to GDP, government will be able to balance its revenue account and eliminate dissaving. Such a fiscal stance would facilitate achieving a higher level of growth rate on a sustained basis. This calls for a period of adjustment during which fiscal deficit is lowered each year from the previous year's level such that, in each successive year, the debt-GDP ratio falls. This adjustment phase may continue until revenue deficit is eliminated. Thereafter, a stabilisation phase can emerge when the fiscal deficit may remain constant at a level leading eventually also to debt-stabilisation.

The FRBMA enacted by the central government, read with its rules and subsequent amendment, specifies the target for achieving a fiscal deficit to GDP ratio of 3 percent by 2008-09. The FRBMA, as it stands at present, is incomplete in two respects. First, it does not define a debt-GDP ratio that would be required for keeping the economy on its potential growth path, and secondly, it does not define suitable limits of departure from the medium-term stance to cope with cyclical fluctuations. The prescription under the FRBMA can be evaluated in relation to the *Maastricht Treaty* norms read with the *Growth and Stability Pact*. In the European context, countries are supposed to maintain balance (zero fiscal deficit) under normal circumstances and up to 3 percent fiscal deficit, when faced with a downturn. Undoubtedly, the higher growth rate in India will allow a higher level of fiscal deficit relative to GDP to be maintained. A combined fiscal deficit of 6 percent of GDP for the

government sector would be consistent with the available supply of funds in the form of financial savings of the household sector of the order of about 10-11 percent of GDP and feasible levels of current account deficit of about 1.5 to 2 percent of GDP. This order of supply of funds would be adequate for meeting the demand for these funds from the private corporate sector to an extent of about 4-5 percent of GDP, demand from the government sector (administrative departments and departmental enterprises) of 6 percent of GDP (fiscal deficit) and that from the non-departmental public enterprises of about 1.5 to 2 percent of GDP. Thus, a combined fiscal deficit of 6 percent of GDP is consistent with the existing ratio of the savings of the household sector in financial assets relative to GDP and prudent levels of current account deficit, and the demand on these by the private corporate sector and non-departmental public enterprises.

The FRBMA of the central government has indicated the need to contain the fiscal deficit of the centre to 3 percent of GDP by 2008-09. In determining a limit for the states considered together, it might be recognised that the states have a higher share in the combined revenue receipts after transfers, and therefore, in the context of sustainability, they may be allowed a higher limit of fiscal deficit relative to GDP. But the states also face a higher interest rate on average. If these two factors roughly neutralise each other, allowing a target limit of fiscal deficit relative to GDP for the states similar to that for the centre, it would result in a ratio of interest payments to revenue receipts for the states similar to that for the centre[8]. Thus, fiscal deficit may be stabilised at 6 percent of GDP on the combined account of the central and state governments with 3 percent each on their separate accounts, assuming that these levels of fiscal deficits relate to the 'own' requirements of the two levels of government. This should be considered as the relevant target over a cycle. The Twelfth Finance Commission in the suggested programme for restructuring public finances has recommended the target of reaching a combined fiscal deficit of 6 percent of GDP by 2008-09. Among important observers of the fiscal scene in India, Chelliah (2001, 2004) has argued for this level of combined fiscal deficit. In a recent analysis of debt sustainability, Ram Mohan, Dholakia, and Karan (2005), while dealing with central debt, highlight a number of measurement issues. In their adjustment programme, two scenarios are drawn with alternative assumptions. In both cases, the central fiscal deficit to GDP ratio is brought down to 3.9 percent by 2009-10. This is under the assumption of the system of on-lending from the central to state governments being

continued. About 0.8 percentage points of central fiscal deficit may only be for on-lending to the states. Thus, for central fiscal deficit, representing borrowing only for 'own' needs, the target level after adjustment that is considered feasible in their analysis does not appear to be much different from the one suggested here, although there are differences in the initial levels.

As already mentioned, before the stabilisation phase is reached, the Indian economy will have to pass through an adjustment phase. During this phase, the debt-GDP ratio will have to fall. This can be done by reducing the fiscal deficit to GDP ratio each year to a level lower than that, which will stabilise the debt-GDP ratio at the previous year's level. For example, if the previous year's debt-GDP ratio is 80 percent, and the nominal growth rate is 12 percent, a fiscal deficit to GDP ratio of about 8.57 percent would leave it unchanged at 80 percent at the end of the current year. A fiscal deficit that is below this level would lead to a reduction in the debt-GDP ratio. The period of the adjustment phase will be shorter, the larger the extent by which the actual fiscal deficit relative to GDP is lower than the debt-stabilising level, and the faster the improvement in the revenue to GDP ratio on the combined account of central and state governments. Once the adjustment phase is over, and the combined fiscal deficit of the centre and the states remains fixed at 6 percent, the debt-GDP ratio would still keep falling and eventually stabilise at 56 percent of GDP[9]. This is under the assumption that the nominal growth rate would be 12 percent. At that stage, the interest payments to revenue receipts ratio will stabilise at 17 percent[10] . This ratio would be most desirable as it would permit a larger primary revenue expenditure to be incurred on the social sectors. In fact, this will be happening as the ratio of interest payments to revenue receipts begins to fall from its present level of around 34 percent. The decomposition of this overall interest payment to revenue receipts ratio between the centre and the states will depend on their revenue receipts to GDP ratios and their respective average interest rates. Maintaining balance on revenue account will be facilitated as interest payment to GDP ratio falls. Under these circumstances, the government can maintain a capital expenditure to GDP ratio reasonably above 6 percent with some positive non-debt capital receipts. In the medium term, a strategy of fiscal correction broadly on these lines would support growth on a sustained basis as government dissavings are reduced and government capital expenditure, focused on infrastructure, is increased and kept above the level of 6

percent of GDP. The behaviour of the debt-GDP ratio under the proposed reform scenario is given in chart 5 and appendix table A4.

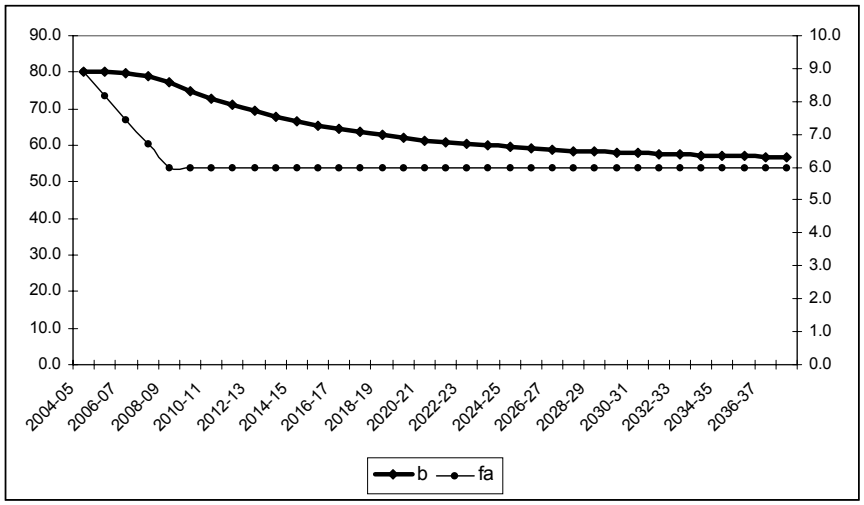

Chart 5: Debt and Fiscal Deficit to GDP Ratios under the Reform Scenario

Note: Debt-GDP ratio (b) is shown on the left hand vertical axis and fiscal deficit to GDP ratio (fa) is shown on the right hand vertical axis with a different scale.

An argument is sometimes advanced that in the current economic scenario, higher fiscal deficits should be used for accommodating higher expenditure on infrastructure and social sectors. While an increase in expenditures in some of these areas may be desirable and even necessary, they ought to be undertaken in such a way that there is no increase in primary deficit and debt-GDP ratio. Expenditure prioritisation is thus requisite under such a situation. In fact, as a result of expanding expenditures, government dissaving increases, a sustained increase in the growth rate cannot emerge. With high levels of revenue deficit, increased levels of expenditures on infrastructure and social sectors cannot also be sustained. As demand for funds from the private corporate sector increases, it cannot be assumed that the cost of funds will remain benign, if government dis-savings do not come down. An appropriate medium term strategy is to control fiscal deficit, reduce debt-GDP ratio so that interest payments relative to revenue receipts can

be reduced and government dissavings can be eliminated. This will augment the overall saving rate. With stable costs of borrowing, overall investment will increase to sustain a growth rate of 7 percent and above. With the ratio of revenue deficit to GDP coming down progressively to zero, the entire amount of borrowing supplemented by non-debt capital receipts can be used for capital investment by the government. The right time for the adjustment phase is at present when the economy is on the upswing.

VIII. Concluding Observations

This paper has looked at the impact of fiscal deficits on saving, investment, and growth in the light of the theoretical literature on the subject in the context of the fiscal deficit and debt on the combined accounts of the central and state governments. Revenue deficits amount to reduction in government savings, which may not be fully offset by a corresponding rise in the private savings, leading to a fall in the overall saving rate. The impact of fiscal deficit on investment arises both from its impact on private investment and government investment. The adverse effects on private investment occur if fiscal deficits put pressure on interest rates, and if private investment is sensitive to the interest rate. The effect on government capital expenditure is through committed interest payments, which rise if the debt-GDP ratio rises and/or interest rate rises. In the context of debt accumulation in India, the main findings are summarised below.

- Fiscal deficit and government debt in India, have received growing attention of analysts and policymakers, particularly since the nineties, when in most years the combined fiscal deficit was higher than 9 percent of GDP. The concerns have become more serious in recent years when there has been an explosive rise in the debt-GDP ratio in spite of the fact that the nominal interest rates have fallen. This is because, during 2000-03, nominal growth rates fell even more. With growth rate being less than the effective interest rate, the debt-GDP ratio increased both because of cumulated primary deficits and excess of interest rate over growth rate during 2000-01 to 2002-03.

- Even if fiscal deficits may appear to be sustainable according to some studies, the critical issue relates to determining appropriate levels of debt and deficit relative to GDP on which these should be stabilised. This can be done by developing rules with given growth and interest rates and initial debt levels. However, since fiscal deficits and debt affect growth and interest rates, answers need to be derived using information on their impact on savings and investment, which ultimately determine the growth rate. The interest rates are also affected by the fiscal deficit and monetary policy, but there may also be exogenous influences, particularly international interest rates and inflow of foreign capital.
- When fiscal deficits are high in magnitude relative to GDP and largely structural in nature, government's ability to mount counter-cyclical interventions could be compromised, particularly when growth is below trend levels and intervention is needed. This was clearly experienced in the late nineties and the early part of the new decade.
- In India, the household sector saves more than it invests, and the excess becomes available in the form of financial savings of this sector to the private corporate sector and the government sector for their investment requirements that are not financed by their own savings. Although government dissavings increased since the late nineties, the pressure on interest rates was not witnessed because of a fall in investment demand by the private corporate sector. This may prove to be temporary.
- The overall growth rate depends on the overall savings rate and investment rate. There is reason to believe that when government saving falls, private saving rate increases as wealth held in the private sector in the form of government bonds increases. This compensatory rise in the private sector saving rate has been partial. On the investment side, government's own investment demand also fell as its debt-GDP ratio and the ratio of interest payments to revenue receipts rose. Empirical tests indicate that government capital expenditures do respond negatively to the interest payments and positively to revenue receipts. If interest payments rise faster than revenue receipts, government capital expenditure falls. Private investment responds negatively to a rise in expected interest rates. In the nineties and beyond, government capital expenditures relative to GDP fell not only because interest payments relative to GDP increased but also because ratio of revenue receipts to GDP fell.

- The FRBMA has certain positive features. It is incomplete in two respects. One, it does not indicate a suitable level of debt-GDP ratio along with the specified fiscal deficit target, and secondly, it does not provide for a suitable strategy for coping with short-term fluctuations.
- It is important that centre's FRBMA is supplemented by state level fiscal responsibility legislations because, taken together, states' borrowing and debt contribute significantly to the overall fiscal deficit and debt relative to GDP and have significant macro implications.
- To achieve and sustain growth at high levels, it is required that the overall savings ratio is increased leading to a rise in the investment ratio, and revenue and fiscal deficits should be so managed as to serve this purpose. In the context of the present policy options, there is a need to bring down the debt-GDP ratio from its present level, which is in excess of 80 percent of GDP. The process of adjustment can be considered in two phases: adjustment phase and stabilisation phase. In the adjustment phase, fiscal deficit will have to be reduced in each successive year to a level, which is less than the level of fiscal deficit relative to GDP that will stabilise the debt-GDP ratio at its previous year's level. This phase should be continued until the revenue deficit is eliminated. In the second phase, the fiscal deficit could be stabilised at 6 percent of GDP. In this phase, the debt-GDP ratio would fall for some more years and eventually stabilise at 56 percent. At this level of debt-GDP ratio, it is estimated that the interest payment to revenue receipts ratio, under given assumptions, would fall to 17 percent. As the ratio of interest payments to revenue receipts begins to fall, it will enable a progressively larger amount of primary revenue expenditure to be incurred on the social sectors.

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Table A1: Savings and Investment Relative to GDP at Market Prices

(percent to GDP)

	Gross Domestic Savings			Public sector	Total (2+3+4)	Gross Domestic Capital Formation			
	Household sector	Private corporate sector	Total private			Public sector	Private sector	Total (12+13)	Adjusted total (14+15)
	SH	SPC	SPVT	SPUB	S	IPUB	IPVT	ISUM	IADJ
1950-51	6.16	0.94	7.10	1.83	8.93	2.78	7.73	10.51	8.72
1951-52	5.52	1.29	6.80	2.52	9.32	3.04	7.81	10.85	11.05
1952-53	6.15	0.62	6.76	1.54	8.31	2.64	6.20	8.85	7.98
1953-54	5.81	0.80	6.60	1.27	7.87	2.76	4.63	7.38	7.76
1954-55	6.73	1.11	7.84	1.57	9.41	4.47	5.49	9.96	9.56
1955-56	9.62	1.23	10.85	1.75	12.60	4.80	7.72	12.52	12.96
1956-57	9.10	1.20	10.29	1.94	12.23	5.34	9.19	14.52	15.01
1957-58	7.47	0.91	8.38	1.99	10.37	6.43	8.24	14.68	13.91
1958-59	6.83	0.94	7.77	1.69	9.46	5.67	6.02	11.70	11.99
1959-60	8.30	1.18	9.48	1.67	11.15	5.95	7.47	13.42	12.63
1960-61	7.30	1.64	8.94	2.64	11.59	6.86	7.79	14.66	14.39
1961-62	7.04	1.76	8.80	2.89	11.69	6.52	8.44	14.96	13.59
1962-63	7.84	1.76	9.59	3.08	12.67	7.62	8.04	15.65	14.92
1963-64	7.20	1.75	8.95	3.34	12.29	7.71	7.76	15.47	14.25
1964-65	7.15	1.48	8.63	3.30	11.93	7.65	7.88	15.54	14.22
1965-66	9.40	1.46	10.87	3.12	13.99	8.25	8.08	16.33	16.15
1966-67	10.30	1.35	11.65	2.33	13.98	7.06	9.53	16.59	16.92
1967-68	8.76	1.12	9.88	2.01	11.88	6.59	8.64	15.23	14.17
1968-69	8.63	1.13	9.76	2.40	12.16	5.82	8.56	14.38	13.23
1969-70	10.39	1.28	11.67	2.61	14.28	5.52	9.82	15.34	14.84
1970-71	10.15	1.47	11.62	2.94	14.56	6.39	9.43	15.82	15.42
1971-72	10.67	1.57	12.24	2.82	15.06	6.98	9.95	16.93	16.03
1972-73	10.43	1.49	11.92	2.67	14.59	7.18	8.98	16.17	15.14

Table A1: Savings and Investment Relative to GDP at Market Prices (contd.)

(percent to GDP)

	Gross Domestic Savings			Public sector	Total (2+3+4)	Gross Domestic Capital Formation			
	Household sector	Private corporate sector	Total private			Public sector	Private sector	Total (12+13)	Adjusted total (14+15)
	SH	SPC	SPVT	SPUB	S	IPUB	IPVT	ISUM	IADJ
1973-74	12.17	1.65	13.82	2.94	16.76	7.47	9.18	16.66	17.36
1974-75	10.43	1.89	12.32	3.66	15.98	7.43	10.89	18.32	16.82
1975-76	11.70	1.30	13.00	4.23	17.23	9.37	9.60	18.97	17.09
1976-77	13.20	1.32	14.52	4.88	19.40	9.83	9.27	19.10	17.94
1977-78	14.13	1.39	15.52	4.31	19.83	7.97	10.71	18.68	18.38
1978-79	15.45	1.50	16.95	4.55	21.50	9.23	11.48	20.71	21.61
1979-80	13.81	1.98	15.80	4.32	20.12	10.04	11.33	21.37	20.60
1980-81	13.82	1.63	15.45	3.43	18.88	8.42	10.27	18.69	20.33
1981-82	12.59	1.52	14.11	4.49	18.60	10.07	12.34	22.41	20.15
1982-83	12.33	1.58	13.91	4.34	18.26	10.70	10.97	21.66	19.62
1983-84	12.83	1.48	14.31	3.27	17.58	9.69	9.99	19.68	18.73
1984-85	14.28	1.65	15.93	2.83	18.76	10.43	11.17	21.60	20.10
1985-86	14.32	1.95	16.27	3.22	19.49	10.79	12.88	23.67	21.73
1986-87	14.48	1.71	16.20	2.75	18.94	11.17	12.03	23.20	20.99
1987-88	16.69	1.67	18.37	2.21	20.58	9.53	12.59	22.11	22.50
1988-89	16.76	2.01	18.77	2.08	20.85	9.52	14.17	23.69	23.77
1989-90	17.89	2.44	20.32	1.68	22.00	9.54	14.12	23.66	24.53
1990-91	19.33	2.67	21.99	1.10	23.10	9.34	14.73	24.07	26.30
1991-92	16.96	3.11	20.06	1.97	22.03	8.82	13.11	21.93	22.55
1992-93	17.51	2.67	20.18	1.59	21.77	8.55	15.24	23.79	23.61
1993-94	18.42	3.48	21.90	0.63	22.53	8.24	13.01	21.25	23.09
1994-95	19.68	3.48	23.17	1.66	24.83	8.71	14.67	23.38	26.00
1995-96	18.19	4.93	23.12	2.03	25.15	7.66	18.87	26.53	26.90

Table A1: Savings and Investment Relative to GDP at Market Prices (contd.)

(percent to GDP)

	Gross Domestic Savings			Public sector	Total (2+3+4)	Gross Domestic Capital Formation			
	Household sector	Private corporate sector	Total private			Public sector	Private sector	Total (12+13)	Adjusted total (14+15)
	SH	SPC	SPVT	SPUB	S	IPUB	IPVT	ISUM	IADJ
1996-97	17.05	4.47	21.51	1.67	23.19	7.03	14.74	21.77	24.48
1997-98	17.63	4.17	21.80	1.33	23.13	6.61	15.96	22.57	24.60
1998-99	18.77	3.74	22.51	-0.99	21.52	6.58	14.80	21.38	22.57
1999-00	20.88	4.35	25.23	-1.04	24.20	6.94	16.72	23.66	25.33
2000-01	21.93	4.12	26.05	-2.31	23.74	6.29	16.33	22.62	24.35
2001-02	22.74	3.46	26.20	-2.75	23.45	5.83	16.48	22.31	23.13
2002-03	22.65	3.41	26.05	-1.85	24.20	5.68	17.15	22.83	23.28

Source: National Income Accounts, CSO.

Table A2: Combined Central and State Finances: Structural and Cyclical Deficits

(percent to GDP)

	Actual fiscal deficit	Structural fiscal deficit	Cyclical fiscal deficit (1-2)	Structural primary deficit (2-7)	Debt-stabilising primary deficit	Actual interest payments	Structural interest payments	Structural primary gap(4-5)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1951-52	1.121	0.850	0.271	0.160	1.1299	0.644	0.690	-0.969
1952-53	0.639	1.371	-0.733	0.614	-1.283	0.724	0.757	1.896
1953-54	0.701	1.896	-1.195	1.071	1.714	0.736	0.825	-0.643
1954-55	2.582	2.418	0.164	1.527	-2.647	1.040	0.891	4.175
1955-56	2.771	2.922	-0.151	1.968	-0.556	1.140	0.954	2.524
1956-57	2.928	3.393	-0.465	2.379	4.626	0.957	1.014	-2.247

Table A2: Combined Central and State Finances: Structural and Cyclical Deficits (contd.)

(percent to GDP)

	Actual fiscal deficit	Structural fiscal deficit	Cyclical fiscal deficit (1-2)	Structural primary deficit (2-7)	Debt-stabilising primary deficit	Actual interest payments	Structural interest payments	Structural primary gap(4-5)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1957-58	4.913	3.813	1.099	2.741	-0.031	0.989	1.072	2.772
1958-59	6.312	4.163	2.149	3.033	2.713	0.988	1.130	0.320
1959-60	5.785	4.432	1.353	3.244	0.836	1.142	1.188	2.408
1960-61	3.506	4.631	-1.125	3.387	2.425	1.270	1.245	0.961
1961-62	2.928	4.786	-1.858	3.487	1.053	1.341	1.298	2.435
1962-63	3.987	4.909	-0.923	3.562	1.534	1.467	1.348	2.027
1963-64	4.862	4.997	-0.135	3.605	4.339	1.348	1.392	-0.734
1964-65	5.723	5.035	0.689	3.604	4.783	1.350	1.431	-1.180
1965-66	5.658	5.007	0.652	3.542	0.705	1.525	1.465	2.837
1966-67	9.705	4.904	4.801	3.412	3.672	1.677	1.493	-0.260
1967-68	4.529	4.726	-0.197	3.212	5.790	1.558	1.514	-2.578
1968-69	3.251	4.517	-1.267	2.987	1.114	1.551	1.530	1.874
1969-70	2.648	4.322	-1.674	2.779	2.894	1.530	1.543	-0.115
1970-71	2.380	4.172	-1.792	2.617	1.337	1.635	1.555	1.280
1971-72	6.816	4.081	2.734	2.514	1.346	1.700	1.567	1.168
1972-73	4.126	4.047	0.079	2.463	3.006	1.602	1.583	-0.542
1973-74	1.100	4.092	-2.992	2.485	7.195	1.532	1.607	-4.710
1974-75	3.037	4.242	-1.205	2.599	4.841	1.508	1.643	-2.242
1975-76	2.090	4.492	-2.403	2.798	1.258	1.394	1.694	1.540
1976-77	7.361	4.824	2.537	3.061	0.762	1.948	1.763	2.299
1977-78	7.118	5.198	1.921	3.348	3.206	1.723	1.849	0.142
1978-79	3.312	5.596	-2.284	3.643	1.453	1.990	1.953	2.190

Table A2: Combined Central and State Finances: Structural and Cyclical Deficits (contd.)

(percent to GDP)

	Actual fiscal deficit	Structural fiscal deficit	Cyclical fiscal deficit (1-2)	Structural primary deficit (2-7)	Debt-stabilising primary deficit	Actual interest payments	Structural interest payments	Structural primary gap(4-5)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1979-80	6.086	6.023	0.062	3.949	1.713	2.212	2.075	2.236
1980-81	7.372	6.459	0.912	4.246	5.342	2.065	2.214	-1.096
1981-82	5.983	6.886	-0.903	4.514	4.611	2.228	2.372	-0.097
1982-83	9.177	7.293	1.884	4.743	2.295	2.464	2.550	2.448
1983-84	5.389	7.661	-2.272	4.916	4.581	2.531	2.745	0.335
1984-85	8.551	7.991	0.560	5.035	2.189	2.925	2.956	2.846
1985-86	8.995	8.261	0.734	5.082	2.895	3.144	3.179	2.187
1986-87	10.123	8.452	1.671	5.045	2.385	3.443	3.407	2.660
1987-88	9.010	8.556	0.454	4.918	3.514	3.666	3.637	1.404
1988-89	9.089	8.578	0.510	4.715	5.790	3.901	3.863	-1.075
1989-90	8.991	8.532	0.459	4.450	3.780	4.217	4.082	0.670
1990-91	9.383	8.433	0.950	4.144	4.476	4.397	4.288	-0.331
1991-92	7.162	8.302	-1.140	3.822	3.228	4.746	4.480	0.594
1992-93	7.240	8.171	-0.931	3.516	2.954	4.792	4.656	0.561
1993-94	9.824	8.059	1.765	3.243	2.834	4.953	4.816	0.408
1994-95	6.945	7.975	-1.030	3.012	4.332	5.128	4.963	-1.320
1995-96	6.778	7.947	-1.169	2.846	3.871	4.962	5.101	-1.025
1996-97	6.081	7.993	-1.912	2.757	2.504	5.111	5.236	0.253
1997-98	7.660	8.118	-0.459	2.748	0.547	5.159	5.370	2.201
1998-99	8.227	8.309	-0.083	2.801	1.989	5.318	5.508	0.812
1999-00	9.002	8.548	0.453	2.899	0.300	5.682	5.650	2.598
2000-01	8.792	8.816	-0.024	3.022	-1.184	5.727	5.794	4.206
2001-02	10.557	9.099	1.458	3.159	-0.490	6.098	5.939	3.649

Source (Basic data): Indian Public Finance Statistics, Ministry of Finance and National Income Accounts, CSO.

Table A3: Consistency of Short-Run Fiscal Stance

(percent to GDP)

	Cyclical fiscal deficit	Actual growth rate in GDP at factor cost	Trend growth in GDP at factor cost	Actual growth minus trend growth rate (% points)	Opposite signs [cyc. def and (actual – trend) growth rate]
1951-52	0.271	2.334	4.445	-2.110	Y
1952-53	-0.733	2.838	4.277	-1.439	
1953-54	-1.195	6.087	4.144	1.943	Y
1954-55	0.164	4.245	4.029	0.216	
1955-56	-0.151	2.562	3.937	-1.375	
1956-57	-0.465	5.692	3.871	1.821	Y
1957-58	1.099	-1.209	3.825	-5.034	Y
1958-59	2.149	7.589	3.806	3.783	
1959-60	1.353	2.188	3.776	-1.588	Y
1960-61	-1.125	7.080	3.735	3.345	Y
1961-62	-1.858	3.103	3.668	-0.565	
1962-63	-0.923	2.115	3.594	-1.479	
1963-64	-0.135	5.063	3.522	1.540	Y
1964-65	0.689	7.584	3.449	4.135	
1965-66	0.652	-3.655	3.382	-7.037	Y
1966-67	4.801	1.017	3.371	-2.354	Y
1967-68	-0.197	8.138	3.388	4.750	Y
1968-69	-1.267	2.609	3.386	-0.777	
1969-70	-1.674	6.517	3.369	3.148	Y
1970-71	-1.792	5.013	3.331	1.682	Y
1971-72	2.734	1.010	3.297	-2.288	Y
1972-73	0.079	-0.318	3.305	-3.624	Y
1973-74	-2.992	4.552	3.366	1.185	Y
1974-75	-1.205	1.161	3.455	-2.294	
1975-76	-2.403	9.004	3.559	5.445	Y
1976-77	2.537	1.250	3.647	-2.397	Y
1977-78	1.921	7.470	3.741	3.729	
1978-79	-2.284	5.503	3.836	1.667	Y
1979-80	0.062	-5.202	3.963	-9.164	Y
1980-81	0.912	7.170	4.164	3.006	
1981-82	-0.903	5.969	4.386	1.584	Y
1982-83	1.884	3.060	4.606	-1.547	Y
1983-84	-2.272	7.684	4.822	2.862	Y
1984-85	0.560	4.311	5.016	-0.705	Y
1985-86	0.734	4.453	5.199	-0.746	Y

Table A3: Consistency of Short-Run Fiscal Stance (contd.)

(percent to GDP)

	Cyclical fiscal deficit	Actual growth rate in GDP at factor cost	Trend growth in GDP at factor cost	Actual growth minus trend growth rate (% points)	Opposite signs [cyc. def and (actual – trend) growth rate]
1986-87	1.671	4.332	5.375	-1.043	Y
1987-88	0.454	3.827	5.539	-1.712	Y
1988-89	0.510	10.475	5.679	4.796	
1989-90	0.459	6.703	5.769	0.934	
1990-91	0.950	5.567	5.833	-0.266	Y
1991-92	-1.140	1.298	5.898	-4.600	
1992-93	-0.931	5.119	5.982	-0.863	
1993-94	1.765	5.903	6.059	-0.156	Y
1994-95	-1.030	7.255	6.100	1.155	Y
1995-96	-1.169	7.342	6.082	1.261	Y
1996-97	-1.912	7.839	5.996	1.844	Y
1997-98	-0.459	4.795	5.849	-1.054	
1998-99	-0.083	6.507	5.663	0.844	Y
1999-00	0.453	6.061	5.446	0.615	
2000-01	-0.024	4.374	5.211	-0.838	
2001-02	1.458	5.777	4.975	0.801	

Source (Basic Data)***:*** National Income Accounts, CSO, and Indian Public Finance Statistics.

Table A4: Debt and Fiscal Deficit Relative to GDP Under Reforms

(percent)

Year	Debt-GDP ratio	Fiscal deficit to GDP ratio under reforms
	b	Fa
2004-05	80.80	8.90
2005-06	81.04	8.18
2006-07	80.53	7.45
2007-08	79.36	6.73
2008-09	77.58	6.00
2009-10	75.27	6.00

Table A4: Debt and Fiscal Deficit Relative to GDP Under Reforms (contd.)

(percent)

Year	Debt-GDP ratio	Fiscal deficit to GDP ratio under reforms
	b	Fa
2010-11	73.20	6.00
2011-12	71.36	6.00
2012-13	69.71	6.00
2013-14	68.24	6.00
2014-15	66.93	6.00
2015-16	65.76	6.00
2016-17	64.72	6.00
2017-18	63.78	6.00
2018-19	62.95	6.00
2019-20	62.20	6.00
2020-21	61.54	6.00
2021-22	60.95	6.00
2022-23	60.42	6.00
2023-24	59.94	6.00
2024-25	59.52	6.00
2025-26	59.14	6.00
2026-27	58.81	6.00
2027-28	58.51	6.00
2028-29	58.24	6.00
2029-30	58.00	6.00
2030-31	57.78	6.00
2031-32	57.59	6.00
2032-33	57.42	6.00
2033-34	57.27	6.00
2034-35	57.13	6.00
2035-36	57.01	6.00
2036-37	56.90	6.00
2037-38	56.81	6.00

Source: based on estimation

End Notes

[1] To an extent, monetisation of fiscal deficits can help reduce the cost of servicing debt in terms of the interest payments directly or indirectly. The direct impact obtains when the government borrows from the central bank at less than market or sometimes zero interest rates. The indirect impact obtains when the government borrows from the Central bank at comparable interest costs but gets higher dividends from the Central bank, thereby reducing the effective cost of borrowing. At a theoretical level, the benefit of expansion in money supply through seigniorage is limited by the increase in money supply that is justifiable, taking into account the need for maintaining reasonable price stability. Any rise in prices fuelled by excessive increase in money supply may worsen the budgetary gap, if revenues respond less than expenditures to increase in prices. In the present Indian conditions, nominal interest rates are low because of excess liquidity conditions due to the expansion of reserve money based on the accretion of foreign exchange reserves. In fact, through stabilisation bonds, the government is trying to suck liquidity. The benefit of low interest rates is available to the government and others. Any additional expansion of money supply could lower nominal and real interest rates further and adversely affect private sector savings. Any build-up of inflationary expectations would also adversely affect growth.

[2] Sometimes this equation is defined with an explicit term for the ratio of seigniorage to GDP. Seigniorage can be obtained in many forms. It may be explicit in the form of printed money. It may be implicit if the government is able to borrow with the help of the central bank at administered rates, which are less than what the market would determine otherwise. Seigniorage also arises if the government borrows from the central bank at non-zero interest rates, but gets dividends from the central bank on such earnings.

[3] It can be shown that

$$\delta f^*/\delta g = -p.i/(g-i)^2$$

Similarly, $$\delta d^*/\delta g = -p.(1+i)/(g-i)^2$$

The effect of an increase in the growth rate, given the interest rate and holding other variables unchanged, is to lower the equilibrium levels of fiscal deficit and debt.

[4] For a discussion on the issue of optimality also *see* Rakshit (2005).

[5] According to the *Pact for Stability and Growth* (PSG), in the medium term, the net deficit or the net borrowing to GDP ratio should be "close to balance or in net surplus". However, the net deficit may exceed 3 percent of GDP under exceptional or temporary circumstances. The

PSG acknowledges the need to distinguish between cyclical and structural components of budget balance. In any case, the three-percent reference value should not be exceeded during normal economic downturns.

[6] An economic downturn is considered exceptional if there is an annual fall of real GDP of at least 2 percent. A severe recession is defined as a downturn with a negative annual real GDP growth of 0.75 percent or more.

[7] The Hodrick-Prescott filter is a two-sided linear filter. It is widely used to obtain estimates of the trend component of a long series. This filter computes the smoothed series **s** of **y** by minimising the variance of **y** around **s**, subject to the penalty that constrains the second difference of **s**. **s** is chosen so as to minimise, the following expression:

$$\Sigma(y_t - s_t)^2 \qquad (t \text{ varies from } 1,2,\ldots,T)$$
$$+ \lambda\Sigma\{(s_{t+1} - s_t) - (s_t - s_{t-1})\}^2 \qquad (t \text{ varies from } 2 \text{ to } T-1)$$

The penalty parameter λ is set so as to control the smoothness of the derived series s. For annual series, the recommended value of λ is 100. As λ approaches infinity, s will approach a straight line.

[8] The ratio of interest payments to revenue receipts of the states will be equal to or less than that for the centre as long as the ratio of states' revenue receipts to the that of the centre equals or exceeds the ratio of the average interest rate paid by the states to that paid by the centre, after the fiscal deficit and debt-GDP ratios are equalised for the two levels of the government.

[9] This is derived on the assumption of a nominal growth rate of 12 percent using equation (10).

[10] This is based on the assumption of revenue receipts to GDP ratio of about 21 percent.