Chapter 4

Fiscal Policy and Fiscal Deficit in India

4.1 Introduction

The fiscal policy in India during 1980-81 to 2011-12 has been studied in the present chapter. An attempt has been made to study fiscal deficit, steady state debt income ratio and decade wise decomposition of accumulation of debt in this chapter. To study how fiscal policy affects macroeconomic variables like price, output, foreign exchange reserve, primary deficit, growth of the economy, impact on savings and investment decision of the economy, the Mundell Fleming model, Inter temporal budget constraint method and Domar model are used for this purpose.

4.2 Fiscal Policy and Fiscal Deficits in India

After independence India adopted very rigid economic structure. The economic activity was driven by government controls rather than market directives and because of this; role of macroeconomic policies was quite limited. Soon, it was realized that the government controlled economy will not last long as it breeds inefficiency and corruption. The said rigid structure was sustained till 1980s, as on domestic account the government was more or less staying “within its means” (i.e. it was not borrowing to meet its day to day expenditure). Almost the entire deficit of the current account was financed by concessional loans which helped to maintain debt servicing burden low. However, from eighties shocks started appearing. Domestically government started borrowing heavily to meet its day to day expenses like interest payment, subsidies etc (practically which brought no return). Even good return from capital expenditure started reducing subsequently because of poor performance of public sector undertakings, and the burden of interest payment remained intact. Moreover, due to substantial rise in the oil prices, import costs rose steeply and as exchange rate became unsustainable India’s access to concessional loans drastically shrank. By 1990-91, situation was almost out of control, as total government borrowings from all sources, domestic and external reached at its peak. The external debt to GDP ratio rose sharply from 17.7 percent in 1984-85 to 24.5 percent in 1989-90. Also, continued government borrowing raised the size of the public debt to alarming levels. As a result, a large fund of government revenue was going towards payment of interest on the debt. And as its final effect, government deficit fed in to the current account deficit, which kept rising steadily until it reached 3.5 percent of GDP and accounted for 43.4 percent of exports in 1990-91. Moreover, because of structural rigidities India was unable to respond to external shocks such as rise in oil prices, decreased access to concessionary loans (by earning more foreign exchange) and these structural rigidities made her products and services globally un-competitive. From the above structural rigidities, a lesson was learnt that controls, even if justified initially, cannot be allowed to continue for an extended period of time. The policy makers realized that to

avoid getting into such debt trap (because debt has a tendency to spill over other account of government), India must earn more foreign exchange. To deal with such a situation where we were on the verge of default, policies of economic liberalization was launched in June 1991. This policy of economic liberalization had two components: (a) structural change and (b) fiscal stabilization.

4.2.1 Structural Change

It targets towards removing or at least reducing structural hurdles which acts as a major speed breaker for India to enhance its global competitiveness. Thus trade policy reforms have gradually removed most of the quantitative restriction and have reduced tariff levels; industrial policy has removed barriers for entry and limits on the growth and size of the firm. In a sequence of this reform, financial sector has been deregulated, tax structure has been rationalized and regime for foreign exchange and foreign technology has been liberalized considerably.

4.2.2. Fiscal Stabilization

It is very crucial to address and deal properly with fiscal stabilization because as mentioned above debt has a spill over characteristics and since government deficit has spilled over to current account deficit and caused 1991 crisis. The reason is that there exists a close relationship between government deficit and some of the key cost variables of the businesses like interest rates, prices, tax rates and exchange rates.

The structural change signals opportunities and challenges for business, while fiscal stabilization focuses on cost of doing the business. There is a very close and direct relationship between structural reforms and fiscal stabilization. Without fiscal stabilization such as justified tax rates, reducing fiscal deficit, price stability, balance of payments etc., and structural reforms cannot bring the desired outcome. Similarly, even with more sound fiscal stabilization, the economy cannot accelerate if structural rigidities are not dealt with. So, balance has to be struck with these policy measures. The pace and quality at both the level is crucial for the success. It has been realized all over the world that fiscal stabilization measures have a quick impact; while structural reforms take longer time to bring the results.

4.2.3 Fiscal Trends in India since 1950s

The government expenditure has increased steadily since 1950s due to prominent role assigned to PSUs in early phase of economic planning in India. However, at that time, rising public expenditure were financed by borrowing only, due to constraints in raising tax and non-tax revenues. The combined effect was a steady rise in debt of country over a period of time. The revenue expenditure as a per cent of total expenditure rose steeply from 65.5 per cent in 1950-51

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30 All these above said reforms were ‘first generation reforms’ which is almost completed even if process is continuous. India is now grappling with ‘second generation reforms’ which are politically more sensitive to implement.

31 To understand it let’s understand an example. A progressive reduction in the indirect tax rates as a part of structural reform, without broadening the tax base, will put additional strain on the stabilization objective.
to 81.8 per cent in 1997-2002 and further to 82 per cent in 2007-08. In comparison of this; share of capital expenditure as a per cent of total expenditure decreased from 34.5 per cent in 1950-51 to 18.2 per cent in 1997-2002 to 18 per cent in 2007-08\textsuperscript{32}. Thus, it has been observed that the pattern of this expenditure is highly skewed against capital expenditure. Further to add to the problem, the growth in revenue remained relatively slow from 1950s to 1970s; followed by worsening during early and mid 1990s.

Till the beginning of 1980s, the central and state government could maintain surplus in their revenue account; as the conventional paradigm was practiced that the revenue account should generate surplus and borrowing should be used to finance the capital expenditure. From 1950s to 1970s, growth in public expenditure was more aligned to that of revenues. Analysis of combined status of expenditure and revenue shows that there was considerable growth in expenditure and revenue, however, rise in revenue could not keep pace with that of expenditure; and fiscal gap jumped and resulted in a heavy requirement of borrowed fund. Thus, the growth rate of borrowing requirement increased from 17 per cent in 1970s to 21 per cent in 1980s. As a result, aggregate debt of the government increased steeply from 22.9 per cent of GDP in 1950s to 72.9 per cent in 1991.

In 1991, Indian economy experienced balance of payment crisis and had to initiate fiscal stabilization programme and structural adjustment programme; at the behest of International Monetary Fund in an attempt to overcome economic crisis. The fiscal reforms resulted in some improvement of fiscal situation. However, the impact was not very effective and lasting due to high dependence of central government on banking system for its finances. By coordinating fiscal and monetary policy, elimination of monetized debt and policy of government borrowings at market interest rates and successive tax reforms repaired the fiscal gap to some extent. During the first half of 1990s, the fiscal gap reduced due to cut in the expenditure as revenue generation was much slow as cut in the tax rates did not brought the desired tax buoyancy. Moreover, the structural transformation and its contribution to the GDP (shift from agriculture to manufacturing to service sector) also impacted the revenues of the country. Still, one irony is that even though service sector contributes approximately 60 per cent in our GDP, it largely remains outside the purview of taxation (even though now it is taxed) and at the same side agricultural sector which is a latent area for revenue flows remains unexploited. Therefore, it is faulty to look and address the empirics of debt sustainability only from central government point of view; it should be addressed from central, state and combined government’s viewpoint (Goyal, Rajan; Khundrakapam, J.K; Ray, Partha Sen 2004).

Because of fiscal consolidation program, the fiscal deficit-GDP ratio declined in the initial period of 1990s, but again started to rise steeply in the year 1993-94 in case of state governments and in the later part of 1990s in case of central governments. As the government could not keep a cap on increasing consumption expenditure, in particular interest payments, rise in wages and pension rates due to fifth and sixth pay commission, and due to this; impact of the fiscal

\textsuperscript{32} various issues of Economic Survey
consolidation was not sustainable. It is very clear that the central government has unlimited access to borrow from the market (and up till, under monetized debt, was able to borrow at sub-market interest rates). Unlike the central government, the state government has to take prior permission from the central government before borrowing from the market. Not only this, state governments do not have the direct recourse to finance from the RBI. Thus, there is an implicit cap on the growth of state governments’ and UTs’ deficit and debt proportion compared to central government. It can be observed that the fiscal deficit of central government and that of combined state and UTs’ were approximately parallel to each other till 1970s and then diverged vary widely (Goyal, Rajan; Khundrakapam, J.K; Ray, Partha Sen 2004).

4.3 The Mundell Fleming Model for an Open Economy

In order to study fiscal policy and its impact, fiscal deficit to GDP, primary deficit to GDP ratio and revenue deficit to GDP ratio are analyzed. Fiscal policy is studied in terms of its impact on prices and output in the economy. To study the first objective of the research say to study fiscal policy and find out the impact of fiscal deficit on trade balance, foreign exchange reserve, prices and output in India; Mundell Fleming Model is applied for a period of 1980-81 to 2011-12. For this an index of fiscal deficit, index of price and index of output has been constructed and analyzed. Real value of fiscal deficit was calculated to find out the impact of fiscal policy on trade and foreign exchange reserves of the economy.

4.3.1 Mundell Fleming Model

Different economies of the world are allied together all the way by two channels. A) by trade in goods and services and B) by movement of capital across countries. And because of these international linkages, economic boom or recession in one economy makes a worldwide repercussion on income and output in other economies of the world. e.g. recession in the USA reduces the income of the American people and affects their demand for imported goods and affects India’s exports to USA. Again as in the year 2002-04, when Bank of America lowered the interest rate than that of India, there was a capital outflow from US to India; and these dollar inflows affects the exchange rate and reserves of foreign exchange with RBI. Today, portfolio managers of banks or corporate entities shop around the world to park their funds in the assets like equity, bonds and other assets of other economies which offer them most attractive yields. In most of the countries of the world today there are no restrictions on holding financial and physical assets abroad. This mobility of capital around the world affects income, employment, exchange rate, interest rate at home and abroad.

National Income and Trade Balance Accounting for an Open Economy

An economy’s gross domestic product (GDP) can be divided into following components:
\[ Y = C + I + G + X - M \]  
(1)

This can be categorized in to two parts. 1. The aggregate spending by domestic residents is called absorption A and 2. Some output of the economy is absorbed by foreigners (by exporting our goods) and Imports are deducted because that part of consumption, investment and government expenditure which is imported is not part of economy’s domestic production.
Thus, 1 and 2 can be presented mathematically as

\[ A = C + I + G \]  \hspace{1cm} (2) \\
\[ NX = X - M \] (export-import) \hspace{1cm} (3) \\

So, the aggregate output in the economy can be written as

\[ Y = A + NX \]  \hspace{1cm} (4)

From above, one can conclude that goods market consists of expenditure by residents on foreign goods and by foreigners on domestic goods. As consumption is a positive function of income and consumption and investment are negative function of interest rate, it can be denoted by \( A (r, Y) \) as that part of domestic absorption depends upon aggregate output and the interest rate. The other component of the absorption is the government expenditure which is known as exogenous policy variables. If the exchange rate \( (EP^*)/P \) depreciates exports become cheaper and imports become expensive so net export increases with the rise in the real exchange rate.\(^{33}\) But, at the same time increase in income also increases the demand for foreign goods i.e. imports; which results in a decline in net export with a rise in income.

The IS curve for an open economy goods market equilibrium condition is given by

\[ Y = A (r, Y; G) + NX (Y, EP^*/P) \] \hspace{1cm} (5)

From equation (5), equating aggregate income to expenditure is an expression for the aggregate savings equals the investment condition for an open economy

From above, as

\[ Y = A + NX \] \\
\[ Y = C + I + G + NX \] \\
\[ Y - C - G - NX = I \]

If taxes are subtracted and added less transfers to the left hand side

\[ (Y - T) - C + (T - G) - NX = I \]

Where \((Y - T)\) is private disposable income and \((Y - T) - C\) is private savings and can be denoted by \( Spvt \). \((T - G)\) is government savings and denoted by \( Sgovt \).

\[ Spvt + Sgovt - NX = I \]

Thus, national savings \( S \) can be written as

\[ S = Spvt + Sgovt \] \\
\[ S - NX = I \]  \hspace{1cm} (6)

\(^{33}\) The presumption here is that Marshall- Lerner condition holds.

\(^{34}\) Where \( G \) is an exogenous level of government expenditure. This discussion of Mundell-Fleming Model focuses on short run when prices are fixed. With fixed prices, the reference interest rate is the real interest rate and the reference exchange rate is the nominal exchange rate. \( Ar < 0 \) as a rise in interest rate reduces consumption and investment. \( 0 < Ar < 1 \) as a rise in income includes a rise in consumption expenditure. \( NXy < 0 \) as a rise in income increases imports and reduces net exports. \( NXe > 0 \) as a depreciation of currency increases export competitiveness and increases net exports.
4.3.2 Balance of Payments

Balance of Payments is a systematic record of all economic transactions undertaken by residents of one country i.e. households, firms and the government with their counterparts in rest of the world. It consists of: 1. Current Account, 2. Capital Account and 3. Reserve Account.

The Current Account covers transactions in goods and services and transfers during the current period.

Current Account = Value of Exports - Value of Imports + Net Transfers from Abroad

= Net Exports + Net Transfers from Abroad

Net Exports is the trade balance. Exports and imports include trade in goods and services\(^{35}\). Positive net transfer from abroad means that the foreigners are transferring less out of India (e.g. in form of gifts, remittances, foreign aid etc) compared to Indians are transferring from abroad. As India tops among the remittance receivers in the world, it carries a large positive value in our account. Positive (negative) right hand side is a matter of surplus (deficit) in current account. Current account can result in to surplus in case of large transfers from abroad even if a net export is negative. Deficit current account means that the revenue from the exports is less than the expenditures on imports. It can be financed only by borrowing (i.e. selling bonds to foreign banks) or drawing down foreign assets. Net Foreign Assets (NFA) of India is the excess of foreign assets owned by Indians over the assets owned by foreigners here. Surplus (Deficit) in current account leads in to an addition to (reduction in) NFA of a country.

The Capital Account records transactions in assets.

Capital Account = Receipt from the sale of domestic assets - Spending on buying foreign assets

Reserve account has a positive entry if the other two accounts combined have surplus, in case of deficit it declines. By considering current account and capital account together

Balance of Payments = Current Account + Capital Account

Balance of Payment (BoP) is considered surplus (deficit) if the combined current and capital accounts have surplus (deficit). Thus a deficit in current account by itself does not create a BoP deficit. It can be outweighed by a sufficiently large surplus in capital account.

Basic Accounting Rule for BoP

Any transaction leading to a net receipt of foreign exchange creates a surplus (credit) in the corresponding account. Any transaction leading to net payment to foreigners creates a deficit (debit) in the corresponding account\(^{36}\).

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\(^{35}\) Trade in services is called invisibles also as it cannot be seen to cross national borders.

\(^{36}\) If a country’s exports exceeds imports in value \((NX > 0)\), exporters receive foreign exchange, so it is called current account surplus. When a sale of bonds to foreigners (borrowing abroad) exceeds purchase of foreign bonds (lending to foreigners) by that country’s residents, that country is acquiring foreign currency on balance. This is a surplus on capital account. A surplus (deficit) on capital account is called a net capital inflow (outflow) to the country. When a country borrows abroad to fill the gap between its exports and imports, its current account deficit is being offset by a capital account surplus. Repayment of foreign loan is a deficit in capital account as it involves payment (outflow) of foreign exchange.
4.3.3 Capital Mobility and Balance of Payments

In Mundell Fleming Model, current balance is determined independently of the capital account so that the achievement of overall balance requires adjustments in the domestic economy. As per earlier discussion, current account consists of exports and imports, depends positively on the exchange rate and negatively on income. i.e. \( NX = NX (Y(-), E (+)) \). As capital controls are legal restrictions on the ability of citizens to hold and exchange assets denominated in the currencies of other nations, the capital account depends on the extent of capital mobility. If the domestic interest rate is greater than the interest rate abroad\(^{37}\), there is a net capital flows to the economy.

In other words, Net Capital Flows (NKI) can be derived as \( NKI = k (r-r^*) \)

Thus, BoP can also be written as

\( \text{BoP} = NX (Y, E) + NKI (r-r^*) \)

For the BoP equilibrium \( NX (Y, E) + NKI (r-r^*) = 0 \)

4.3.3.1 Fiscal Policy under Flexible Exchange Rates

Fiscal expansion results in to an increase in government expenditure and so IS curve shifts to the rightward. It results in to a rise in interest rate and income. This occurs because rise in interest rate increases capital inflow. At this time due to rise in income import rises; however capital account becomes surplus and current account becomes deficit due to rise in imports associated with a rise in income. Resultant effect of this occurrence is appreciation of the exchange rate, but the appreciation of exchange rate makes exports more expensive and so IS curve shifts to the left hand side. The ultimate effect of this is that due to rise in income import rises; export falls and so there is a deficit in current account. Thus, in an open economy two crowding out takes place.

1. Higher interest rate reduces investment and 2. Exchange rate appreciation reduces net exports.

4.3.3.2. Fiscal Policy under Fixed Exchange Rates

In an expansionary fiscal policy higher interest rate causes higher income and so rise in imports. However, overall surplus in capital account is more than that of deficit in current account due to higher interest rate. As here interest rate is very high, foreigners try to tap this opportunity by accumulating their domestic financial assets and investing in India. This results in to an increase in capital inflow that causes foreign exchange reserves to augment. As the money supply in the economy rises, the LM curve shifts rightwards. It reaches a point where deficit in the current account is almost balanced by capital inflow. Thus, in a fixed exchange rate policy, fiscal expansion results in to higher interest rate and income and surplus in balance of payment in the short run.

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\(^{37}\) It is inclusive of expected depreciation of domestic currency.
### 4.3.4 Evaluation of Fiscal Deficit by Mundell Fleming Model

Table 4.1 An Index of Fiscal Deficit, Trade Deficit and Forex Reserves from 1980-81 to 2011-12

<table>
<thead>
<tr>
<th>Year</th>
<th>Index of Fiscal Deficit</th>
<th>Trade Index</th>
<th>Foreign Exchange Reserve Index</th>
</tr>
</thead>
<tbody>
<tr>
<td>1980-81</td>
<td>112.3853</td>
<td>-193.645</td>
<td>280.9017</td>
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<tr>
<td>1981-82</td>
<td>110.5922</td>
<td>-192.428</td>
<td>203.9007</td>
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<td>1982-83</td>
<td>115.8882</td>
<td>-182.07</td>
<td>242.2492</td>
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<tr>
<td>1983-84</td>
<td>166.5033</td>
<td>-201.022</td>
<td>302.5329</td>
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<tr>
<td>1984-85</td>
<td>229.4933</td>
<td>-178.789</td>
<td>366.92</td>
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<td>1985-86</td>
<td>231.1718</td>
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<td>1986-87</td>
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<td>2011-12</td>
<td>6461.739</td>
<td>-29409.4</td>
<td>76298.38</td>
</tr>
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</table>

(Source: Calculated from RBI and Centre for Monitoring Indian Economy data)

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38 For basic data see table 1,2, and 3 of appendix 1.
Figure 4.1 Fiscal Policy, Trade Balance and Foreign Exchange Reserves from 1980-81 to 2011-12

Mundell Fleming Model is used to find the impact of fiscal policy on trade and foreign exchange policy. From the table 4.1 and figure 4.1 it is clear that fiscal policy has positive impact on foreign exchange reserves and this impact is very large. However, impact of fiscal policy on trade index is negative indicating that it results in deterioration of trade balance. Further, Twin deficit hypothesis says that as the fiscal deficit of the centre goes up its trade balance (i.e. the difference between exports and imports) also goes up. Hence, when a government of a country spends more than what it earns, the country also ends up importing more than exporting. In India, trade deficit arises due to two main commodities namely oil and gold. Thus, it can be summarized that above empirics as per Mundell Fleming Model also supports this twin deficit hypothesis. A high fiscal deficit leads to higher trade deficit and a high trade deficit leads to higher fiscal deficit. This leads to a weaker rupee ---which again leads to higher fiscal deficit.

Here to measure the impact of fiscal deficit on price level of the economy and output, index of all these three parameters (index of real value of fiscal deficit, output and price level of the economy) has been calculated.

(Source: Graph is plotted by calculating index of fiscal deficit, trade and forex by taking data from year 1980-81 to 2011-12)
Table 4.2 Index of Real Value of Fiscal Deficit, Output and Price

<table>
<thead>
<tr>
<th>Year</th>
<th>Index of Real Value of Fiscal Deficit</th>
<th>Index of output growth rate</th>
<th>Index of the Price level of the economy</th>
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(Source: Calculated from RBI and Centre for Monitoring Indian Economy data)

39 For basic data see table see table 1,2,3 and 4 of appendix 1.
The table 4.2 and figure 4.2 shows that the linear trend line of the impact of real value of fiscal deficit on price is higher than that of impact on output. It means that when fiscal deficit increases it has greater effect on prices and impacts less on output. Thus the government expenditure, which is financed by borrowing, i.e. increases fiscal deficit and leads to larger increase in prices compared to output in India.

4.3.5 Deficit to GDP Ratio

Fiscal deficit is the difference between total expenditure (both revenue and capital) and revenue receipts plus certain non-debt capital receipts like recovery of loans, proceeds from disinvestment etc. In other words, fiscal deficit is equal to budgetary deficit plus government market borrowings and liabilities. The concept fully reflects the indebtedness of the government and throws light on the extent to which the government has gone beyond its means. Revenue deficit takes place when the revenue expenditure is more than revenue receipts. Direct and indirect taxes and non tax revenue are the components of revenue receipt. Revenue expenditure means expenditure incurred for administrative expenses, interest payments, defense expenditure and subsidies. Revenue deficit means government is not able to meet its day to day expenditure

---

40 Budgetary Deficits is the difference between all receipts and expenditure of the government, both revenue and capital. This difference is met by the net addition of the treasury bills issued by the RBI and drawing down of cash balances kept with RBI. The budgetary deficit was called deficit financing by GOI. This deficit adds to money supply in the economy, and therefore it can be a major source of inflationary rise in prices. The concept of budgetary deficit has lost its significance after the 1997-98 year budget. From this year, practice of ad-hoc treasury bills which earlier acted as a source of finance for government was discontinued. Ad-hoc treasury bills were issued by the government and held only by the RBI. They carried a low rate of interest and fund monetized deficit. From year 1997-98 onwards, these bills were replaced by ways and means advances. Thus, because of this new practice, budgetary deficit has not figured in Union Budget since 1997-98. From year 1997-98, instead of budgetary deficit, gross fiscal deficit became functional indicator.
like government consumption, transfer payments, interest payments, etc out of its current income. It also indicates that the government is living beyond its means and is borrowing to finance the gap.

When fiscal deficit is accumulated over the years, it is known as stock of debt. So, every year borrowed money results in to accumulation of debt on which government has to pay the interest. As this concept covers the debt borrowed from past so many years, it is not the true yardstick to judge that to what extent the present government is living within its means. This can be measured by the term called ‘primary deficit’. Fiscal deficit is further decomposed in to primary deficit and interest payments. It is obtained by deducting interest payments from fiscal deficit. It shows the real position of the government finances as it excludes the interest burden of the loans taken in the past.

Monetized deficit is the sum of the net increase in holdings of treasury bills of the RBI and its contributions to the market borrowing of the government. It shows the increase in net RBI credit to the government. It creates equivalent increase in high powered money or reserve money in the economy.

Figure 4.3 Combined deficit of central and state government as a percentage of GDP (1980-81 to 2011-12) in India

This figure 4.3 examines the long term profile of deficits to GDP ratio in India. The combined fiscal deficit of centre and state stood at 9.3 percent of GDP in 1990-91 after that it fell to 6.26 percent in 1996-97; but then it started rising and was at around 10 percent in year 2001-02 and 2002-03. Even though this rise was marginally higher than that of 1990-91, this level of fiscal deficit was alarming as it was accompanied by much higher level of debt to GDP ratio, interest payment to revenue receipt ratio and proportion of revenue deficit to fiscal deficit.

(Source: Graph is plotted by calculating gross fiscal, revenue and primary deficit to GDP from www.rbi.org.in)

41 For basic data see table 2 of Appendix 1.
From the above figure 4.3 it can be seen that revenue deficit which was marginally a surplus has gradually increased and reached at peak level of 7.05 percent of GDP in 2001-02 and has shown a downward trend due to FRBM Act. However, in 2008-09 it has again increased. Gross fiscal deficit reached an alarming level of 9.78 percent of GDP in 1986-87; then afterwards it has shown zigzag pattern staying on an average of 7.5 to 8 percent of GDP. Again from year 1989-90 it started rising at 8.91 percent of GDP and has touched a level of 9.86 percent of GDP in year 2001-02. It has shown downward trend afterwards but again it has shown upward trend from year 2008-09. Positive primary deficit indicates that the present government is also resorting to borrowing to meet its current expenditure. This indicates that future debt has been built in the economy.

4.4 The Model and Methodology (1980-81-2011-12) - Inter Temporal Budget Constraint Method

Inter temporal budget constraint method empirically tests fiscal policy and debt dynamics. It allows study of divergence between actual and sustainable debt; and actual and sustainable primary deficit. It reveals when fiscal correction can be applied by studying variables like central and state government combined liability, central and state government deficits, GDP deflator, interest rate etc.

As stated in the second objective an attempt has been made to derive steady state debt income ratio and sustainable primary deficit by using Inter temporal budget constraint method. Efforts have been made to evaluate and analyze the fiscal policy, fiscal deficit aggregates, its dynamics pertaining to Indian Economy; and deals with the empirical evaluation of fiscal deficit based on the path shown by Errol D’Souza42.

4.4.1 Inter temporal budget constraint method

The inter temporal budget constraint of the Government is

\[ G_t - (T_t + T_n + T_d) + rB_{t-1} = (M_t - M_{t-1}) + (B_t - B_{t-1}) \]

Where \( t \) indicates time period

\( G \): Public expenditure – i.e. (current + capital expenditure)

\( T_t \): Tax revenue (net of non debt related transfer payments, such as subsidies)

\( T_n \): Non tax revenues, such as user charges on public utilities

\( T_d \): Revenues from disinvestment

\( B_t \): End of period stock of domestic public debt which bears interest rate \( r \)

42 D’Souza, Errol (2010), Macroeconomics, Pearson Education,
M_t: Stock of credit allocated by the central bank.

Let \( T= T_t + T_n + T_d \) be the total Government revenue.

As the focus is on debt financing of deficits, the budget constraints can be written as

\[
\Delta B = (B_t - B_{t-1}) = G_t - T_t + rB_{t-1}
\]

The left hand side of the above equation is Fiscal deficit. The primary Deficit is the non interest component of the fiscal deficit:

Primary Deficit = \( G_t - T_t = D_t \)

Expressing the above equation it can be rewritten in terms of Debt to GDP ratio as

\[
\Delta B = (B_t - B_{t-1}) = rB_{t-1} + (G-T)
\]

Or \( B_t = (1+r) B_{t-1} + D_t \)

Here \( D_t \) is the primary deficit and dividing by GDP, \( Y_t \)

\[
\frac{B_t}{Y_t} = (1+r) \frac{B_{t-1}}{Y_{t-1}} + \frac{D_t}{Y_t}
\]

Where, \( b_t = \frac{B_t}{Y_t} = \) the debt GDP ratio

\( d_t = \frac{D_t}{Y_t} = \) the primary deficit/GDP ratio

The one period growth rate of GDP can be defined as \( g = (Y_t - Y_{t-1})/Y_{t-1} \)

or else, \( 1+g = Y_t/y_t \)

Thus, the above equation can be rewritten as

\[
b_t = 1+r/1+g \ b_{t-1} + d_t
\]

The Debt to GDP ratio can increase because of two reasons: a) because of \( d_t \) i.e. government issues debt to cover a primary deficit, and b) The other reason is that the government pays interest on existing debt i.e. \( 1+r/1+g \). As per the second scenario, to pay interest on the existing debt, government has to compulsorily increase the debt by a factor of \((1+r)\). This further raises the debt component in Debt to GDP Ratio. But, if during the same time economy expands; GDP also increases and increased GDP means more tax revenue for the government. Thus, GDP also increases at the rate of \((1+g)\). The combined effect (i.e. rise in Debt and GDP) results in decline (rise) in Debt/ GDP ratio if the growth rate of GDP (Debt) is more (less) than that of Debt (GDP). In a nut shell, for a sustainable economy ‘g’ must be greater than ‘r’. The sustainability and non-sustainability of economy can be well analyzed by plotting the graph of \( b_t \) (the Debt to...
GDP ratio in period \( t \) as a function of \( b_{t-1} \). The graph is linear with intercept equal to \( dt \) (i.e. primary deficit) and slope of it is \( 1+r/1+g \).

\[
 b_t = \frac{1+r}{1+g} b_{t-1} + d
\]

**Figure 4.4 The Evolution of Debt to GDP**

![Graph showing the evolution of Debt to GDP](image)

(Source: Macro Economics by Errol D’Souza, 2010)

A steady state solution is a value for the Debt to GDP ratio that satisfies the government budget equation which is independent of time.\(^{43}\) By taking \( b_t = b_{t-1} = \bar{b} \) as a solution for steady state situation gives that value of \( b \) which if attained will not change without a shock to the system.

Therefore,

\[
\bar{b} = \frac{1+r}{1+g} \bar{b} + d
\]

\[
\bar{b} = \frac{g-r}{1+g} = d
\]

\[
\bar{b} = \frac{1+g}{g-r} \times d
\]

By taking the same level of primary deficit in both the figure, (Panel A and B of Figure 4.5, Stability of Debt to GDP) the parameters of the steady state situation can be well understood. The level of primary deficit is same in both the figure (panel A and B of figure 4.5) but their slopes are different. In panel A, slope is less than unity (i.e. \( \frac{1+r}{1+g} < 1 \) i.e. \( r < g \) represents a steady state situation of the economy as the Debt to GDP ratio at any time moves closer to the steady state value \( \bar{b} \). As \( g \) is greater than debt, the economy of a nation would in due course settle in to a steady state. A constant level of Debt to GDP ratio for a comparatively shorter period of time is not a matter of much concern for the economy as a whole and also for

\(^{43}\) As per Willian Buiter and Urjit Patel (2006), Inter temporal budget constraint is satisfied if the Debt to GDP ratio converges without specifying its target value.
policy makers, but this constant ratio for a reasonably longer period is a matter of much worry. The perpetual Debt to GDP ratio indicates that the debt will never be repaid and $b_t$ will not tend to zero. Gradually, the ratio will tend towards $\bar{b}$ and it means that the government is never ever able to repay its principal sum of debt borrowed.

In panel B of the figure 4.5, the slope is $[(1+r)/(1+g)] > 1$ i.e. $r > g$ this indicates that the Debt to GDP ratio moves further away from the steady state value $\bar{b}$ over time for any starting value of $b_t$. It presents that the interest rate is increasing at a higher rate than that of GDP and so the Debt to GDP ratio increases over time. Thus, over a longer period of time, debt becomes so voluminous that the entire GDP is insufficient to pay interest on debt. For any economy, to sustain the positive primary deficit $d$, there are two ways. a) By an average value of Debt to GDP ratio, the government must have large primary surpluses by accumulating enough assets. However, this way is not feasible for a shorter time due to unstable government in a developing economy like India. Instead of this, sound long term policy perspective, most of the governments follow balanced budget policy. b) As per this, government usually continues with existing level of debt and raises revenue to repay interest of existing debt. Under this policy, the government tries to set its fiscal deficit near to zero. Therefore, in above equation, $\Delta B = (B_t - B_{t-1}) = G_t - T_t + rB_{t-1}$, if $(G-T)_t + rB=0$, the interest payments on debt are positive. If $R_b>0$ and $(G-T) <0$, the government runs a primary surplus. It generates revenue and pay off interest on debt that was raised to finance deficit. This makes present value of net worth of the government positive, but does not present a clear picture of government solvency.

**Figure 4.5 Stability of Debt to GDP**

![Figure 4.5 Stability of Debt to GDP](source: Macro Economics by Errol D’Souza, 2008)

The below figure 4.6 show the case of primary surplus; however the situation is different in both. Panel A describes a situation when government runs a small primary surplus indicated by $d$ (where $dt<0$). In panel A, $1+r < 1+g$ indicating stable state situation and if at that time the
economy’s Debt to GDP has value other than $\bar{b}$, it will gravitate towards $\bar{b}$. In such a case, economy will accumulate a stock of positive assets which will also earn a return. In comparison of this; in Panel B, $1+r>1+g$, indicates unstable debt level. This shows that at any time an economy’s Debt to GDP ratio will diverge away from the steady-state level of $\bar{b}$. In panel B, as $\bar{b}$ is positive, and even if the government is able to push the Debt to GDP Ratio to its steady state level, it will never ever be able to pay back the debt of $\bar{b}$ raised.

Figure 4.6 Primary Surpluses

![Diagram](Source: Macro Economics by Errol D’Souza, 2008)

4.4.2 Debt and Deficits in India

The data calculated for deficit and debt of India has been presented in the following table no. 4.3, Debt and Deficits in India. The results for calculation of sustainability of deficit are also given in below table no. 4.4.
<table>
<thead>
<tr>
<th>Year</th>
<th>Combined Liability of Central and State Govt.</th>
<th>GDP at Market Prices</th>
<th>g = Growth Rate of GDP at Factor Cost</th>
<th>B ratio = Govt. Debt to GDP Ratio</th>
<th>Interest Rate on Central and State Govt. Securities</th>
<th>GDP Deflator</th>
<th>Real Int. Rate = Nominal Rate - Inflation</th>
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<td>Rs. in Billion</td>
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(Source: Calculated from RBI and Centre for Monitoring Indian Economy data)
### Table 4.4 Dt Ratio

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<th>GDP Deflator</th>
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<td>0.11</td>
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<td>1.03</td>
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<td>1.02</td>
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<td>0.07</td>
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<td>2008-09</td>
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<td>0.08</td>
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<tr>
<td>2009-10</td>
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<td>0.08</td>
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<td>1.02</td>
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<td>2010-11</td>
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<td>0.09</td>
<td>0.66</td>
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<td>0.06</td>
<td>0.66</td>
<td>0.66</td>
<td>0.0361</td>
</tr>
</tbody>
</table>

(Source: Calculated from RBI and Centre for Monitoring Indian Economy data)
4.4.2.1 GDP Growth rate and Real Interest Rate

The above data reveals that except for the years 1997-98, 1999-2000, 2000-01 and 2001-02, for rest of the years (from 1980-81 to 2011-12) GDP growth rate is higher than the real interest rates. As from the year 1998-99 to till 2001-02, the rate of growth in interest rate is steeper than that of GDP, it posed an alarming situation for the Indian government to seriously work for fiscal correction. The below figure 4.7 shows that both GDP growth rate and real interest rate were almost close to each other from the year 1996-97 to 2002-03, after that GDP has increased above real interest rate in the subsequent years. During most of the years of nineties, even when the GDP growth rate remained in excess of the interest rate, the gap between the two has been narrow and almost same in year 2002-03; afterwards it has improved admirably. As per Report on Currency and Finance by RBI (2002), interest rate has not increased in recent years in spite of high fiscal deficits because of larger liquidity available to the system.

Figure 4.7 GDP Growth Rate and Real Interest rates from 1980-81 to 2011-12

![GDP growth rate and real interest rate chart](Source: Graph is plotted by taking data from RBI and Centre for Monitoring Indian Economy data)

4.4.2.2 Government Debt to GDP Ratio

From the below figure 4.8 it can be said that the trend of debt to GDP ratio has throughout remained within the range of approximately 0.5 to 0.8 percentage. It shows an increasing trend from the end of 90s to till the year 2003-04. However it stabilized after that and then has reduced slowly.
The issue of sustainability of debt and solvency are distinct issues from each other. Sustainability means capacity of the government to keep balance between costs of additional borrowing with returns from such borrowing, which results in to higher growth and higher government revenue which can be used for servicing the additional borrowing. Any economy’s sustainability must be viewed in combination of debt and fiscal deficit and not only considering either of them. For example, sustainability concerns are quite different for a fiscal deficit of 10 percent along with debt-GDP ratio of 100 percent; with fiscal deficit of 10 percent with debt-GDP ratio of 50 percent\textsuperscript{44}.

Debt becomes unsustainable if rise in fiscal deficit results in to in self perpetuating rise debt-GDP ratio; and when this phenomena occurs it affects negatively the growth rate and positively to interest rate.

4.4.2.3 Steady State Debt Position

To know what the debt sustainability in India is, steady state debt ratio has been derived for the years 1991 to 2012. It shows whether India is able to repay its debt or not. If $b_t$ is not converging to $\bar{b}$, economy will not be able to repay its debt.

\textsuperscript{44} Rangrajan and Shrivastav (2005)
Table 4.5 Stability of Debt to GDP Ratio and value of $\bar{b}$

<table>
<thead>
<tr>
<th>Year</th>
<th>$b_t$</th>
<th>$\bar{b}$</th>
<th>Year</th>
<th>$b_t$</th>
<th>$\bar{b}$</th>
</tr>
</thead>
<tbody>
<tr>
<td>1991-92</td>
<td>0.728855</td>
<td>0.687025</td>
<td>2002-03</td>
<td>0.830481</td>
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<tr>
<td>1992-93</td>
<td>0.720094</td>
<td>0.687025</td>
<td>2003-04</td>
<td>0.833343</td>
<td>0.687025</td>
</tr>
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<td>1993-94</td>
<td>0.723908</td>
<td>0.687025</td>
<td>2004-05</td>
<td>0.821322</td>
<td>0.687025</td>
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<td>1994-95</td>
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<td>0.687025</td>
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<td>0.790714</td>
<td>0.687025</td>
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<td>1995-96</td>
<td>0.672813</td>
<td>0.687025</td>
<td>2006-07</td>
<td>0.746625</td>
<td>0.687025</td>
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<tr>
<td>1996-97</td>
<td>0.643659</td>
<td>0.687025</td>
<td>2007-08</td>
<td>0.71441</td>
<td>0.687025</td>
</tr>
<tr>
<td>1997-98</td>
<td>0.662885</td>
<td>0.687025</td>
<td>2008-09</td>
<td>0.722117</td>
<td>0.687025</td>
</tr>
<tr>
<td>1998-99</td>
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<td>2009-10</td>
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<tr>
<td>1999-00</td>
<td>0.708546</td>
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<td>2010-11</td>
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<tr>
<td>2000-01</td>
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<td>0.687025</td>
<td>2011-12</td>
<td>0.655517</td>
<td>0.687025</td>
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<tr>
<td>2001-02</td>
<td>0.790427</td>
<td>0.687025</td>
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<td></td>
</tr>
</tbody>
</table>

(Source: Calculated from RBI and Centre for Monitoring Indian Economy data)

The $\bar{b}$ shows the steady state level of debt. In this case by taking time period from 1991-92 to 2011-12, it has come to 0.687025. In a similar way, following steady state debt income ratio was analyzed for a different time frame. Below table gives a $\bar{b}$ value for a different time frame.

$$\bar{b} = \frac{(1+g)/(g-r)*d}{d} = 0.687025$$

**Table 4.6 Year wise value of $b$**

<table>
<thead>
<tr>
<th>Year</th>
<th>$\bar{b}$</th>
</tr>
</thead>
<tbody>
<tr>
<td>1991-92 to 2011-12</td>
<td>0.687025</td>
</tr>
<tr>
<td>1991-92 to 2002-03</td>
<td>2.725097</td>
</tr>
<tr>
<td>1991-92 to 2005-06</td>
<td>1.21578</td>
</tr>
<tr>
<td>1980-81 to 2011-12</td>
<td>0.8528277</td>
</tr>
<tr>
<td>1980-81 to 2002-03</td>
<td>1.404183</td>
</tr>
<tr>
<td>1980-81 to 2005-06</td>
<td>1.139777</td>
</tr>
</tbody>
</table>

From the above table 4.6 it can be observed that steady state level of debt is very large for a period of 1980-81 to 2002-03 and 1991-92 to 2002-03 and thus it gave a signal that fiscal correction is required to reduce this large steady state level of debt---which is unsustainable. In reaction to this kind of situation the government passed the Fiscal Responsibility and Budget Management Act (FRBMA), which stipulated numerical targets for reduction of debt to GDP ratio. Thus, as a response to this act it can be seen that the $b$ value for a period of 1980-81 to 2005-06 and for year 1991-92 to 2005-06 has reduced to a great extent. However, this also shows that further correction is still required in this regards. From the below graph, it can be
interpreted that $b_t$ ratio is much above from $\bar{b}$, and from the year 1998-99 to 2010-11, it has crossed or almost touched the steady state debt $\bar{b}$. However, after 2010-11, it has shown downward journey; and it shows sustainable situation of debt in India.

**Figure 4.9 Debt ($bt$) and Stabilization of Debt ($b$): 1991-92 to 2011-12**

![Debt and Stabilization of Debt](image)

(Source: Graph is plotted by taking data from RBI and Centre for Monitoring Indian Economy data)

### 4.4.3 Sustainable Primary Deficit

The sustainable primary deficit ratio shows the preferred level of primary deficit to GDP ratio by assuming current level of debt. It says that if the economy is able to maintain it, it will be able to repay all its obligations and will move towards steady state situation. By assuming a closed macroeconomic framework one can consider,

$$b_t = \frac{1+r}{1+g} * b_{t-1} + d_t^{45}$$

or

$$d_t = \frac{g-r}{1+g} * b_{t-1}$$

**Table 4.7 Actual and Sustainable Primary Deficit**

<table>
<thead>
<tr>
<th>Year</th>
<th>$Dt=(g-r)/(1+g)*b_{(t-1)}$ (%)</th>
<th>Primary Deficit to GDP (%)</th>
<th>Year</th>
<th>$Dt=(g-r)/(1+g)*b_{(t-1)}$ (%)</th>
<th>Primary Deficit to GDP (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1981-82</td>
<td>0.042242</td>
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<td>1997-98</td>
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<td>0.016084</td>
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<td>0.002181</td>
<td>0.030003</td>
</tr>
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</table>

45 As derived above
The above equation is for the sustainable primary deficit/GDP ratio which is required in order to check out the sustainability of existing level of debt in the economy. The below figure 4.10 and 4.11 presents a clear picture of sustainability of India’s primary deficit during 1980-81 to 2011-12. The figure 4.11 shows that sustainable primary deficit to GDP ratio has been below the actual primary deficit/GDP ratio from beginning of 1980s. From the year 1994-95 to 1996-97, the actual primary deficit ratio was less than sustainable primary deficit ratio because of favorable economic circumstances as the growth rate of GDP at 7.97 percent was the highest in the 90s and on the other side interest rate at -1.94 percent was lowest during decade. Because of this sustainability of primary deficit, the Debt to GDP ratio reduced in the year 1996-97\(^{46}\). This favorable situation empowered the government to reduce the debt required to be raised to make interest payments and the principal of the debt.

Figure 4.10 Actual Primary Deficit to GDP ratio: 1980-81 to 2011-12

\(^{46}\) It reduced from 0.724 in the year 1993-94 to 0.644 in the year 1996-97.
Essentially, the primary deficit to GDP ratio ($D_t$ Ratio) should be below 2.365 percent of GDP, if it is assumed that the current level of debt are to be continued indefinitely. The above figure shows that immediate and long lasting fiscal correction is must in Indian economy as fiscal correction cannot be delayed indefinitely, as from the year 1981-82 to till the year 1993-94 actual primary deficit to GDP ratio is more than sustainable primary deficit to GDP ratio. Only from the year 1994-95 to 1996-97, the actual primary deficit was sustainable as it was very close to sustainable one. In the recent past, the primary deficit/GDP ratio of the government has been sustainable as shown in the graph. But if the actual primary deficit ratio is compared with average sustainability ratio of primary deficit, one can say that it needs serious address as it has increased steeply from the year 2007-08 to 2008-09 as has crossed the average sustainability value of 2.365 percent.

Calculation of primary deficit by considering debt and GDP of the economy for the period 1980-81 to 2002-03 (pre FRBM Act Period),

$$b_t = 0.036607 + 0.973929 b_{t-1}$$

That is average primary deficit for the period of 1980-81 to 2002-03. Where $d = 0.036607$ and $[(1+r)/(1+g)] = 0.973929$. This implies that $[(1+r)/(1+g)]$ is near to 1 which may pose serious threat to the economy if it goes beyond 1.

Using the data for a period of 1980-81 to 2005-06, the debt equation came out as

$$b_t = 0.03402877 + 0.970144 b_{t-1}$$

---

47 The Average Sustainable Primary Deficit from the year 1981-82 to 2011-12.
This shows the immediate correction in primary deficit to GDP ratio and \((1+r)/(1+g)\) after enactment of FRBMA compared to debt equation realized for a period of 1980-81 to 2002-03.

Comparing the same figures with that of average of 1980-81 to 2011-12 the following equation for debt is obtained.

\[ b_t = 0.031567 + 0.962985 b_{t-1} \]

Where the average primary deficit for period of 1980-81 to 2011-12 is \(d = 0.031567\) and \([(1+r)/(1+g)]=0.962985\), which shows that the govt. has been able to move towards stabilization of the deficit by reducing value of \((1+r)/(1+g)\) but only marginally.

Thus it can be realized that for all these three phases (starting from 1980-81 to 1. 2002-03, 2. 2005-06 and 3. 2011-12) primary deficit to GDP ratio and \((1+r)/(1+g)\) has reduced gradually. The reduction in the above parameters is not appreciable; however it shows that correction is in proper direction as it does not show random movement or any fluctuation.

In a similar way, calculating same for the period 1991-92 to 2002-03

\[ b_t = 0.0260957 + 0.990424 b_{t-1} \]

for the period 1991-92 to 2005-06

\[ b_t = 0.0237282 + 0.9805124 b_{t-1} \]

for the period 1991-92 to 2011-12

\[ b_t = 0.02292 + 0.966638 b_{t-1} \]

Analyzing the similar debt equation for a period of 1991-92 to 1. 2002-03, 2. 2005-06 and 3. 2011-12; it can be realized that primary deficit to GDP ratio and \((1+r)/(1+g)\) has reduced steadily and at reasonably good pace compared to phase of 1980-81 to 2011-12. This visible correction is due to FRMBA and also rise in GDP of the Indian economy.

This trivial positive change\(^{48}\) was mainly in reaction due to the Fiscal Responsibility and Budget Management (FRBM) Act, which stipulated numerical targets for reduction of deficit. This act was passed in the parliament of India in August 2003, which requires the fiscal deficit of the central government not to exceed 3 per cent of GDP. The specified annual reductions of deficit were 0.3 per cent of GDP or more. The Act has also provided for elimination of revenue deficit by 2008-09, with 0.5 percentage of GDP as the minimum annual reduction target. The act was amended in July 2004 to shift the terminal date for achieving the numerical targets pertaining to the fiscal indicators by a year 2008-09. Most states have stipulated a reduction in fiscal deficit as a percent of state domestic product (SDP) to 3 percent by 31-03-2010.

To analyze the third objective, “To study the decade wise decomposition of accumulation of debt relative to GDP” Domar Debt Model is used.

\(^{48}\) From year 1991-92 to 2002-03 to year 1991-92 to 2011-12
4.4.4 Fiscal Policy and Debt Sustainability

High level of fiscal deficit to GDP ratio causes sharp rise in the debt-GDP ratio; deteriorates savings and investment of public and private sector and also adversely affects growth. The combined fiscal deficit of central and states recorded highest value of 9.504 percent of GDP in 1986-87. After that it gradually reduced and again in late nineties and beginning of 2000s, it remained near to 9.4 to 9.9 from 1999-00 to 2002-03. Although approximately near to that in 1986-87, this level of fiscal deficit was qualitatively much alarming as it was accompanied by very much higher level of debt-GDP ratio (around 83 percent), ratio of interest payment to revenue receipt (53 percent), and the ratio of revenue deficit to fiscal deficit (79.68 percent).

4.5 Domar Model for Sustainability Analytics

To consider the dynamics of debt accumulation, following equation is used:

\[ B_t = p_t + b_{t-1} \left[ \frac{(1+r_t)/(1+g_t)}{1+(1+r_t)/(1+g_t)} \right] \quad (7) \]

\( B_t \) = Debt to GDP ratio in time t
\( p_t \) = primary deficit to GDP ratio in time t
\( G_t \) = growth rate in GDP at factor cost
\( R_t \) = growth rate in interest rate

Equation 7 can also be written as

\[ b_t = p_t + x_t b_{t-1} \quad (8) \]

Where \( x_t = \frac{(1+r_t)/(1+g_t)}{1+(1+r_t)/(1+g_t)} \)

If \( b_0 = p_0 \)
Then, \( b_1 = p_1 + x_1 p_0 \)

Generalizing, one can get

\[ B_t = p_t + (x_t)p_{t-1} + (x_t x_{t-1})p_{t-2} + \ldots + (x_t x_{t-1} \ldots x_1) \]

If it is assumed that \( x_t \) is constant, which implies \( g \) and \( I \) are constant for all \( t \),

It can be written as,

\[ B_t = p_t + x p_{t-1} + x^2 p_{t-2} + \ldots + x^{t-1} p_1 + x^t p_0 \]

This model can be tested for three cases (i) when \( g = I \), (ii) when \( g > I \) and (iii) when \( g < I \)

Here, the second case \( g > I \) is only considered and for that the long term equilibrium value of \( b_t = b^* \) is given by

\[ b^* = p(1+g)/(g-i) \quad (9) \]

the fiscal deficit to GDP ratio \( f^* \) corresponding to a stable debt GDP ratio \( b^* \) is

\[ f^* = p \cdot g / (g-r) \quad (10) \]

To solve equation 9 and 10, it is assumed that values of \( g \) and \( r \) are given and are consistent with the stable debt-GDP ratio. Also, it is indicative that high values of \( p \) is associated with high values of \( b \) and \( f \)

By using equation 9 and 10, the relationship between \( b^* \) and \( f^* \) can be written as:

\[ b^* = f^* \cdot (1+g)/g \quad (11) \]
Table 4.8 The Long run equilibrium value $b_t=b^*$

<table>
<thead>
<tr>
<th>Year</th>
<th>Pd</th>
<th>GDP (Current Prices)</th>
<th>pd/GDP</th>
<th>$1+r/1+g$</th>
<th>$b_{t-1}$</th>
<th>$p_t+b_{t-1}+(1+r)/(1+g)$</th>
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</thead>
<tbody>
<tr>
<td>1980-81</td>
<td>78.18</td>
<td>1496.42</td>
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<td>1983-84</td>
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<td>4.559</td>
<td>0.931</td>
<td>53.291</td>
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<td>1984-85</td>
<td>151.5</td>
<td>2566.11</td>
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<td>0.977</td>
<td>52.545</td>
<td>57.239</td>
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<td>1985-86</td>
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<td>55.949</td>
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<td>1986-87</td>
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<td>3239.49</td>
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<td>1.001</td>
<td>60.508</td>
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<td>5.904</td>
<td>1.001</td>
<td>68.154</td>
<td>68.306</td>
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<td>1989-90</td>
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<td>4.503</td>
<td>0.971</td>
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<td>70.243</td>
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<td>1990-91</td>
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<td>4.876</td>
<td>0.957</td>
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<td>1991-92</td>
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<td>1992-93</td>
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<td>193.13</td>
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<td>0.961</td>
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<td>71.397</td>
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<td>1995-96</td>
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<td>67.281</td>
<td>67.372</td>
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<td>1997-98</td>
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<td>15723.94</td>
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<td>1.016</td>
<td>64.366</td>
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<td>1998-99</td>
<td>639.56</td>
<td>18033.78</td>
<td>3.546</td>
<td>0.976</td>
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<td>1999-00</td>
<td>743.75</td>
<td>20121.98</td>
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<td>750.35</td>
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<td>23483.3</td>
<td>3.579</td>
<td>1.006</td>
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<td>2002-03</td>
<td>759.27</td>
<td>25306.63</td>
<td>3.000</td>
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<td>79.043</td>
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<td>2003-04</td>
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<td>28379</td>
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<td>2004-05</td>
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<td>32422.09</td>
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<td>2005-06</td>
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<td>0.943</td>
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<td>2006-07</td>
<td>6.01</td>
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<td>2007-08</td>
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<td>74.663</td>
<td>68.739</td>
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<td>2008-09</td>
<td>1838.26</td>
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<td>3.265</td>
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<td>69.612</td>
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<td>2009-10</td>
<td>2935.86</td>
<td>64573.52</td>
<td>4.547</td>
<td>0.938</td>
<td>72.212</td>
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<td>2010-11</td>
<td>2628.26</td>
<td>76741.48</td>
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<td>0.920</td>
<td>70.828</td>
<td>68.556</td>
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<td>2011-12</td>
<td>2219.23</td>
<td>88557.97</td>
<td>2.506</td>
<td>0.945</td>
<td>65.983</td>
<td>64.884</td>
</tr>
</tbody>
</table>

(Sources: Calculated by taking the values form Indian Public Finance Statistics and RBI)
The debt GDP ratio has reduced from the level of around 83 percent in 2003-04 to around 65 percent in 2011-12. At this juncture, the policy option is whether to stabilize the debt GDP ratio at its present level or bring it down before stabilizing. To achieve the medium term fiscal policy stance this must be controlled because combination of high fiscal deficit, high debt, and high interest payment relative to GDP negatively affects the trend of growth rate by keeping the saving-GDP ratio below its potential. By reducing the debt-GDP ratio, interest payment to GDP also reduces and if at that time revenue receipts relative to GDP is maintained, government can balance its revenue account and eliminate dissavings. Such fiscal stance facilitates economy to achieve a higher level of growth rate on a sustainable basis. To achieve this adjustment, it is required to reduce fiscal deficit each year from the previous year’s level such that, in successive year, the Debt/GDP ratio falls. This adjustment phase continues until revenue deficit is eliminated. Thereafter, a stabilization phase can emerge when the fiscal deficit may remain constant at a level leading eventually to debt-stabilization.

As per the FRBM Act enacted by the government, a target of 3 percent of fiscal deficit to GDP must be achieved by 2008-09. But, the problem with FRBM Act is that it is incomplete in two aspects and because of this reason, it is difficult to achieve target ratio and because of this failure to achieve; this should not be considered as unsustainability. 1. It does not define debt-GDP ratio along with target fiscal deficit to GDP ratio to keep the economy on its potential growth path. 2. It also does not define suitable limits of departure from the medium term fiscal stance to cope with cyclical fluctuations. This has been addressed in Maastricht Treaty for European Member countries.49 The economy which is growing with the higher growth rate, will naturally allow higher level of fiscal deficit relative to GDP to be maintained.

For the sustainability of fiscal deficit and determining a limit for the same; states and central must be considered together. It is found that states have a higher share in combined revenue receipts after transfers and thus, in the context of sustainability, states must be allowed a higher level of fiscal deficit to GDP compared to central government. But, on the other hand, states also face a higher interest rate on an average. If it is considered that these two factors roughly neutralize each other, states should be allowed target limit of fiscal deficit to GDP similar to that of centre. Thus, fiscal deficit may be stabilized at 6 percent of GDP on the combined account of the central and state governments with 3 percent each on the separate account50. This should be considered as a relevant target over a cycle. Also, The Twelfth Finance Commission and Chelliah (2001, 2004) have argued for this level of combined fiscal deficit.

As it has been often said that Indian economy will have to pass through an adjustment phase before the stabilization phase is reached. And during this adjustment phase, debt-GDP ratio must fall. This can be achieved by reducing the fiscal deficit to GDP ratio each year to a level lower than that, which can stabilize debt-GDP ratio at the previous year’s level. The larger the extent by which the fiscal deficit relative to GDP is lower than the debt stabilizing level along with

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49 For the European member countries, countries are supposed to maintain balance (zero fiscal deficits) under normal circumstances and up to 3 percent fiscal deficit when faced with downturn.

50 Ibid
faster improvement in the revenue to GDP of central and state governments, the period of adjustment will be shorter. Once the stabilization phase is over, and the combined fiscal deficit of centre and states remains at 6 percent, the debt-GDP ratio would still keep falling and eventually can stabilize at 56 percent of GDP\textsuperscript{51}. Once if Indian economy is able to achieve this ratio, it will allow larger primary revenue expenditure to be incurred on the social sectors. This will be happening as the ratio of interest payments to revenue receipts has begun to fall from its present level of around 35.9 percent\textsuperscript{52}. 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, broadly on these lines a strategy of fiscal correction 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 actual issue is determining that level of fiscal deficit, which will stabilize the debt-GDP ratio and at the same time can promote growth. The question is not that whether deficit should be there or not. The relevant question is the appropriate level of fiscal deficit.

<table>
<thead>
<tr>
<th>Year</th>
<th>Combined Liability of central and state govt.</th>
<th>GDP at market prices</th>
<th>Bt</th>
<th>GFD/GDP</th>
<th>g\textsuperscript{=}Growth rate of GDP at factor cost</th>
<th>Real Int. Rate= Nominal Rate- Inflation</th>
<th>Interest Payment /Revenue Receipt</th>
<th>Interest Payment /GDP</th>
<th>Revenue Receipt /GDP</th>
</tr>
</thead>
<tbody>
<tr>
<td>1980-81</td>
<td>717.33</td>
<td>1496.42</td>
<td>0.479</td>
<td>7.204</td>
<td>7.170</td>
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<td>0.017</td>
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<td>-3.682</td>
<td>0.213</td>
<td>0.018</td>
<td>0.085</td>
</tr>
<tr>
<td>1982-83</td>
<td>1047.93</td>
<td>1966.44</td>
<td>0.533</td>
<td>5.653</td>
<td>2.924</td>
<td>-0.166</td>
<td>0.226</td>
<td>0.020</td>
<td>0.089</td>
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<td>2100.66</td>
<td>3239.49</td>
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<td>4.401</td>
<td>0.279</td>
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<td>1.797</td>
<td>0.304</td>
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<td>1988-89</td>
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<td>0.701</td>
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<td>3.058</td>
<td>0.340</td>
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<td>1990-91</td>
<td>4036.13</td>
<td>5862.12</td>
<td>0.689</td>
<td>9.140</td>
<td>5.285</td>
<td>0.787</td>
<td>0.391</td>
<td>0.037</td>
<td>0.094</td>
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</table>

\textsuperscript{51} This is calculated by considering equation b\textsuperscript{*}=f\textsuperscript{*} (1+g)/g. this is under the assumption that the nominal growth rate would be 8 percent, and at this stage interest payment to revenue receipts will stabilize at 35.9 percent and also revenue receipts/GDP is assumed to remain stable at 9 percent of 2011-12 level.

\textsuperscript{52} This ratio was around 51 percent in 2002-03 and after that it has reduced gradually and in year 2011-12, it is 35.9 percent. The decomposition of this overall interest payment to revenue receipt ratio between the centre and states depends on their revenue receipts to GDP ratios and their respective average interest rates.
<table>
<thead>
<tr>
<th>Year</th>
<th>Debt to GDP (%)</th>
<th>Fiscal Deficit/GDP (%)</th>
</tr>
</thead>
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<td>2012-13</td>
<td>0.643</td>
<td>3.989</td>
</tr>
<tr>
<td>2013-14</td>
<td>0.631</td>
<td>4.207</td>
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<td>2014-15</td>
<td>0.620</td>
<td>4.437</td>
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<td>2015-16</td>
<td>0.608</td>
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<td>2016-17</td>
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<td>4.928</td>
</tr>
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<td>2017-18</td>
<td>0.586</td>
<td>5.190</td>
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</tbody>
</table>

(Sources: - calculated by taking data from Indian Public Finance Statistics and RBI)

Table 4.10 Debt and Fiscal Deficit Relative to GDP under Reforms

53 For basic data see table 5 of appendix 1.
From the table 4.10 it can be observed that estimation as per the Domar Model helps to effectively reduce debt/GDP ratio but at a same time fiscal deficit to GDP ratio does not remain constant at 6 percent and gradually rises. However it can be interpreted that if an economy grows at the rate of more than 10 percent in later year\textsuperscript{54} (i.e. from 2013-14 onwards) and debt/GDP ratio decreases, such economy can sustain higher level of fiscal deficit to GDP ratio.

**The main findings of the Domar Model**

This model defines combinations of stable debt-GDP ratio and fiscal deficit to GDP ratio but does not determine their best or desired level. If the growth rate is higher than the interest rate, the debt-GDP and the fiscal deficit to GDP ratio will eventually stabilize. This is actually the case in Indian Economy since the growth rate is more than the interest rate. To determine the fiscal stance, it is best to consider the debt-GDP ratio and fiscal deficit to GDP ratio together rather than only one of them. As the growth rate rises up to a point, fiscal deficit relative to GDP rises initially. This is because initially as fiscal deficit rises, government investment also increases which crowds in private investment and also positively affects the private savings. With the higher debt-GDP ratio, the interest payment to GDP ratio also increases, and beyond a point, interest payments become so large that it results in to revenue deficit. When revenue deficit rises, government savings and capital expenditure falls and because of this overall savings rate also falls and the growth rate begins to fall.

**Table 4.11 Decade wise Decomposition of Debt Accumulation Relative to GDP**

<table>
<thead>
<tr>
<th>Decade</th>
<th>Cumulated Changes in Debt to GDP Ratio (percentage)</th>
<th>Cumulated Changes in Primary Deficit/GDP Ratio (percentage)</th>
<th>Cumulated Changes in Growth and Interest Rate Differential (percentage)</th>
<th>Relative Impact of Cumulated Primary Deficit</th>
</tr>
</thead>
<tbody>
<tr>
<td>2018-19</td>
<td>0.575</td>
<td>5.463</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2019-20</td>
<td>0.564</td>
<td>5.748</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2020-21</td>
<td>0.554</td>
<td>6.044</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2021-22</td>
<td>0.544</td>
<td>6.353</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2022-23</td>
<td>0.534</td>
<td>6.673</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2023-24</td>
<td>0.524</td>
<td>7.004</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2024-25</td>
<td>0.514</td>
<td>7.347</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2025-26</td>
<td>0.505</td>
<td>7.702</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

\textsuperscript{54} As can be seen from appendix 1
The above table 4.11 indicates that from the year 1980-81 to 1984-85, 54.617 percent of cumulative primary deficit was absorbed by the growth interest rate differential. The remaining 45.383 percent of the cumulated primary deficit of 17.655 percent resulted in an increase in a Debt to GDP ratio of 8.012 percentage points. In 1985-86 to 1989-90, cumulated primary deficit to GDP ratio rose, but 53.269 percent of this was absorbed by the difference of growth over interest rate, and due to this, debt-GDP ratio increased just by 9.555 percent. As this was the case in eighties, during 1990-91 to 1994-95, 87.086 percent of the impact of cumulated primary deficit was absorbed by the growth interest rate differential and so it resulted in negligible rise in debt to GDP ratio (1.194 percent). In a similar way, from the year 1995-96 to 1999-00 and 2000-01 to 2004-05 around 66.022 and 17.470 percent respectively were absorbed by growth interest rate differential and resulted in rise of debt-GDP ratio by 3.573 and 8.164 percent respectively. From the year 2005-06 to 2009-10, it can be observed that growth in cumulated primary deficit to GDP ratio has slowed down compared to earlier years (vide effect FRBM Act), this is the reason in time frame of 2005-06 to 2009-10 growth rate was much above then the interest rate and therefore 224.718 percentage of this was absorbed by the difference of growth over interest rate and as a resultant effect debt-GDP ratio fell by 8.244 percent. Similar trend is found in 2010-11 to 2011-12.

The above table 4.11 shows that how cumulated primary deficit was the most persistent factor in causing the Debt to GDP ratio to rise and how the growth interest rate differential was able to absorb a significant portion of it from 1950s to 2008-09. But, in 1997-98 and three consecutive years, viz., 1999-00, 2000-01 and 2001-02, the nominal growth rate fell below the effective interest rate. So, in this year instead of absorbing the impact of primary deficits, the growth interest differential, being negative, worked in the opposite direction and thus added to the Debt-GDP ratio. Moreover, as this effect depends on the previous year’s debt-GDP ratio, its impact became progressively larger for the same underperformance in the growth rate relative to the interest rate. To achieve the macroeconomic stabilization, when economy is at below potential output, discretionary expenditure must be used to stimulate the economy. It was decided in the Maastricht Treaty (MT) that on a long term basis, the debt to GDP ratio should not be allowed to exceed 60 percent of GDP.

55 With reference to table 4.11 and figure 4.7.
4.5.1 Structural primary Gap

It is defined as the difference between actual structural primary deficit ($p_t$) and the debt stabilizing primary deficit $(b_{t-1}*(g-r)/(1+g))$. The table 4.12 shows that the primary deficit is higher than the debt stabilizing primary deficit. The large value of structural primary balance since the early 80s indicates that the medium term fiscal stance was not sustainable in the past but now it has become sustainable as structural primary deficit is less than debt stabilizing primary deficit.

Table 4.12 Structural Primary Gap

<table>
<thead>
<tr>
<th>Year</th>
<th>pd/gdp</th>
<th>$b_{t-1}*(g-r)/(1+g)$</th>
<th>Structural Primary Gap</th>
<th>Year</th>
<th>pd/gdp</th>
<th>$b_{t-1}*(g-r)/(1+g)$</th>
<th>Structural Primary Gap</th>
</tr>
</thead>
<tbody>
<tr>
<td>1980-81</td>
<td>5.224</td>
<td>-0.328</td>
<td>1.090</td>
<td>1996-97</td>
<td>1.209</td>
<td>-0.100</td>
<td>3.075</td>
</tr>
<tr>
<td>1981-82</td>
<td>3.896</td>
<td>1.469</td>
<td>1.827</td>
<td>1997-98</td>
<td>2.065</td>
<td>1.608</td>
<td>1.938</td>
</tr>
<tr>
<td>1982-83</td>
<td>3.296</td>
<td>3.692</td>
<td>0.867</td>
<td>1998-99</td>
<td>3.546</td>
<td>-0.853</td>
<td>4.549</td>
</tr>
<tr>
<td>1984-85</td>
<td>5.904</td>
<td>0.505</td>
<td>4.175</td>
<td>2001-02</td>
<td>3.579</td>
<td>-0.433</td>
<td>4.012</td>
</tr>
<tr>
<td>1985-86</td>
<td>4.680</td>
<td>1.088</td>
<td>4.188</td>
<td>2002-03</td>
<td>6.269</td>
<td>0.218</td>
<td>2.782</td>
</tr>
<tr>
<td>1986-87</td>
<td>6.219</td>
<td>-0.050</td>
<td>6.269</td>
<td>2003-04</td>
<td>2.006</td>
<td>4.630</td>
<td>-2.624</td>
</tr>
<tr>
<td>1987-88</td>
<td>5.276</td>
<td>1.088</td>
<td>4.188</td>
<td>2004-05</td>
<td>4.295</td>
<td>0.152</td>
<td>2.782</td>
</tr>
<tr>
<td>1989-90</td>
<td>4.503</td>
<td>2.993</td>
<td>1.883</td>
<td>2006-07</td>
<td>1.962</td>
<td>-0.084</td>
<td>5.771</td>
</tr>
<tr>
<td>1990-91</td>
<td>4.876</td>
<td>2.289</td>
<td>-0.084</td>
<td>2007-08</td>
<td>0.951</td>
<td>4.708</td>
<td>-5.924</td>
</tr>
<tr>
<td>1991-92</td>
<td>2.205</td>
<td>1.106</td>
<td>0.951</td>
<td>2008-09</td>
<td>2.057</td>
<td>5.094</td>
<td>-1.829</td>
</tr>
<tr>
<td>1993-94</td>
<td>1.847</td>
<td>2.840</td>
<td>-0.993</td>
<td>2010-11</td>
<td>3.425</td>
<td>5.697</td>
<td>-2.272</td>
</tr>
<tr>
<td>1994-95</td>
<td>1.516</td>
<td>1.616</td>
<td>-0.100</td>
<td>2011-12</td>
<td>2.506</td>
<td>3.605</td>
<td>-1.099</td>
</tr>
</tbody>
</table>

(Source: (basic value) taken from RBI and Indian Public Finance Statistics)

4.5.2 Debt Management

It has been argued by various experts from time to time that in the current economic scenario, higher fiscal deficit should be used for accommodating higher expenditure on infrastructure and social sectors. In India, as at this juncture, increase in expenditure in some areas is desirable and even necessary; they must be incurred in such a way that there is no increase in primary deficit and debt to GDP ratio. So, it is required to prioritize expenditure. In fact, as a result of increasing expenditures, government dissaving increases and it moves towards unsustainability if at the same time growth rate does not rise. Because if growth rate do not rise; with high level of revenue deficit, increased levels of expenditure on infrastructure and social sectors cannot be
sustained. As demand for funds from private corporate sector increases and at the same time if government dissaving does not come down, the cost of the funds does not remain stable. So, in a medium term, to control fiscal deficit, an appropriate strategy is to reduce debt to GDP ratio, so that interest payments relative to revenue receipts can be reduced and government dissavings can be eliminated. This helps to increase savings rate and with stable cost of borrowings, overall investment can increase to sustain a growth rate. And if gradually ratio of revenue deficit to GDP comes down to zero, the entire amount of borrowing supplemented by non-debt capital receipts can be used for capital investment by the government. As now Indian economy has recovered from crisis, apparently—this is the right time to start adjustment phase.

4.5.2.1 Fiscal Policy, Savings and Investment in India

It is required to know and understand the trend of saving and investment of public and private sectors for considering impact of fiscal deficit on it. As long as public sector gets enough funds supplied by financeable savings of the household sector, interest rates remain under control. Also, any reduction in public saving is a loss to the overall saving rate on a one to one basis.\(^{56}\)

The following symbols are used to analyze the Sector wise profile of the savings and investment.

The following notations are used.
- \(I = \text{Gross Domestic Capital Formation at Current Prices}\)
- \(S = \text{Gross Domestic Savings at Current Prices}\)
- \(I_h = \text{Gross Domestic Capital Formation by the Household Sector}\)
- \(I_c = \text{Gross Domestic Capital Formation by the Private Corporate Sector}\)
- \(I_p = \text{Gross Domestic Capital Formation by the Public Sector}\)
- \(S_h = \text{Gross Domestic Savings by the Household Sector}\)
- \(S_c = \text{Gross Domestic Savings by the Private Corporate Sector}\)
- \(S_p = \text{Gross Domestic Savings by the Public Sector}\)
- \(D_c = \text{Shortfall of the Savings of the Private Corporate Sector relative to its Investment}\)
- \(D_p = \text{Shortfall of the Savings of the Public Sector relative to its Investment}\)
- \(E_h = \text{Excess of the saving of the Household Sector relative to its Investment}\)
- \(Z = \text{Excess of Gross Domestic Capital Formation over Gross Domestic Savings}\)

From the above notation, following relations are written.

Gross Investment is the sum of investments in household, private corporate and public sectors:
\(I_h + I_c + I_p = I\)

Similarly, Savings are the sum of household, private corporate and public sector savings:
\(S_h + S_c + S_p = S\)

The excess of public sector investment over its own savings is financed by excess of domestic sector saving over domestic investment.

Thus, \((I_p - S_p) = (S_h - I_h) - (I_c - S_c) + Z\)

Or \((- (I_p - S_p)) = (S_h - I_h) - (I_c - S_c) + Z\)

Or \(+ D_c = E_h + Z\)

---

\(^{56}\) Rangarajan C, Shrivastav D K (2004)
It says that the excess of household saving over its domestic investment is being used to finance the excess of investment over saving for both the public and the private corporate sectors. It can also be interpreted that the financial savings of the household sector is identically equal to the excess of total investment of the household sector over its savings.

4.5.2.2 Savings

Table 6 of appendix 1 gives the savings of the household, private corporate and public sectors in India over the period 1980-81 to 2011-12. The public sector saving relative to GDP had a temporary peak in 1981-82 at 4.5 percent, but since then there is a steady decline. It has turned negative in 1998-99 and the dissaving relative to GDP continued to increase in magnitude reaching a level of negative -2.75 percent in 2001-02. This results in to a total fall of 7 percent points from the level of 4.5 percent achieved in 1981-82. The household sector has a steady rise from 1981 (12.59 percent) to 2008-09 (22.63 percent). In the case of private corporate sector, saving to GDP ratio has been below 2 percent till year 1987-88, after that it steadily rose and crossed 4 percent in 1995-96. It has achieved another peak in year 2005-06 at 7.49 percent and since then it has remained more or less near to 8 percent. After showing negative trend in the year 1998-99, it has again started improving and has shown somewhat enhancement. Below figure 4.12 shows the profile of the savings/GDP ratio of the household, private corporate and public sectors from 1980-81 to 2011-12.

Figure 4.12 Savings relative to GDP: Household, Private Corporate and Public Sector

(Savings to GDP (%))

(Source: Centre for Monitoring Indian Economy and RBI)

4.5.2.3 Investment

The figure 4.13 shows the Investment to GDP profile of public and private sector from 1981-82 to 2010-11. Both the sectors have shown mere up and down in most of the years, but from the year 1986-87 to till 2002-03, investment to GDP ratio of public sector has steadily declined while that of private sector has improved. However, from the year 2003 onwards, both the sectors have shown rising trend. Among other factors, the fall in the nominal interest rates in the later part of the nineties is attributable to the decline in corporate investment.

57 For basic data see table 6 of appendix 1.
Within the public sector, savings and investment of administrative departments and departmental enterprises is referred to as ‘government’ savings and investment. These government savings and investments are more directly related to fiscal deficit, and its impact on growth. The table below gives the savings investment profile of the different components of the public sector. Comparing values of year 1996-97 with year 2001-02, it is apparent that the draft of the government sector 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 from 0.4896 to 0.7445 during this period. This rise in the ratio of revenue deficit and also of government investment over saving did not result in a rise in the interest rate because private investment (from 18.87 percent in 1995-96 to 16.33 percent in 2000-01) as well as government investment (from 1.66 percent in 1996-97 to 1.61 percent in 2001-02) fell during this period. The answer to improve medium term fiscal stance is to reduce government dissavings and increase government capital expenditure relative to GDP. These can happen when the pre-emptive claim of the interest payments relative to GDP falls and/or government revenues relative to GDP rises. In fact, this has actually happened in India as interest payment to revenue receipts has gradually fallen from around 51 percent in 2002-03 to 35.9 percent in 2011-12.

---

58 For basic data see table 7 of appendix 1.
59 See in the graph Investment relative to GDP—Public and Private Sector.
60 Which has remained more or less stable during that time. See Appendix 1.
Table 4.13 Gross Domestic Savings and Capital Formation of the Public Sector Relative to GDP

<table>
<thead>
<tr>
<th></th>
<th>Admin. Departments</th>
<th>Departmental Enterprises</th>
<th>Non-Departmental Enterprises</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Gross Domestic Savings</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1993-94</td>
<td>-3.16</td>
<td>0.86</td>
<td>2.79</td>
</tr>
<tr>
<td>1994-95</td>
<td>-2.68</td>
<td>0.99</td>
<td>3.23</td>
</tr>
<tr>
<td>1995-96</td>
<td>-2.14</td>
<td>0.83</td>
<td>3.19</td>
</tr>
<tr>
<td>1996-97</td>
<td>-2.41</td>
<td>0.75</td>
<td>3.25</td>
</tr>
<tr>
<td>1997-98</td>
<td>-2.92</td>
<td>0.68</td>
<td>3.45</td>
</tr>
<tr>
<td>1998-99</td>
<td>-5.23</td>
<td>0.57</td>
<td>3.53</td>
</tr>
<tr>
<td>1999-00</td>
<td>-5.10</td>
<td>0.57</td>
<td>3.36</td>
</tr>
<tr>
<td>2000-01</td>
<td>-5.55</td>
<td>0.23</td>
<td>2.86</td>
</tr>
<tr>
<td>2001-02</td>
<td>-6.22</td>
<td>0.04</td>
<td>3.29</td>
</tr>
<tr>
<td>2002-03</td>
<td>-5.81</td>
<td>0.09</td>
<td>3.72</td>
</tr>
<tr>
<td><strong>Gross Domestic Investment</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1993-94</td>
<td>1.68</td>
<td>1.94</td>
<td>4.47</td>
</tr>
<tr>
<td>1994-95</td>
<td>1.93</td>
<td>1.80</td>
<td>4.85</td>
</tr>
<tr>
<td>1995-96</td>
<td>1.77</td>
<td>1.72</td>
<td>3.96</td>
</tr>
<tr>
<td>1996-97</td>
<td>1.66</td>
<td>1.54</td>
<td>3.71</td>
</tr>
<tr>
<td>1997-98</td>
<td>1.44</td>
<td>1.60</td>
<td>3.44</td>
</tr>
<tr>
<td>1998-99</td>
<td>1.61</td>
<td>1.40</td>
<td>3.37</td>
</tr>
<tr>
<td>1999-00</td>
<td>1.70</td>
<td>1.48</td>
<td>3.58</td>
</tr>
<tr>
<td>2000-01</td>
<td>1.70</td>
<td>0.11</td>
<td>4.30</td>
</tr>
<tr>
<td>2001-02</td>
<td>1.61</td>
<td>0.81</td>
<td>3.23</td>
</tr>
<tr>
<td>2002-03</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Excess of Investment over Savings</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1993-94</td>
<td>4.84</td>
<td>1.08</td>
<td>1.68</td>
</tr>
<tr>
<td>1994-95</td>
<td>4.61</td>
<td>0.81</td>
<td>1.62</td>
</tr>
<tr>
<td>1995-96</td>
<td>3.91</td>
<td>0.89</td>
<td>0.78</td>
</tr>
<tr>
<td>1996-97</td>
<td>4.07</td>
<td>0.79</td>
<td>0.46</td>
</tr>
<tr>
<td>1997-98</td>
<td>4.36</td>
<td>0.92</td>
<td>-0.01</td>
</tr>
<tr>
<td>1998-99</td>
<td>6.84</td>
<td>0.83</td>
<td>-0.16</td>
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<tr>
<td>1999-00</td>
<td>6.81</td>
<td>0.90</td>
<td>0.22</td>
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<tr>
<td>2000-01</td>
<td>7.25</td>
<td>-0.13</td>
<td>1.44</td>
</tr>
<tr>
<td>2001-02</td>
<td>7.83</td>
<td>0.76</td>
<td>-0.06</td>
</tr>
</tbody>
</table>

(Source: Adapted from C Rangrajan and Shrivastav D K (2004), NIPFP Working Paper; and from CMIE Report)
4.5.2.4. Empirics for Savings and Investment

As a high level of Debt to GDP ratio lead to high interest payments relative to GDP, which crowd out government capital expenditure and shrink the overall saving rate, two interactions are significant to examine.

1. The responsiveness of changes in the savings ratio with respect to changes in the fiscal deficit level.
2. The responsiveness of government capital expenditure to changes in the level of interest payments.

For empirical findings following variables are used.
IPDFC –Implicit Price Deflator of GDP at factor cost
PVSS – private sector saving
PVDI- private disposable income
PUSS- public sector saving
PVI- private investment
RR- combined revenue receipts of the central and state governments
RIT-interest payments on the combined account of central and state governments
GCE-combined capital expenditure of central and state governments
CMDFD-Combined derived fiscal deficit

4.5.2.5 Private Saving Function: Impact of Public Savings

To empirically test whether any fall in the public sector savings, implying an increase in the revenue deficit is compensated by rise in private sector savings regression analysis was carried out.

For that Private Disposable Income (PVDI), Public Sector Savings (PUSS) and Real Interest Rate (RIT) are taken as an independent variable and their impact on Private Sector Savings (PVSS) is tested.

<table>
<thead>
<tr>
<th>Model Summary</th>
</tr>
</thead>
<tbody>
<tr>
<td>R</td>
</tr>
<tr>
<td>0.867</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>ANOVA h</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model</td>
</tr>
<tr>
<td>Regression</td>
</tr>
<tr>
<td>Residual</td>
</tr>
<tr>
<td>Total</td>
</tr>
</tbody>
</table>

61 For basic data see table 8 of Appendix 1.
a. Predictors: (Constant), Real Interest Rates, Public Sector Savings, Private Disposable Income
b. Dependent Variable: Private Sector Savings

The Durbin-Watson statistics is used to test for the presence of serial correlation among the residuals. The value of Durbin-Watson statistics ranges from 0 to 4. As a general rule of thumb, the residuals are uncorrelated if the Durbin-Watson statistics is approximately 2. A value close to zero indicates strong positive correlation, while a value of 4 indicates strong negative correlation. Here the DW value 0.415 indicates positive correlation.

**Coefficients**

<table>
<thead>
<tr>
<th></th>
<th>Unstandardized Coefficients</th>
<th>Standardized Coefficients</th>
<th>95.0% Confidence Interval for B</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Constant)</td>
<td>12664.428</td>
<td>5.614</td>
<td>0.000</td>
</tr>
<tr>
<td>Private Disposable Income</td>
<td>-170.991</td>
<td>-0.673</td>
<td>-5.415</td>
</tr>
<tr>
<td>Public Sector Savings</td>
<td>0.884</td>
<td>0.291</td>
<td>2.366</td>
</tr>
<tr>
<td>Real Interest Rates</td>
<td>-127.900</td>
<td>-0.223</td>
<td>-2.083</td>
</tr>
</tbody>
</table>

So, equation works out to be:

\[
PVSS(t) = 12664.428 -170.991 PDI(t) +0.884 PUSS(t) - 127.900 RIT(t)
\]

So, 1 percent increase in ‘PDI’ leads to -170.991 percent decrease in ‘PVSS’.
1 percent increase in ‘PUSS’ leads to 0.884 percent increase in ‘PVSS’.
1 percent increase in ‘RIT’ leads to -127.900 percent decrease in ‘PVSS’.

The sixth column indicates the p-level to be 0.000. This indicates that the model is statistically significant at confident level of 99 percent. The p-level indicates the significance of the F-value. The \(R^2\) value is 0.751 and the t-test for significance of independent variables indicate that at the significance level of 99 percent, only private disposable income –PDI is statistically significant. The other two variables real interest rates and public sector savings are individually not significant. Again, looking at the individual variable t- test, it has been found that the coefficient of variables for public sector savings and real interest rates are statistically not significant as their respective p-values are 0.025 and 0.047.
4.5.2.6 Fiscal Deficit and Government Capital Expenditure

As interest rates rise relative to current revenues of the government, a process of adjustment starts in government expenditure, which results in to a reduction in public investment, particularly government investment relative to GDP. This has been examined by taking interest payments and revenue receipts as an independent variable and combined capital expenditure of the state and central government as a dependent variable.

**Model Summary**

<table>
<thead>
<tr>
<th>R</th>
<th>R square</th>
<th>Adjusted R Square</th>
<th>Std. Error of Estimate</th>
<th>F Change</th>
<th>df1</th>
<th>df2</th>
<th>Sig. F Change</th>
<th>Durbin-Watson</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.982</td>
<td>0.964</td>
<td>0.961</td>
<td>235.8996081</td>
<td>387.183</td>
<td>2</td>
<td>29</td>
<td>0.000</td>
<td>1.124</td>
</tr>
</tbody>
</table>

As discussed above here Durbin-Watson statistics value 1.124 indicates positive correlation, however it does not show strong positive correlation as value is far from 0.

**ANOVA**

<table>
<thead>
<tr>
<th>Model</th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regression</td>
<td>4.309E7</td>
<td>2</td>
<td>2.155E7</td>
<td>387.183</td>
<td>.000a</td>
</tr>
<tr>
<td>Residual</td>
<td>1613810.127</td>
<td>29</td>
<td>55648.625</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>4.471E7</td>
<td>31</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

a. Predictors: (Constant), Revenue Receipt, Interest Payment
b. Dependent Variable: Capital Expenditure

**Coefficients**

<table>
<thead>
<tr>
<th>Coefficients</th>
<th>Unstandardized Coefficients</th>
<th>Standardized Coefficients</th>
<th>95.0% Confidence Interval for B</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>B</td>
<td>Std. Error</td>
<td>Beta</td>
</tr>
<tr>
<td>(Constant)</td>
<td>119.595</td>
<td>63.492</td>
<td>.458</td>
</tr>
<tr>
<td>Interest Payment</td>
<td>.720</td>
<td>.266</td>
<td>.458</td>
</tr>
<tr>
<td>Revenue Receipt</td>
<td>.286</td>
<td>.091</td>
<td>.530</td>
</tr>
</tbody>
</table>

Dependent Variable: Capital Expenditure

---

62 For basic data see table 5 and 8 of appendix 1.
So, equation works out to be:

\[
GCE(t) = 119.595 + 0.720 \text{INT PAY}(t) + 0.286 \text{RR}(t)
\]

So, 1 percent increase in ‘INT PAY’ will lead to a 0.720 percent increase in ‘GCE’.  
1 percent increase in ‘RR’ will lead to a 0.286 percent increase in ‘GCE’.

As the p-value is 0.00, it indicates that the model is statistically significant at confident level of 99 percent. The p-level indicates the significance of the F-value. The R² value is 0.964 and the t-test for significance of independent variables indicate that at the significance level of 99 percent, both the independent variables revenue receipts and interest payments are statistically significant in the model. But it can be said that interest payments and revenue receipts affects positively to government capital expenditure. If interest payments rise faster than revenue receipts, government capital expenditure falls.

4.6 Conclusion

Study of fiscal policy and fiscal deficit in India by applying Mundell Fleming Model reveals that fiscal deficit is responsible for increase in prices but not in output. This supports the crowding out of the investment due to higher fiscal deficit. Also as per this model fiscal deficit results in deterioration of trade balance while it affects positively to foreign exchange reserve. The Inter temporal Budget Constraint Method concludes that GDP growth rate has far exceeded interest rate and it shows fiscal correction in the economy. Due to this India has achieved steady state debt situation. Due to favorable improvement in GDP rate compared to interest rate and steady state debt level, actual primary deficit is below than sustainable primary deficit. As per the Domar Model cumulated primary deficit is the most affecting factor to increase the Debt to GDP ratio but due to higher growth rate of GDP over interest rate, significant portion of debt is absorbed.