An Economic Analysis of Domestic Debt of the Central Government in India

A thesis submitted to the University of Mysore, Mysore, through the Institute for Social and Economic Change (ISEC), Bangalore, for the award of the Degree of Doctor of Philosophy in Economics

by

Hrushikesh Mallick

Under the supervision of
Prof. Hemlata Rao
Economics Unit

Institute for Social and Economic Change, Bangalore

February 2005

Declaration

I hereby declare that the thesis entitled "***An Economic Analysis of Domestic debt of the Central Government in India***" is the result of research work carried out by me at the Institute for Social and Economic Change, Bangalore, under the guidance of Professor Hemlata Rao, Economics Unit, ISEC, Bangalore.

I further declare that it has not been previously submitted either in part or full to this or any other university for any degree. Due acknowledgements have been made whenever any thing has been borrowed or cited from other sources.

Date:- 14.02.2005

Hrushikesh Mallick

(Hrushikesh Mallick)

Certificate

I certify that I have guided and supervised the preparation and writing of the present thesis entitled "***An Economic Analysis of Domestic Debt of the Central Government in India***" by Mr. Hrushikesh Mallick who worked on this subject, in Economics Unit, Institute for Social and Economic Change, Bangalore.

I also certify that this work has not previously formed the basis for the award of any Degree, Diploma or Associate Fellowship of the University of Mysore or any other University.

Date:- 14-02-05

Hemlata Rao

(Hemlata Rao)
Economics Unit,
Institute for Social and
Economic Change
Bangalore-560072

INSTITUTE FOR SOCIAL AND ECONOMIC CHANGE
BANGALORE

Preface

This study "An Economic Analysis of Domestic Debt of the Central Government in India" is undertaken mainly because it is a subject of great concern for the policy makers and the economists in the present context of Indian economy where the country has witnessed a persistent increase in the level of central government domestic debt.

The experience of a persistent increase in government debt as a legacy of past accumulated government deficits is not an exception in many of the emerging economies and this has thrown up major debates across the economies over the years. It involves a wide range of issues. Among major issues, the study first theoretically addresses sustainability of public debt/fiscal policy issue in general and then empirically examines the issue with reference to the Indian context in particular. The study addresses the question - is the trend of government domestic debt in India sustainable? What are the criteria/conditions for assessing sustainability?

Another major important issue addressed in the study relates to the macroeconomic implications of government debt in general and tries to investigate in the context of India, with a special emphasis on the impact of central government domestic debt on private consumption and investment, as all these have bearings towards economic growth and stability of the economy. The macroeconomic impact of government debt, besides how it is being spent, hinges on various factors depending on where from it is being raised - whether internal sources or external sources - and further, within internal sources, how it is being raised - whether through monetisation or non-monetization, and while the government is raising loans, what is the economic condition or structure of the economy (developed or underdeveloped, degree of openness, fully employed or underemployed). The first factor i.e. the choice of external vs internal sources of borrowing *inter alia* depends upon both the internal and external public debt management policy, which in turn, depends on the economic environment characterizing the economy. Further, within the domestic sources of government borrowing, to a great extent, it depends on the internal public debt management system of the country. After examining the debt management policies in relation to the monetary and fiscal stance of the economy, the study attempts to examine the real impact of domestic public debt on the Indian economy. The study examines the impact of aggregate domestic debt exclusive of borrowings from the Reserve Bank of India (RBI) instead of different components, with a view to examining the net wealth impact and crowding out proposition in the context of India. The second explanation for examining the aggregate impact of domestic debt exclusive of the credits from the Reserve Bank of India is that recent years have witnessed less reliance on monetisation as a source of financing government deficits as a result of imposition of ceilings on it. Therefore, it is more relevant to evaluate the impact of aggregate domestic debt excluding borrowings from the central bank.

It is difficult to place on record the help that I have received from people at different stages of this work. At first, I express my deep sense of gratitude to my Ph. D. supervisor, Prof. Hemlata Rao for extending her valuable guidance and encouragement throughout the study without which it would have been difficult to bring out this work in the present shape. I am also very much thankful to my M. Phil supervisor, Dr. V. Narasimhan (Reader in the Department of Economics, University of Hyderabad) for motivating me to work in this area. I express my due regards to Dr. Shashank Bhide and Dr. T. Krishna Kumar for sparing their valuable time in discussing and going through the initial drafts of my thesis and providing me valuable suggestions. I also acknowledge with due regards to my doctoral committee advisors at ISEC Dr. M. Govind Rao, Dr. G. Thimmaiah and Dr. Meenakshi Rajeev and doctoral committee advisors at the Mysore University for offering me valuable advice and insights into my study.

I am thankful to the Director of the Institute for Social and Economic Change (ISEC), Dr. Gopal Kadekodi and other faculty members at ISEC for their unflinching support and for the Fellowship. Specifically, I am thankful to Dr. K. Gayatri, B. P. Vani, and Dr. M. Ramachandran for their help and suggestions.

I take the opportunity to thank the researchers/faculties at the Reserve Bank of India (RBI), Mumbai, Institute of Economic Growth (IEG), Jawaharlal Nehru University (JNU), Delhi School of Economics (DSE) and National Institute of Public Finance and Policy (NIPFP), Delhi, for their suggestions and cooperation during the course of my visit. Among others, especially, I had an opportunity to discuss the theoretical and statistical issues relating to my research topic with Dr. N. S. S. Narayan (ISI), Dr. B. Kamaiah (HCU), Dr. K. L. Krishna (ICREAR), Dr. V. N. Pandit, Dr. Indira Rajaraman (NIPFP), Dr. Sabya Sachi (IEG), Dr. Charan Singh (RBI), Bhopal Singh (RBI), Dr. Parth Sen (DSE), Dr. Pami Dua (DSE), and Dr. Vivek Moorthy (IIMB).

I thank Mr. R. H. Itaqi for his sincere efforts put in for proof reading of this thesis. I also thank H. K. Amarnath, K. S. Narayan, R. Krishna Chandran and B. H. Chandrashekara for their help and inspiration. I am highly thankful to the library staff at the Institute for Social and Economic Change (ISEC) for extending to me all help and cooperation. I am also thankful to the staffs of RBI library, IEG library, JNU library, NIPFP library, Indira Gandhi Memorial Library, University of Hyderabad and Ratan Tata Library, DSE.

I am thankful to my friends at ISEC and in far of places for extending their support during the course of my work. Specially, I thank Ashish, Anand, Badri, Bikash, Geetu, Jayaprakash, Kshama, Lija, Prabhash, Pramil, Prasobh, Sachi, Sarala, Sukumar and others. I am also thankful to my seniors Purna Chandra Parida, Dukha Bandhu Sahu, Gagan Bihari Sahu, Mirza Alim Baig, Ramakrishna Panigrahi, Bhanu Moorthy, Prabhakar Sahoo, Subodh K. and others. Last but certainly not the least, I am highly obliged to my parents and other family members for their unstinted support, patience and encouragement throughout my study.

Hrushikesh Mallick

CONTENTS

List of Tables

List of Figures

List of Appendices

Chapter 1

Domestic Debt of the Central Government in India: Introduction, Problem Identification and Research Objectives

1.0 Introduction

Fiscal imbalance continues to be the most intractable problem for both the central and the state governments in India. Correcting fiscal imbalances, while continuing to achieve growth objectives, has long been the foremost concern of policy makers and fiscal experts in the country. In this context, it is well recognised that control over and reduction in fiscal deficits is necessary to restrain build up of high level of national public debt in the country. The financial position of the central government, which the study specifically aims to address, is of particular concern as it has a greater potential of creating macroeconomic instability than the sub-national public debt. There is a widely held consensus that the fiscal stance of the central government in recent years has been unsustainable. Apart from the uncomfortably high level of central government total liability, the internal/domestic liability (of the two broad components of aggregate liabilities viz. internal/domestic liability and external liability) is accumulating rapidly.

Along with the rising level of fiscal deficit, the revenue deficit which determines the quality of fiscal adjustments is also deteriorating. The resource mobilisation through taxation and non-taxation has failed to match the size of government expenditure. The increasing proportion of revenue deficit in total deficit implies that the increase in total expenditure is more from the revenue account. This indicates a diversion of capital receipts to meet the revenue expenditure.[1] The government borrowings, which form a major source of capital receipts, get absorbed in incurring revenue expenditure. With the revenue expenditure being less yielding and associated with interest liability have led to a rise in the financial burden of the central government. Further, not only the increase in domestic

[1]The distinction between current expenditure and capital expenditure is usually made with reference to the creation of productive physical wealth. Capital expenditure consists of those government outlays that result in the enlargement of physical productive capacity of the economy either directly through government investment or indirectly through provision of investment grants to the private sector. Those outlays not directly productive are included in the current expenditure.

liability of the central government has implications for the monetary policy scenario of the country, but also the liberalised monetary policy regime of recent years has got implications for the fiscal scenario. The latter, in some years, has led to a rise in the cost of fiscal adjustments.

The "Fiscal Responsibility and Budget Management Bill (FRBMB, 2000)" was introduced at an appropriate time. The bill was perceived to be a desirable policy move on the part of the central government on the same line as proposed for the European countries in the Maastricht Treaty.[2] In India the FRBMB was proposed for a prudential fiscal/financial management of the country and also as a policy measure to restrain the inefficient and ineffective use of resources. The bill was introduced with a view to complying with certain macro fiscal objectives of the country such as maintaining stabilisation (removing fiscal impediments in effecting the conduct of monetary policy and prudent debt management policy consistent with fiscal sustainability) and achieving higher rate of economic growth in keeping with intergenerational equity principle in perspective.[3] In addition to many other measures for fiscal correction, the bill stipulated a set of fiscal rules which required the central government (a) to eliminate the revenue deficit (or rather build up of a revenue surplus) and to target an overall fiscal balance (subject to a fiscal deficit limit of 2 per cent of GDP) as of 2006; (b) to limit yearly issue of guarantees to half a percentage of GDP; to reduce the total liabilities to half a percentage of GDP by 2011; and (c) to abstain from borrowing from the Reserve Bank of India (RBI) effective from the year 2004 (GOI, 2000, Kopits, 2001; Mujumdar, 2002). Effective fulfilment of these conditionalities depends on how well the government implements its budgetary policies. Subsequently, it is observed that the government has continuously failed to keep up with the targets set in line with the proposed fiscal

---

[2] The treaty for European Monetary Union (EMU) was proposed in order to comply with certain fiscal convergence criteria for forming an integration of the European economies. This was with a view to enable the individual member countries and the union as a whole economically stronger and viable (Bougrine, 2000).

[3]The vision of the FRBMB as stated by the Department of Ministry of Finance of India was to provide for the responsibility of the central government to ensure the inter-generational equity in fiscal management and long-term macro-economic stability by achieving sufficient revenue surplus, eliminating fiscal deficit and removing fiscal impediments in the effective conduct of monetary policy and prudential debt management consistent with fiscal sustainability through limits on the central government borrowings, debt, deficits, greater transparency in fiscal operations of the central government and conducting fiscal policy in a medium-term framework and for matters connected therewith or incidental thereto (GOI, 2000).

norms. This led the policy makers to revise the bill in 2004 by extending the time frame to March 2008 to meet the goals as set out earlier.[4]

This gives an indication that despite several policy measures undertaken in the past by the central government, at times in co-ordination with the monetary authority of the country, the government has not been able to curb the rising level of deficits. The rapid build up of domestic debt of the central government has given rise to the emergence of several critical issues. Many authors opine that such a rise in public debt is a threat to the solvency of the treasury and viability of the economy (Rakshit, 2000). In this context, the emerging issues can broadly be outlined as follows, to bring out a consensus regarding the possible consequences of rising level of public debt.

1.1 Domestic Debt of the Central Government in India: Problem Identification

In the context of an increasing domestic debt and heavy reliance on domestic sources of borrowings by the central government, in recent years, many economists postulate that the country may be heading for an "Internal Debt Trap" i.e. a situation in which borrowing has to be resorted to often just to keep up with the servicing of debt. It is also feared that a situation may come, even without a rise in the interest rates on government securities and treasury bills, when the central government would have to borrow money just to pay for the amortisation and interest payments on past domestic borrowings (Seshan, 1987). Such perceptions necessitate **a critical examination of the trends and composition of domestic debt** of the central government. One of the objectives of the study is to make an extensive review of the existing scenario.

Along with the persistent rise in domestic debt of the central government in India, there is another component of domestic liability which is recently evolving and accelerating the financial pressure on the central government (Lahiri et.al, 2000). This arises on account of the central government's guarantees, counter-

[4] In exercise of power conferred by the FRBM Act 2003, the central government framed FRBM rules effective July 2004. The government has made a commitment in the revised FRBM to wipe out the fiscal deficit in a phased manner over the period ending March 31, 2008 (as stated in Annual Report 2003-04, RBI).

guarantees and indemnities **constituting contingent liabilities** of the central government in respect of the state governments and other private and public sector undertakings. In many instances, the state governments, private and public sector undertakings default in repaying the guaranteed loans. One of the reasons could be due to their financial distress. Ultimately, the central government has to shoulder the responsibility of clearing off these debts contracted in the past. Although these liabilities are not accounted for as part of the total liability in the current accounting practice, in actuality, they form a part of the liability of the central government and thereby intensifying its total debt burden.

In the literature related to the debt trap consequence, usually addressed in an environment of chronic fiscal deficits, is the issue of **sustainability**. Unsustainability of public debt is usually referred to as a long-run problem in fiscal policy which forms a core issue in public finance. When the internal debt trap continues for a longer period of time, it raises the possibility of unsustainability of public debt. Then a situation comes when the individuals would be unwilling to lend to the government. As we know that accumulated net fiscal deficits constitute total debt of the government; the increase in deficit and in turn, debt, would call forth not only the question of unsustainability of debt but also unsustainability of the overall fiscal policy of the country. To make the term sustainability more explicit, following Wilcox (1989) one may define it as a situation where the government is able to borrow money as long as it is able to repay the debt. Technically, this is possible if private sector savings grow faster than the growth rate of public debt. It can be shown that this is possible as long as the growth rate of the economy exceeds the rates of interest. This is because private sector savings[5] are related to the growth rate of income/output (higher the level of income, higher would be the savings) and growth rate of public debt is related to the interest rate on the government borrowings (at a higher rate of interest, growth of debt would be higher). Another important consideration to bear in mind is that sustainability cannot merely be ensured only when the private sector savings grow faster than the growth rate of debt, but how the private sector wants to put its surplus money is also important. In particular, whether the private investors go in for buying

[5] The surpluses out of current private income represent private sector savings in the present period.

government securities/financial assets or physical assets or investing in other assets? Thus, the decision of private savers acts as a binding constraint for the government to raise loans. A binding constraint may be avoided if the government is able to repay the debt on maturity and as per the market terms. As quoted by Sobhee (2000), the World Bank defines "a debt burden is sustainable when a country is able to meet its current and future debt obligations in full without recourse to relief or rescheduling debts of the accumulated arrears or without unduly compromising economic growth". But this does not happen in the context of developing countries. In a broader sense, sustainability is understood in terms of stability of the debt-to-GDP ratio in the short and medium term with the ratio tending towards zero in the long-run. In the Indian context, since there is a steady rise in the stock of domestic debt of the central government, it is worth examining the question of sustainability.

Three important concerns arise from high level of public debt. The first one relates to the amount of interest burden likely to arise on account of borrowings made by the government. The second concern relates to the problem of continuing deficits and the explosion of debt-to-GDP ratio which has implications on sustainability.[6] Thirdly, whether debt-financing affects macro-economic indicators and if so, in what way?

The Impact of Public Debt: Contrasting Views

The last one is a serious concern. In India there have been debates pertaining to the implications of rise in domestic debt on the aggregate economic activities. This is to be examined by assessing the overall impact of domestic public debt on the economic activities. This would get reflected in **'crowding out/in'** of private investment and also other macro economic variables viz. prices (inflation), interest rates, private consumption and output. The impact of domestic debt is interrelated with the sustainability of debt issue. When public debt is unsustainable, it may have more adverse impact on the economic activities than when it is sustainable. Besides the direct impact of public debt on real economic activities,

---

[6] The earlier studies have evaluated sustainability of public debt from the perspective of impact of public debt on economic activities. The recent studies evaluate sustainability from the government's solvency position i.e. given the financial position whether it is feasible for the government to continue with its fiscal operations.

there are several indirect channels through which the impact of domestic public debt is felt on the real economic activities. For instance, given a fixed amount of supply of credit in the economy, high level government borrowings may crowd out private investment directly because of the unavailability of credit to the private sector and indirectly via raising the rate of interest in the economy. In India crowding out might not be taking place through the transmission channel of interest rates as the economy was operating under a repressed financial regime for a long period of time. The credit channel, i.e. availability of credit, might be a more relevant channel of crowding out in the context of India as emphasized by the exponents. Crowding out might be occurring directly through the preemption of resources (both financial as well as real resources) from the private sector. However, if the economy is operating under excess capacity, debt-financed government expenditure, particularly on infrastructure projects is likely to produce crowding-in rather than crowding-out effect. This would boost up aggregate demand and capacity utilisation. Capacity utilisation leading to an increase in income and profits of the private sector, would lead to a rise in real investment. This way of fiscal expansion would not only help increase current investment and output but also the long-term potential growth rate of the economy.

New-Classicals' Perspective

In contrast to the above view, New-Classical economists who believe in **Ricardian Equivalence Theorem** (RET), assert that public debt does not produce any concrete economic impact. Consumers respond in exactly the same way to a change in government deficits as to the changes in taxes. Therefore, a tax reduction bond-financed increase in government expenditure wouldn't have any net impact on the economy. In other words, a tax reduction bond-financed increase in deficit merely defers taxes into the future. Thereby, the overall level of private consumption, savings, investment and real interest rates remains unaltered. However, this theorem has later been challenged by several economists (refer Chapter 2 for a detailed review).

Monetarists' Perspective

In India, the Central Bank, known as the Reserve Bank of India (RBI) helps the government in the matters of exercising fiscal policy, however, the monetary policy has been used as part of fiscal policy. Given this scenario, economists view the consequence of an increase in government debt from a monetarists' perspective as viewed by Sargent and Wallace (1981). In monetarists' view, the bond-financed increase in expansionary fiscal policy is prone to more inflationary spiral than the money-financed expansionary fiscal policy (although money-financed is a consequence of bond-financed deficit). In monetarists' analysis, the increase in bond-financed deficit at a certain point requires to be monetized. Monetisation of debt resulting in expansion of money supply (growth of high power money) leads to an increase in the price level. According to the monetarists, like Friedman (1968), monetary authority gives more priority to interest rate stability than price stability. In a situation of higher rate of interest in the economy (resulting from increase in bond-financed public expenditure), the monetary authority tries to accommodate the fiscal policy through printing of notes in order to stabilize the interest rates resulting in an increase in money supply and a consequent upward pressure on price level resulting in price instability. Even if the monetary authority does not accommodate the fiscal policy, given a level of savings in the economy, an increase in government demand for credit, leads to an increase in domestic interest rate. Hence, there is a possibility of crowding out of private investment.

Another striking outcome following from the rise in interest effect of bond-financed government deficit is that the increase in interest rate leads to the appreciation of exchange rates of foreign currencies. The exchange rate appreciation dampens the export performance of domestically produced goods and services, which in turn leads to increase in deficit in the current account of the balance of payments by way of discouraging exports. Therefore, the rise in domestic public debt affects external balance of the economy. Mounting Public debt also influences income levels of individuals across generations, thereby affecting the intergenerational redistribution of resources in the economy (Buchanan, 1958).

Emerging Issues:

Thus, on the basis of above discussion, some of the emerging issues can briefly be outlined as follows:

(1) The growth of domestic debt of the central government and its changing pattern of financing in India has a bearing on the financial burden of the central government.

(i) The growth of government debt in favour of costly forms of domestic debt results in increase in interest burden. The rising debt service burden reflects an ever-widening fiscal deficit.

(ii) This raises the possibility of the central government getting into an internal debt trap situation and debt becoming unsustainable.

(2) The system may react to a severe squeeze on government finances in future through a collapse in expenditure on essential public services including maintenance of infrastructure, which is bound to an adverse impact on growth.

(3) The government may be forced to monetize the deficits to avoid higher interest rates, but this has implications on inflation rate, exchange rate and the resultant external imbalance and distortions in the economy.

(4) There are implications of rising domestic public debt for the aggregate economic activities - for instance, crowding out/in impact of public debt on private consumption and investment. The accentuation of crowding-out phenomenon, again has implication for decelerating growth.

(5) The government may be forced to impose higher taxes in the future to service the expanding size of debt burden, in which case the expectation of higher taxation can discourage investment and encourage capital flights from the economy.

1.1 Researchable Issues and Research Gaps

With a persistent rise in government of India's level of deficits and domestic debt, the following important issues emerge in this context.

- The first one relates to whether such a continuous rise in debt is sustainable. In other words, whether this rise in debt would be

consistent with the macrofiscal policy objectives of stabilization and higher growth rate of the economy.

- The second issue, given the trends and pattern of growth of domestic public debt, concerns the possible impact it can produce on the major macroeconomic variables (in a closed economy as well as in an open economy context). A higher debt-to-GDP ratio may be sustainable but it may have adverse impact on investment, and economic growth rate.
- Third, whether anything went wrong with the past policy prescriptions which have led to such proportion of fiscal imbalance in the country and what needs to be done keeping in mind longer term fiscal policy perspective.
- Another important issue addressed several times at the theoretical level by many economists like **Auerbach et. al.** (1991), **Kotlikoff** (1992) and **Blanchard and Fischer** (1989) is the intergenerational debt burden. Whether the burden is equally distributed across generations? At the empirical level, few studies have examined this issue. However, focusing on the distribution of debt burden is not the concern of the present study as it is a complex issue which needs to be addressed separately.

These are some of the important researchable issues which attracted a lot of research and policy attention among the economists and the policy makers, in developed as well as in less developed countries over the past few decades. There are many studies looking at the trends and causes of growth of public debt in the Indian context but there are limited studies at the empirical level specifically looking into the sustainability aspect of domestic debt of the central government from a long-term fiscal perspective (a detailed empirical review of literature is presented in Chapter 2). The studies by Gupta (1992), Buiter and Patel (1992), Rajaraman and Mukhopadhaya (2000) and Moorthy and Singh (2000) considering short period time series have evaluated the question of sustainability of fiscal policy in the Indian context. Gupta (1992) and Buiter and Patel (1992) have examined sustainability by various time series techniques such as Dickey-Fuller, Augmented Dickey-Fuller and Phillips-Perron unit root tests. Rajaraman and Mukhopadhaya (2000) have applied autoregressive integrated moving average (ARIMA) model for forecasting the level of debt. Moorthy et al. (2000) in order to examine the issue of sustainability, have

examined Domar's (1944) growth rate cross over formula. But by definition, sustainability is a long run issue. For assessing sustainability the length of time period should also be reasonably long. Further, if one could broadly divide the domestic debt into various components such as market borrowings arising on consolidated fund of India and other liabilities arising on public account, then it would be more relevant for policy purpose to examine which components of domestic debt have got more potential for making the fiscal policy more vulnerable. In this direction, hardly any study has made an attempt. The time coverage period considered for the study is longer than what had been considered in the previous studies. By considering a longer time period the present study tries to take care of the definitional aspects of sustainability for assessing the sustainability of domestic public debt in the Indian context. Although there are studies by Gopalakrishnan (1991), Mohanty (1995) and Singh (1998) which have specifically looked into the impact of public debt on private consumption and savings at the macro level, hardly one would find any comprehensive study undertaken with respect to private consumption and private investment (later measured in terms of gross domestic capital formation) as dependent variables in tandem with all other relevant macro-economic determinants. This is expected to give a broad idea about the impact of public debt on the economy. In accordance with the implications, policy actions could produce desirable results in terms of sustainable growth of the economy, if implemented.

1.3 Objectives

Given this background, the study focuses on the sustainability of domestic debt of the centre and its macro-economic impact on private sector activities. The study has the following set of specific objectives.

1. To examine the growth and composition of central government domestic debt inclusive of its contingent liabilities.
2. To critically evaluate the domestic debt and interest rate policy- before and after the financial liberalisation of the economy.
3. To asses the sustainability of domestic public debt.
4. To examine the impact of domestic public debt on the key macro-economic variables viz. private consumption and private investment.
5. To draw policy implications.

1.4 Database and Methodology

For collecting and compiling the required data, the study primarily relies on reports of the Reserve Bank of India (RBI), Central Statistical Organization (CSO), Ministry of Finance and National Institute of Public Finance and Policy (NIPFP). The specific data collected from a particular source and the way it is computed are mentioned in respective chapters.

The study uses both descriptive statistics and econometric techniques to analyse the above objectives. In order to examine the first objective, a time series analysis of trend and composition of government domestic debt in India is attempted. The measure of debt burden and the factors that influence the rise in domestic debt of the central government are discussed with the help of simple ratios and percentages.

For evaluating the second objective, a critical analysis of public debt policies and interest rate policies followed in India is undertaken. In order to empirically examine the third objective i.e. an assessment of sustainability of central government domestic debt along with relevant indicators, unit root test of time series analysis is applied.

For examining the fourth objective i.e. regarding the macro-economic impact of domestic public debt, the study assesses the impact of public debt on the key macroeconomic variables such as private consumption and investment. The relationship between public debt and private consumption is investigated keeping in mind the net wealth impact against no net wealth impact of public debt. The relationship between public debt and private investment is examined aiming at establishing the complementarity/competitive relationship between government borrowings and private investment in the economy. The relationship in many previous studies is analysed either under the neo-classical or standard Keynesian framework. Under the Keynesian framework, the influence of government borrowings on private investment is examined via rate of interest. If government borrowings positively influence the rate of interest, studies conclude that there is crowding out impact of government borrowings on private investment. But this may not give a concrete picture about the relationship between government borrowings

and private investment. Even if there is an adverse impact of rate of interest on private investment as a result of increase in government borrowings, the adverse impact may get nullified due to other incentives to invest. Therefore, the study tries to directly examine the relationship between government borrowings and private investment along with other relevant factors in the model. This would help us determine, if any, impact of government borrowings on private investment.

For the empirical analysis of the fourth objective, an appropriate time series econometric technique is employed. The study relies on the ***autoregressive distributed* lag (ARDL)** approach to cointegration.[7] The ARDL model is used for the reason that this is suitable to establish the dynamic impact of domestic government borrowings on aggregate economic activities. The government borrowings may not have immediate impact on the economy. The economic activities may respond to the change in government borrowings with certain time lags. By considering appropriate time lags, the model incorporates the role of expectation of different economic agents viz. consumers and investors. Modeling through ARDL approach to cointegration, *inter alia*, the study contributes to the existing literature. The fifth objective is to draw policy implications on the basis of empirical results and the analysis of past fiscal policies followed in India.

1.5 Scope of the Study

Debt of a government refers to the financial obligation on the part of the government contracted and discharged in accordance with certain terms and conditions attached with its incurrence.[8] In a broader sense, government of a country should refer to general government and all the public sector undertakings. But the study confines only to the debt of the central government of India which excludes debt of the state and union territory (UT) governments, central public

---

[7]Later the ARDL approach to cointegration results is verified with ***Johansen's cointegration and vector error correction*** results for private consumption model. The same is not verified for private investment model because ***Johansen's cointegration and vector error correction*** model does not fit well with the data for private investment model giving rise to inconsistent estimates, which is not in accordance with the theory. For instance, income adversely affecting private investment, is surprising and is not in accordance with major economic theories.

[8]There is a conceptual difference between public debt and government debt. Public debt refers to government debt from domestic private sector and abroad or non-residents (Bhattacharya, 1990; Rajaraman, 1999). But in general, government debt refers to interest bearing government borrowings irrespective of the sources from which it is raised be it private, quasi-private or public sector.

sector undertakings and public financial institutions. This is for the reason that the central government is a major borrower among all the government entities in the country and also that the measurement of borrowings and lendings of the central public sector undertakings is very difficult due to unavailability of data from the published sources. Debt of the government includes both the interest bearing as well as non-interest bearing/concessional debt obligations. It is the sum of all borrowings and liabilities of a government (owed to other entities) on which the government has to incur interest liabilities (unless it happens to be concessional debt, where the government need not pay interest liability) along with repayment of the principal amount on maturity.

Under a federal fiscal set up, national public debt of the country broadly refers to the debt of the central government, sub-central governments as well as local governments along with debt of the public enterprises. In a country like India with a federal fiscal set up where most of the state governments owe a larger sum of funds to the central government and the local governments owe to the state governments, these inter public sector financial transactions should be netted out from the aggregate national public debt in order to arrive at the actual aggregate national public debt of the country; and in the same way, the borrowings of the state and UTs governments should be netted out from the total central government debt in order to arrive at only the debt burden of the central government.

The government of a country borrows from within the country as well as outside. The government debt of a country comprises aggregate internal and external liabilities. Since there is a drastic compositional shift in the central government borrowings from external sources to domestic sources, the study particularly addresses the issue arising due to domestic debt of the central government in India.

Further, the total internal liabilities or domestic debt of the central government in India broadly comprise(s) (i) internal debt and (ii) other liabilities. The (i) internal debt includes loans raised from the open market, special securities issued to RBI, compensation and other bonds and also includes borrowing through issue of Treasury Bills (TBs) issued to the RBI, State Governments, Commercial

Banks and other institutions, and (ii) other liabilities comprise small savings and public provident funds, and reserve funds etc. According to the Union Budget Document of India (1998) internal debt also includes non-negotiable, non-interest bearing rupee securities issued to the international financial institutions like IMF, IBRD, IDA along with other components defined above. Since the government owes the sum to the domestic market and from other internal sources, especially, public accounts in the form of small savings and provident funds, it is obliged to pay back these liabilities along with the interest payments. External government liabilities include borrowings from multilateral financial institutions and different countries of the world, which are bilateral in nature. Thus, Government of India's debt is the sum of all outstanding domestic liabilities including external liabilities.

As mentioned earlier, the coverage of the study is confined to the central government domestic debt. The problems arising out of state government debt and external public debt and their implications fall outside the scope of the study. Any mention of state government debt and external public debt would be incidental in the course of the study. One important point which needs to be mentioned here is that since a sizeable portion of state and UTs governments' domestic debt is owed to the central government, domestic debt of state and UTs governments and debt of public sector enterprises owed to the centre should be completely eliminated from the total domestic debt of the centre to arrive at the **net domestic debt** of the central government (domestic borrowings in actual possession of the centre). However, due to the fact that most of the states and UTs are under financial strain, they continue to roll over their debt and ultimately it shall become centre's responsibility to settle, and hence the study emphasises on the gross domestic debt of the centre. On the other hand, there are public enterprises, that borrow from the central government and return profits to the government; and there are public enterprises which borrow from the government and incur losses and are unable to pay off their debt. Therefore, in an uncertain world where there is no guarantee that the central government would get back the principal with interest payments thereon, computation of net domestic debt of the central government loses its significance. On account of these practical problems associated with net domestic debt of the centre, the study takes into account the gross domestic debt of the central government in India. As per the definition of the budget document of India,

the issue of non-interest and non-negotiable bearing rupee securities issued to the international financial institutions viz., International Monetary Fund (IMF), International Bank for Reconstruction and Development (IBRD), International Development Agency (IDA) etc. are included in the estimation of domestic debt of the centre. Although debt is external in nature, is being denominated in domestic currencies. Contingent liabilities arising due to central government guarantees to the state governments, private and public sector undertakings are separately shown to highlight the financial risks of the central government. However, an important consideration in measuring the interest payment burden of the central government is that since the state governments do repay the interest liabilities on their past borrowings, they have been netted out from the total interest liabilities of the central government to arrive at the net interest liability, which makes measuring and realising the actual interest burden of the central government more meaningful.

The study covers the period from 1960-61 to 1999-2000. The starting period 1960 has been chosen bearing in mind the fact that in the first two decades, the fiscal health of the country was sound as reflected in the surpluses generated in the revenue account until the end of 1970s; and borrowing was mainly incurred for capital expenditure. In 1980's the fiscal health of the country started deteriorating and the country found itself in a macroeconomic crisis in early 1990s. Subsequently, several policy measures were undertaken to overcome the fiscal problems of the country. The study period extends up to 2000, for the reason that the official reports still give estimated figures on GDP as well as fiscal policy variables. As a result, it is difficult to consider the latest data for a comparative perspective of debt position of the central government in relation to GDP of the country. By taking account all these three phases, the study tries to assess the policy implications with regard to the domestic public debt of the centre.

1.6 Chapter Organisation of the Study

The entire study comprises eight chapters. Chapter 1 presents a brief introduction about the study in terms of emerging issues in the context of rising domestic debt of the central government. In this respect, the study tries to find out research gaps in the existing literature in the Indian context, and then tries to fill up the gaps by

setting up clearly defined objectives. Chapter 2 outlines the theoretical and empirical review of literature, concerning sustainability of domestic public debt and the impact/effect of domestic public debt on the key macroeconomic variables (viz. private consumption and investment). Chapter 3 analyses the trend pattern and compositional character of domestic debt of the central government. This chapter also discusses the genesis of fiscal imbalances along with addressing the fiscal risks arising out of contingent liabilities of the central government.

Chapter 4 critically analyses the central government domestic debt policy and interest rate policy in connection with domestic debt of the central government, with a view to suggesting certain concrete policy measures for maintaining fiscal stability in the economy. Chapter 5 assesses the issue of domestic debt sustainability of the central government. This chapter compares two approaches to sustainability - the accounting approach vs. the present value budget constraint approach.

Chapter 6 empirically evaluates the macroeconomic impact of domestic public debt on private consumption. This chapter specifies a general private consumption model and later augments the structural variables in the model to take care of the influence of specific structural characteristics of the economy on private consumption. Then, it applies a suitable time series technique for examining the impact of domestic public debt on private consumption in India.

Chapter 7 evaluates the macroeconomic impact of domestic public debt on private investment. Similar to private consumption model, this chapter brings out a model of private investment and applies similar econometric technique for examining the impact of government borrowing on private investment in India. Finally, Chapter 8 provides summary results and policy suggestions.

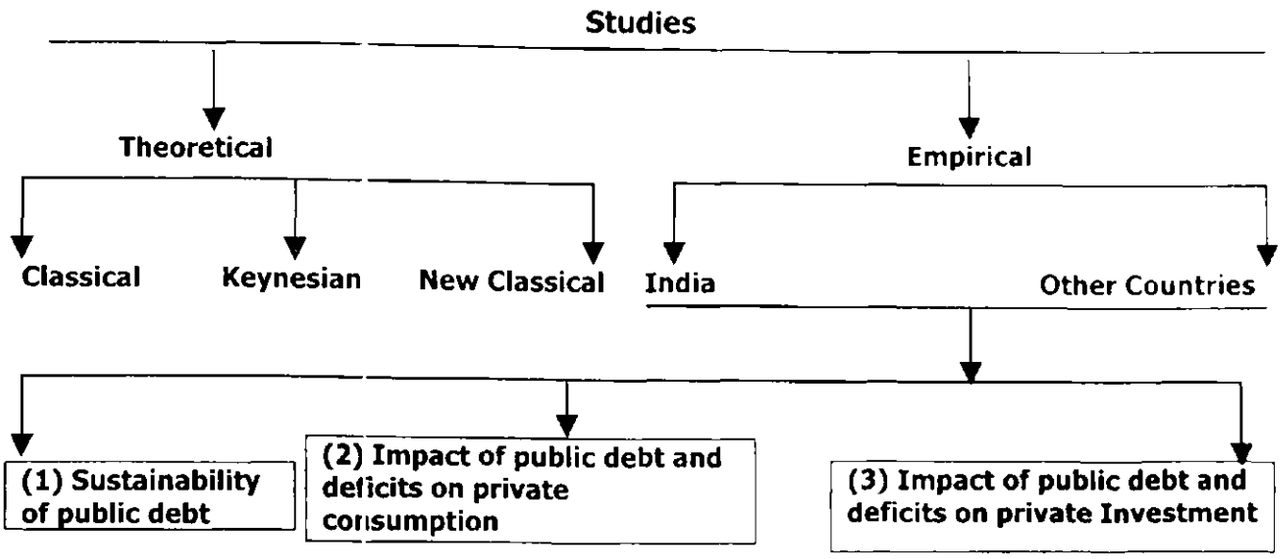
Chapter 2

Review of Theoretical and Empirical Literature

Fiscal policy, as an important part of macroeconomic policy, interacts with the real economic activities. There is a resurgence of debate as to how fiscal policy affects the real economy. The implication of high level of public debt in general and domestic public debt in particular has long been a debatable and contentious issue in macroeconomic literature as each major school of economic thought views the situation differently. There is clearly a division of opinion. Some economists argue in favor of incurrence of public debt while others argue against it and a consensus is yet to be arrived at. While voicing concern against higher level of public debt, economists argue that heavy reliance on public debt can give rise to instability (fiscal and monetary) and create nominal as well as real economic burden on the society. It not only destabilizes and burdens the society but also leads to unsustainability of fiscal policy. In contrast, another view holds on to the idea that effective utilization of public debt may enhance productivity and growth rate of the economy. As there has been a wide spectrum of views in the literature on the issues pertaining to sustainability of public debt/fiscal policy and macroeconomic impact of public debt, some of the views are put forth below in order to provide a theoretical background to the issue concerning higher level of public debt. To the theoretical arguments, empirical evidences have been brought with a view to formulating suitable models later for empirical testing of effects of fiscal policy in the Indian context.

2.1 Public Debt: Some Theoretical and Empirical Considerations

This chapter attempts to shed light on theoretical and empirical contributions to the literature.



2.1.1 Theories on Sustainability of Public Debt

The issue of sustainability of fiscal policy in public finance literature concerns public sector deficit and debt. In view of an increasing size of government debt in many of the emerging market economies (IMF, 2003)[9], sustainability of public debt has become a widely debatable topic among the economists and policy makers for several years. In the light of this, an attempt is made here to review literature relating to sustainability of public debt as follows:

(a) concept and definition of sustainability.

(b) consequence of unsustainable public debt.

2.1.1.1 Sustainability of Public Debt: Concept and Definition

Sustainability is a long-run issue. According to **Pitchford** (1992) sustainability means "to keep going, to keep up an action or process".[10] Unsustainability is manifested when an economic variable or action cannot continue for an indefinite time period with its historical trends. But applied to the context of domestic public debt, merely "to keep up" the process of borrowing does not ensure sustainability of fiscal policy. Its continuation has to be consistent with fiscal targets and other macroeconomic parameters. A government can continue to borrow even when public debt is incurred for unproductive tasks or for debt servicing. Government

[9] The increase in public debt in emerging market economies stands in contrast to fiscal development in the industrial nations, where they have experienced decline in debt ratios in recent years with a notable exception of Japan. This is cited from 'World Economic Outlook' (IMF, Sept 2003).

[10] As cited in "Macroeconomic Modelling of the Long Run" edited by Colin P. Hargreaves (1992), Edward Elgar Publishing Ltd, England, Pp.369.

should be able to repay the debt without rolling over it into an indefinite future. If the government rolls over debt or plays a ponzi game, debt would continue to accumulate further with a rise in interest liability.[11] It is also noteworthy that it is not enough if the government alone is willing to borrow. The important consideration lies in the willingness of the lenders to lend. If lenders/investors are not willing to invest on government bonds/securities, it would be difficult for the government to raise fresh loans even for clearing off the past debt and interest burden (**Masson,** 1985). This implies rolling over the past debt would also be difficult on the part of the government when debt reaches a higher level. Under these circumstances, debt becomes unsustainable. This condition may not be relevant in many of the developing countries as it is difficult to know the individual's preferences to invest on government bonds where there does not exist a sound capital market and where the government bonds do not get acess to open market operations.[12] Further, Masson opines that the concept of sustainability involves a projection of future tax and spending measures, as well as an implicit forecast of economic environment facing the government - the most important, the rate of growth of potential output and the level of real interest rate. But it is argued that a mere growth rate of output exceeding the interest rate may not be a sufficient condition for debt sustainability for the countries where the rate of interest has long been under a repressed financial regime. Rather, absolute level of public debt as well as its growth rate should be taken into consideration in assessing sustainability of debt or fiscal policy. Domar's (1942) formulation of stability criterion of public debt proposes that if the rate of interest charged on public debt exceeds the growth rate of GDP, that would raise the deficit-to-GDP ratio and debt-to-GDP ratio. But it is not just the higher rates of interest that lead to an increase in growth rate of debt. If one considers an economy with a repressed financial regime where the rate of interest is kept at a lower level but due to fresh borrowings there is an explosive rise in the growth rate of debt even exceeding the growth rate of the economy, debt may be unsustainable and it would be undesirable to borrow further.

---

[11] When it involves a ponzi game in debt creation, the government should not borrow from the individuals against their will by imposing the rule that the individuals/banks should contribute certain percentages of their income/bank deposits by way of lending towards the government.

Similarly as Masson referred, **Wilcox** (1989) defined that sustainability of public debt is a situation where the government is able to borrow money as long as it can pay the interest liabilities on the outstanding stock of debt. This condition is possible if private sector savings grow faster than the growth rate of public debt. But mere repayment of interest liabilities and maintaining creditworthiness for further borrowings should not be considered as a desirable criterion for sustainability. Mere growth of private sector savings does not imply that the government debt would be sustainable. In fact willingness of the bond holders and the capacity of the government to pay off the past debt matter most in evaluating sustainability of debt/fiscal policy.

According to **Keynes** (1923), unsustainability would be evident "when the state's contractual liabilities have reached an excessive proportion of national income" (Afonso, 2000). Further, the determination of "excessive value" is subjective. What may be excessive for a nation may not hold for other nations. It essentially depends on to what extent the nation is economically well off. More specifically, **Frankel and Razin** (1996) defined sustainability as a policy stance whose "continuation into infinite future does not violate the solvency of the budget constraint". An unsustainable situation entails when the need for a "drastic" policy shift such as a sudden fiscal tightening which might cause a recession, or even the inability to service the debt which would hurt the savers. Consequently, less drastic policy shifts such as gradual increase in taxes or reduction in expenditures would be called sustainable if they could be implemented without causing social and political upheaval. This is in tune with the conventional approach to evaluating sustainability of public debt.

In a similar way, **Afonso** (2000) interpreted sustainability of public debt as a situation when debt–to-GDP ratio reaches an excessive proportion. There is a problem of sustainability when government revenue is not enough to keep up financing the costs associated with new issuance of public debt. Further, the problem with this definition is that just by examining the interest payment arising on government debt and the revenue earned by the government may not be a solid

[12]In India major portion of government securities are held by captive financial institutions. Some portion arises due to the statutory provisions and some are due to absence of alternative ways of investing financial resources of

basis for judging debt sustainability. It may so happen that a country might have the capacity to generate more tax revenues sufficient enough to service its accumulated debt but if major sectors have fallen outside the purview of the tax net, one may get a false impression regarding sustainability of public debt. This appears to be a rare possibility, because it is hard to believe that the economy has the potential to generate revenues by imposing taxes. In a more strict sense, as noted earlier, the World Bank defines, "a debt burden is sustainable when a country is able to meet its current and future debt obligations in full without recourse to relief or rescheduling debts of the accumulated arrears or without unduly compromising economic growth".

From the above definitions it can be seen that there is more or less an unanimous inclination towards Domar's notion of debt sustainability (although views may differ on Domar's condition of debt stability which tells that debt to be stable, rate of interest on debt should be less than the growth rate). According to Domar increase in public debt should be seen in relation to the GDP of a nation. This can be generalized as, when the growth rate of the economy is more than the growth rate of public debt, debt is said to be sustainable. Efficient utilisation of government borrowing in productive investment would have contributory impact on growth rate. Under this situation borrowing by the government would not pose any problem. With the increase in growth rate of income, the capacity to generate tax revenues would simultaneously expand without producing economic distortion. As a result, government can be able to repay the debt with its servicing cost out of the surpluses generated through the increased tax revenues in future.

It must be emphasised, however, that the underlying notion of "sustainability" in the literature relates to "stability". Debt financing is deemed to be sustainable when the resultant debt-to-GDP ratio converges to an asymptotic upper bound, and otherwise it is considered explosive (Rangarajan, 1989). More clearly, sustainable debt process can be defined as the one in which debt-to-GDP ratio is held constant or tends towards zero through time (Dasgupta, 1996).

---

these banking sector and other financial institutions.

2.1.1.1.1 Sustainability, Solvency and Stability

Often economists relate sustainability with stability and solvency. The term sustainability brings ambiguity when it is used interchangeably with solvency and stability. Each of these terms, although closely related, has a different connotation and significance. Until recently there was no unanimity among the economists with regard to the distinction between these related terms. Further, making distinction is a very complex task. Fiscal policy is said to be sustainable if the government is able to service the stock of public debt over a foreseeable future. Generally, insolvency prevents an entity from raising loans. However, if an entity is insolvent and still able to continue functioning without a break down – then the entity sustains its stance by playing a ponzi game i.e. borrowing to repay the old debt. Thus, in certain circumstances insolvency may arise prior to unsustainability. That means, an entity resorting to perpetual debt finance leads to unsustainability.

To achieve sustainability, solvency condition is to be strictly fulfilled. Solvency is the desirable and necessary condition for sustainability. The solvency condition does not relate only to the current economic status/position but also to the foreseeable economic capacity of an entity (i.e., whether in the future the entity would be able to pay back or not). The government can, however, be solvent even if its debt-to-GDP ratio grows unbound provided it is able to raise non-distortionary taxes. But this is an imaginary situation, where debt is accumulated to higher level and an imposition of large required taxes would not result in distortion of the economy. In this connection, Salop and Spitaller (1980), applying the term sustainability in context of current account deficit, pointed out that "a sustainable current account deficit is one that is consistent with continued financial solvency and economic viability"

According to **Buiter** (1985) a government is solvent when its present value of expected terminal net liabilities (i.e., indebtedness at the end of planning horizon) is zero. If the real interest rate exceeds the long-run growth rate - a sufficient condition for solvency constraint to be satisfied - is that the ratio of debt to output should remain bounded. Given the high level of government debt and a level of seigniorage revenue, if the real interest rate exceeds the rate of output

growth, the solvency condition eventually requires generation of primary surplus at some point of time in the future (Lahiri, 2000).

The net worth approach to solvency implies that a government is solvent when the present value of its outstanding assets (financial and real) is equal to its liabilities. A comprehensive measure of net worth of government should not only include tangible liabilities but also hidden contingent liabilities. Similarly, the assets side should include both tangible and hidden assets evaluated at current market prices with a provision for depreciation. Notwithstanding the measurement problems, estimation of net worth gives a fair idea of sustainability of public debt. The application of the net worth approach is practically very limited for less developed countries (LDCs), because of the assumptions underlying the method or lack of data on net worth.

With regard to stability, Pitchford (1992) states that "Stability of debt is perhaps close to sustainability of public debt".[13] However, while substituting stability for sustainability, one has to be very cautious. Stability is not the same thing as sustainability. For public debt may be stable at a higher level but may not guarantee sustainability. The stability condition essentially implies that public debt-to-GDP ratio should not at least grow more than a critical bound determined by the feasible fiscal policies. This serves as a necessary condition for sustainability.

Evaluation of solvency is, to some extent, subjective as it is to be adjudged from the expected future economic behaviour of the government, but from the preceding discussion, it can be concluded that solvency and stability are the preconditions for debt sustainability.

2.1.1.2 Consequences of Unsustainable Public Debt: Fiscal Implications

Theoretically, the analysis of sustainability of fiscal policy raises the question that can a government follow a policy of perpetual primary deficit by filliping up its deficits just by borrowing? In other words, is a policy of more and more government borrowings feasible or sustainable for an economy? For a developing country like

[13] Cited in the "Macroeconomic Modelling of the Long Run" edited by Colin P. Hargreaves (1992), Edward Elgar Publishing Ltd. Pp.370.

ours, where primary deficit in the government budget is perennial, the question of sustainability of debt assumes significance. The vital question, therefore, is that if the government of a country perpetually relies more on debt financing for incurring its current expenditures, will it be able to repay all of its debt in future without facing financial constraint and economic hazard? These questions have engaged macroeconomists and policy makers for long.

The concept of "budgetary deficit" has evolved over time, from an initial stage of "war deficits" to a final stage of "development deficits"- the intermediary stage being the "depression deficits". The Orthodox/Classical theory of public finance advocates "balanced budget" for the government on the ground that a continuing imbalance piles up high level of deficit or rising level of public debt. It argues that the growth in either deficit or public debt leads to extravagance and waste and weaken the confidence in the government; and this also implies a higher taxation in future. Therefore, the classical theory stipulates that government expenditure should balance with government revenue in each accounting period, and thereby ruling out a deficit budget. It holds that government borrowing mortgages future revenues and burdens the future generations. Classicals believe that public debt increases the cost of debt to the extent of interest charges and once a nation begins to borrow, shall continue till it goes bankrupt. Since bankruptcy is an indication of financial unsustainability, the Classicals do not favour the idea of government borrowing. Moreover, since Classicals economic philosophy is based on balancing the budget, the question of unsustainability of public debt does not arise in their economic theory.

Departing from the classical line of thinking, Keynes advocated incurring public debt or "unbalancing the budget" as a compensatory financial measure to meet the situation arising out of depression. Keynesian theory suggested that increased borrowing had desirable counter-cyclical and growth effects. Public debt is considered as one of the fiscal tools to regulate the economy and to finance developmental activities. But there is a limit to which government can rely on debt for financing as heavy reliance on it can entail unsustainability of public debt. With regard to this, **Blinder and Solow** (1973) emphasised that in a Keynesian framework public debt is sustainable because a bond-financed increase in

government expenditure is expansionary in nature and easily restores the budgetary equilibrium in the long-run.

In contrast, **Barro** (1974) belonging to the New-Classical/Rational Expectation School, believed in Ricardo's neutrality theorem. He revived the theorem as "Ricardian Equivalence Theorem". The essence of the theorem is that public debt raised in the current period gets compensated by the present value of future taxes. Therefore, the effect of debt is nil and the question of unsustainability does not arise.

Some of New Classicals also address the question of sustainability by evaluating the effects of public debt from a monetarists' perspective. Sargent and Wallace (1981) expressing their concern for the unpleasant implications of public debt for monetary policy, opine that if monetary authorities refrain from debt monetisation at all, public debt would eventually become unsustainable as it increases continuously to a ceiling, which can't be crossed. Debt can only become sustainable thereafter if and only the Central Bank intervenes and monetises debt. Monetary authorities can impose fiscal discipline on the government. Whenever the Central Bank refrains from monetising the debt, fiscal authorities must curb government expenditure, fiscal deficits and hence borrowings to avoid unsustainability. Moreover, according to them, although deficit financing has expansionary effect, at some point, it produces adverse consequences. Borrowing for financing the deficit forever is not possible. At certain point of time, deficits require to be monetised. But this may result in steep rise in the price level and destabilization of the economy. This brings the issue of sustainability of the economy into question. If debt at all needs to be monetized for fiscal policy sustainability, the level of monetisation should not bring about price instability.

Masson (1985) points out that an important aspect of the analysis of sustainability of public debt is whether public debt rises faster than GDP, which may signal unsustainability of the fiscal policy. The feasible fiscal policies must be considered in a framework in which the government is subject to an intertemporal budget constraint (**Buiter**, 1983). Similar to individuals, the government also faces borrowing constraint while accumulating debt. An individual faces a finite lifetime

constraint, which restricts his borrowing capacity to meet financial obligations. The no-ponzi-game (NPG) condition restricts an individual to borrow on a continuous basis in order to repay the interest along with the principal. The NPG condition tells that the expected present value of interest-excluded expenditures should not exceed the expected present value of revenues in the future. In contrast, a government with no foreseeable end of its lifetime faces the present value condition. As such, required financial capacity should be maintained by the government in the long-run to meet at least part of the interest costs without further borrowing (**IMF**, 1995). Hence, the current debt must be equal to the discounted sum of future primary surpluses. In order to compensate for the past deficits, presently available resources should be used effectively so that the real growth rate of the economy persistently exceeds the real interest rate on public debt (**World Bank**, 1988). If the real rate of interest is above the real growth rate of the economy, then expansionary fiscal policy at present must involve either contractionary fiscal policy at some point of time in the future in terms of increase in tax rate to stabilize government debt-to-GDP ratio or an increase in seignorage from money creation. Otherwise, the increase in government debt would feed upon itself as government borrows to finance the interest payments on the debt it previously incurred, and debt eventually becomes excessively large relative to other macroeconomic variables. Unsustainability becomes a more pronounced problem as time goes on along with increase in debt accumulation.

Moreover, according to Masson, following an increase in deficits and debt of the government, monetization of deficit or increase in taxes may become necessary. Uncertainty about the sustainability of fiscal policy involves persistent government deficit affecting the behaviour of private sector. Growing public debt has different implications both for the level of interest rates and individuals' demand for government bonds. The longer the deficits persist, the higher would be the outstanding stock of government debt, and greater the need for the fiscal retrenchment or monetisation. Monetisation may accentuate inflationary expectations which in turn, may lead to an increase in nominal interest rates on bonds as a compensation against inflation.

From the above discussion it becomes clear that there is a general aggreement among economists that if the rate of interest at which the government contracts borrowings is in excess of the economy's growth rate, then the ratio of debt-to-GDP would rise without bound. Under such a condition a policy of perpetual primary deficits is impracticable. Besides this is not a sufficient condition for sustainability. It is important that debt should not grow after a certain level. The rate of interest might be at a lower level than the growth rate of the economy, but this may not ensure a falling debt-to-GDP ratio and hence, sustainability of debt. It may so happen that debt would continue growing to an unbounded level, indicating unsustainability of debt or fiscal policy.

2.1.2 Empirical Studies on Sustainability of Public Debt

In recent fiscal literature, a considerable research effort has been directed towards examining sustainability of public debt or fiscal policy.[14] **Hamilton and Flavin**'s (1986) work on sustainability of fiscal policy in US context has prompted a series of works subsequently. Most of the studies concentrate on verifying the time series property of the fiscal policy variables. They employ various unit root tests on public debt. Some studies have conducted unit root test on the discounted debt-to-GDP ratio (nominal and/or real) while some attempt unit root test on the undiscounted value of debt-to-GDP ratio. When a series is moving in a particular direction say, in a positive direction, the test enables one to trace whether the series is stationary (converging to its mean value) or non-stationary (diverging from its mean value). By using Dickey-Fuller unit root test on the discounted debt series, Hamilton and Flavin (1986) find that the series is stationary for the US economy. Having observed stationarity property of the debt series their study concludes that data is fully compatible with what the investors expected the budget to be. This implies that the budget is balanced in the present value sense. **Wilcox** (1987) and **Kremers** (1989) have extended Hamilton and Flavin's work. Wilcox allowed stochastic variation in rate of interest for testing parameter instability while Kremer modified Hamilton and

[14]It is to be noted that as we know government debt and deficits are fiscal policy instruments; while examining sustainability of fiscal policy many studies place emphasis on expenditure and revenue policies of the government, which indirectly indicate the stance of debt sustainability. There are also studies, which directly examine sustainability of public debt. In the literature, most often, the methodology, which is applied for examining sustainability of fiscal deficit, is also applied for examining sustainability of public debt. For that reason all the empirical works relating to sustainability of fiscal deficit and debt are reviewed in order to examine the methods used for assessing sustainability of public debt.

Flavin's test as he observed the test was misspecified. Both the authors claimed that their examination reversed Hamilton and Flavin's findings.

The other time series method used in the literature for evaluating sustainability is the co-integration technique. This technique enables one to know whether a government is consistent in its intertemporal budget constraint. This consistency is revealed through cointegration relationship between government expenditure and revenue receipts. If the government expenditure and the revenue receipts are co-integrated, the fiscal policy is said to be intertemporally consistent and sustainable. **Trehan and Walsh** (1988) and **Smith and Zin** (1988), by employing cointegration technique for the U.S. and Canada economy for the period 1890 to 1983 and 1946 to 1984 respectively, have drawn similar inference that government's behaviour is consistent with its/their intertemporal budget constraints. In contrast, **Afonso** (2000) applying the co-integration technique on the government expenditure and revenue series in the context of European countries, has found that there is no long-run relationship between public expenditure and revenue.

Sobhee (2000) for examining sustainability of public debt for Mauritius economy during the period 1973-96 framed an optimisation model. Representing debt-to-GDP ratio and its growth rate along with inclusion of a time variable in a Hamiltonian function, finally arrived at a quadratic time trend estimable equation. He found that debt-financing public expenditure caused debt-to-GDP ratio grow at a faster rate and had a negative impact on output for some initial years. But due to some exogenous policy factors, debt-to-GDP ratio has come down to a sustainable level in later years. To investigate sustainability of fiscal deficit in ten African countries, **Taiwo** (1994) applied Dickey-Fuller unit root and Bayesian posterior odds ratio tests to verify the stationarity property of time series data on fiscal deficit for the period 1960-90. Observing stationairity of fiscal deficit in terms of its nominal, real values as well as nominal and real values as percentage of GDP in most of the country cases, the study concluded that fiscal deficit was sustainable in most of the countries.

In the case of India, **Rangarajan et. al.** (1989) studied the fiscal/financial situation of the economy during 1975-76 to 1987-88. The study developed an analytical framework linking government deficit with its different alternative modes of financing by a simple budget constraint. It was revealed that debt-financing as a ratio to GDP tended to rise when the primary deficit increased in relation to GDP and debt-to-GDP ratio tended to fall when the change in the outstanding net RBI credit to government (monetization of government deficit) rose as a proportion of GDP. Later, **Chelliah** (1991) attempted to project the growth path of public debt for the period 1989-90 to 2000-01. Finding similar results, the study concluded that the growth of public debt could be brought down to a sustainable level if the primary deficit was reduced to one percentage of GDP.

Similar to the above studies, **Seshan** (1987) considering the increasing trends of domestic debt-to-GDP ratio as a sign of unsustainability, concluded that the government might face an internal debt trap like situation which is a sign of unsustainability of fiscal situation in the country. In contrast, **Buiter and Patel** (1992) in their study critically examined the issue of stabilisation and solvency of public debt in India. Under the intertemporal budget constraint (IBC) framework, (testing the stability of public debt by using unit root test of time series technique), they brought out that despite fiscal adjustment undertaken in the past, given the indefinite continuation of public debt, solvency was not assured in India. **Rajaraman et. al.** (2000) by applying a structural time series model (STSM) to debt-to-GDP ratio series predicted that debt would be explosive during 1998 to 2014. From this, they concluded that debt-to-GDP ratio might not get stabilised at any level without correction of underlying fiscal parameters. In contrast to these findings on sustainability of public debt, **Khundrakpam** (1998) and **Moorthy et. al.** (2000) found that the behaviour of Indian public debt satisfied the Domar's condition of stability, perceived as a necessary condition for sustainability.

From the above empirical literature it can be observed that in the Indian case, there are few empirical studies looking into the aspect of sustainability of public debt from a long-run perspective. Further, most of the studies concentrate on analysing the nature and pattern of trends of public debt in the context of India. Given the past behaviour of public debt in India, **Rangarajan** (1989) and **Chelliah**

(1991) predicted that debt would grow unless measures are taken to raise primary surpluses in the government budget. **Buiter et. al.** (1997) carried out a test for solvency of public debt by considering discounted value of public debt for a short span of time series data. Applying unit root test, they drew the conclusion that debt is not stable implying the insolvency of the government's financial position. But the prediction about the future fiscal policy may unreasonably go in favour of unsustainabiliuty as the study derives inference by using less number of observations in a time series framework.

However, given the fact that stability and solvency are the two basic conditions of sustainability of debt or fiscal policy, there are no studies examining which component of domestic government debt in aggregate domestic debt of the central government leads to unsustainability of fiscal policy. Buiter and Patel's (1997) study includes debt of all the governments including debt of public sector enterprises. The domestic debt of the central government can be divided into three broader components, such as loans raised from the market through bond issuance (to the commercial banks or corporate non-bank financial institutions), loans from the public account and loans which are being monetised. The monetised debt gives rise to accretion of seigniorage revenue to the government and it is less expensive on the part of the government since this is incurred at lower rates of interest and most often is not returned to the central bank of India. Under such a situation it is the interest-bearing component of domestic debt which makes the debt and the fiscal policy more vulnerable. Loans raised from the market through bond issuance and loans raised from the public account are two components prone to debt explosion. It requires a further treatment for examining sustainability issue of public debt of the central government in India by looking at different components of domestic debt in order to trace which component of central government domestic debt poses a potential threat to the solvency of the central government, which forms one of the important objectives of the present study.

2.1.3 Theories on the Macro-Economic Impact of Public Debt

2.1.3.1 Orthodoxy/Classical Vs. Keynes' View

Classicals considered public debt as detrimental for it burdens the future generations by raising taxes. They believed that higher public debt could push the

economy towards bankruptcy. Hume, one of the Classicals, did not favour the idea of the government incurring public debt. Smith stressed that public expenditure was unproductive and public debt for such expenditures was unwise and might lead to withdrawal of private productive capital goods, resulting in crowding out of private investment. This follows that total capital stock gets reduced as government debt stock accumulates. According to Mill, if a government incurs debt from the surplus not needed by the private sector, then there would be no problem of crowding out. But danger is when the government competes with the needs of private sector for the same capital, which leads to rise in price of capital and ultimately affects aggregate investment, employment and output of the economy adversely.

While Smith conceived of an unbalanced budget to meet the emergency arising out of war, the Keynesian revolution advocated an unbalanced budget, a cure for depression. Keynes's "General Theory of Employment, Interest and Money (1936)" provided a scientific basis for evolution of theory of public debt. According to Keynes resorting to public debt would be desirable at a time when an economy is passing through a phase of recession. When an economy undergoes recession due to lack of aggregate demand, there would be shrinkage of investment, employment and ultimately low growth rate of output. To avert such fluctuations in economic activities, Keynes suggested resorting to deficit financing or public borrowing as a prime fiscal measure in the short-run. Public debt in such a situation, by acting as an anti-cyclical fiscal policy measure, provides a push forward move to economic operations and thereby saves the economy from the danger of recession (Sijben, 1979).

However, according to Keynes the extent to which government can resort to debt-financing has a limit. If the government recourses to market borrowings during full-employment equilibrium, it would result in displacement of resources from private sector use to public sector use. Given the resources/funds availability in the economy and the private sector demand for those funds, an increase in government demand for the same funds, would lead to an increase in interest rate. This in turn, may crowd out private investment, and thereby may set off a recessionary trend. However, the overall impact of interest rate on aggregate investment *ceteris paribus* {as investment depends on other factors such as marginal efficiency of

investment (MEI) and cost of capital} depends on the elasticity of investment demand with respect to interest rates.

Later economists pleaded for incurring public debt in the event of a country undertaking development programs in the public sector of a magnitude not economically and politically feasible for it to finance within the framework of a balanced budget. Over time, the concept of unbalanced budget has been accommodated in the theories of public finance as well as the functioning of economies for achieving full-employment and price stability. It is also often argued that budgetary deficits are only a temporary phenomenon and that with the revival of economic prosperity (as a result of acceleration of developmental activities), the deficits would be wiped out through generation of surpluses. Thus, there would be no deficit in the government budget in the long-run. The long-run flexible budgeting is only an extension of the orthodox theory of balancing the budget. In real practice, it is very unusual to find long-run balancing of budget taking place in economies. What is actually observed is either a surplus budget or a deficit budget. It was Lerner (1948) who accommodated government borrowing as an instrument of fiscal policy in his theory of functional finance. However, the impact of growth of budgetary deficits can be adverse if financed through creation of new money. This leads to rise in the price level and thereby bringing instability in the economy. Therefore, economic theories generally discourage "chronic" as well as high budgetary deficits.

2.1.3.2 Keynesian View

The Keynesians suggest that public spending is the remedy against unemployment. There must be deficit spending and not the spending balanced by an equal amount of taxes in conformity in the short-run, since in the latter case, the government would only be taking back with one hand what it gives with the other. In a situation of unemployment and idle resources, there is a definite employment-creating effect of public outlays even when they are fully covered by taxes. Keynesians justified debt-financed government expenditure.[15] Hansen and Perloff arguing on a similar

[15] Keynesians give more attention to fiscal policy in stabilizing economic activity because government expenditures and taxes have a more direct and rapid impact on total demand than monetary measures (Sijben, 1979).

line view that an increase in productive government expenditures (the initial expenditure being financed by borrowing) would tend to enlarge the national income roughly by the amount of government expenditure, even though subsequently financed through consumption taxes (Joshi, 1995).

The no-burden thesis came to the forefront during thirties and forties largely due to the efforts of Keynes and his followers during the great depression. The 'no burden' thesis draws on certain advantages of public borrowing. According to Keynsians, by debt-financing, government can tap surplus savings and thus can utilize for productive uses and bring about an increase in national income.

The followers and believers of Keynesian economic principle have dismissed the burdensome argument of public debt in favour of income generating potential of public debt. According to them, debt creation brings into the exchequer the unutilised resources, productive utilisation of which results in an increase in national income. The tax payments necessary for servicing debt are met out of the increased income and therefore it is not a burden on the community. On the basis of this, they did not voice their concern regarding unsustainability of public debt. In this context, Lerner (1948) puts forth the view that in case of internal debt, even if the interest payment is raised out of current taxes, constitutes only the interest on a fraction of benefits enjoyed through government spending, and is not lost to the nation but merely transfers from taxpayers to bond holders. Only there is a redistribution of wealth across the generations. Government debt incurred in the present generation may be descended on to posterity but gets counter balanced by an asset left by the current generation. However, except Domar, Keynesians had not understood the necessity of resorting to budget deficit over the long-run while favouring deficit financing when an economy was in the down phase of the business cycle in the short-run (Parguez, 2000).[16]

Subsequently some writers have countered the 'no burden thesis' argument. The most vigorously contested view relating to public debt both in the past as well as in the present, is whether primary real burden of public debt is borne by the

[16] as cited in "The Economics of Public Spending: Debts, Deficits and Economic Performance" (eds.) by Hassan Bougrine (2000), Edward Publishing Ltd. (U.K.)

present generation which incurs debt or by later generation which pays taxes both to meet the principal as well as interest payments. One of the exponents among Classical economist, Buchanan (1958), maintains that the taxpayers in future time period do bear the real burden of public debt. While the real income of taxpayer goes down, the same increases in case of bondholders. Hence, it is the taxpayer who ultimately bears the debt burden. The bond holders acting voluntarily simply earn assets and income in future. They in fact improve their position over time, as they make no sacrifice and bear no burden. Buchanan further asserts that the "generations" living at the time of debt creation, on aggregate, as such do not bear any burden. It is the individual who pays taxes, bears the burden and gives a part of his/her income. Public debt creates burden and primary real burden is shifted to future generation. He asserts that payment of taxes *per se* is in itself a burden and when debt financing postpones levy of taxes, the burden will be shifted on to the future generation. On the basis of this argument, Bowen-Davis and Kopf (1960) consider that if real burden of debt is defined as the total amount of private consumption goods given up by the community at the time of spending borrowed funds, then it implies that the cost of public project is simply borne by the generation alive at the time of borrowing. However, the matter would be different if public expenditure in the current period is incurred by borrowing from the present generation and is paid in future by the generation next with the taxes imposed on it.

2.1.3.3 New-Classical View

In contrast to the above viewpoints, Barro (1974), the New-Classical/Rational Expectationist, basing his argument on Ricardo's hypothesis of neutrality of public debt, opines that given the size of public expenditure, an increase in debt-financed public expenditure wouldn't have any impact on the economy as future taxes are embodied in current public debt. This reinforces the argument that although initially, aggregate public and private demand is raised to the extent of original amount of government spending, over time, it would leave total consumer spending unchanged (Multiplier=1). This implies that stimulative policy raises consumer spending while a repressive policy (resulting from increased taxes) lowers it. Therefore, a repressive policy financed through taxes on the individuals followed by a stimulative policy financed through issue of bonds would have no impact on the economic activity.

Based on the neutrality proposition enunciated by Ricardo (1817), Barro (1974) revived the theorem as Ricardian Equivalence Theorem (RET). The theorem assumes that individuals act as if they would live forever implying the presence of intergenerational transfer motive among the individuals and that there is the presence of perfect capital market in the economy. It also assumes that individuals are not liquidity constrained. They can freely lend and borrow in the market against their future income. Given these assumptions, the contention of the theorem is that domestic public debt does not have wealth impact as it is counter balanced by present value of future taxes. Individuals perfectly discount the lump sum involved and hold government bonds as bequests or savings so that they can easily pay for such taxes later without affecting their chosen path of consumption-savings. Hence, debt and taxes are equal in their effects. This also follows that when the government accumulates large domestic debt, rational households anticipate higher taxes in the future. Their "permanent" income gets reduced. As a result, the impact of accumulated domestic debt falls on private consumption. The current reduction in private consumption gets substituted with an increase in future private consumption expenditure as individuals in future would get back their principal and interest earnings on the holding of government bonds. The overall private consumption-savings remains unaffected. The argument construes that the government deficit is equivalent to private sector surpluses/savings. As a consequence, the national savings remain unchanged. This wouldn't result in any impact on rate of interest, private investment and aggregate output. Hence, there would not be any net effect of tax-cut and debt-financed increase in public expenditure on economic activities.

2.1.3.4 Latest View

The contention of Barro regarding the impact of public debt has not remained unchallenged. As there is a growing evidence for developing countries in invalidating the Ricardian equivalence proposition (Haque and Montiel, 1989; Corbo and Schmidt-Hebbel, 1991), more criticisms are levelled against the impracticability of assumptions underlying the proposition (McCallum, 1985). Seater (1993) and others, criticizing the assumptions, have challenged the neutrality impact of public debt on the ground that some individuals have finite horizon. Thus they may not

leave bequest for future generations.[17] There are no perfect capital markets in most of the economies leading to differences in discount rates among individuals. In the presence of these factors, the impact of public debt is likely to be different from the impact of futures taxes. Although Barro agrees about the failure of neutrality proposition under such conditions, it needs to be empirically established in particular country cases (Barsky, Mankiw, Zeldes, 1986).

2.1.4 Empirical Studies Relating to the Macro-Economic Impact of Public Debt and Deficits on the Key Economic Aggregates: Private Consumption and Private Investment

An important strand of macro-fiscal empirical literature which has received a great deal of attention from economists relates to the impact of budget deficits and public debt[18] on inflation rate, interest rate, private consumption, private savings, private investment, aggregate output and other macroeconomic variables. Ever since Barro (1974) explicitly propounded Ricardian equivalence theorem (RET), it has continuously engaged macroeconomists for almost three decades in terms of empirically examining the effects of fiscal policy on different macroeconomic activities in order to verify whether there is an evidence of Ricardian equivalence in different economies. The empirical research in this direction can broadly be compartmentalised into two categories. One category of empirical researchers base their findings on Keynesian theoretical foundation and the other upon New-Classical theoretical foundation mainly supporting Ricardian equivalence proposition (REP). The Keynesians believe that an increase in government debt produces impact on the economic activities as this has got wealth impact, while others belonging to New-Classicals drawing on the assumption of rational behaviour of economic agents argue that an increase in government debt does not produce any impact on economic variables on an aggregate basis as debt does not have net wealth impact (Barsky, Mankiw, Zeldes, 1986). Resolution of these issues is important for

[17] It is argued that parents having no children, may not leave any bequests for future (seater, 1993).

[18] Here, while reviewing the literature pertaining to the impact of domestic public debt, the literature relating to the impact of budget deficit/fiscal deficit have also been examined. The impact of budget/fiscal deficit is examined because the increase in budget deficit leads to increase in total public debt and it is the accumulated fiscal deficits/budget deficits which constitute the total debt of a government in an economy. The review relating to impact of total public debt is done here because of the fact that domestic public debt and external public debt are two components of total public debt and in certain respect both components have got the same impact on economic activities. The other reason of reviewing the impact of both deficit and debt is that it will help us enrich

designing macroeconomic policies in different economies. Unfortunately, on the basis of mixed empirical findings, authors reason that the data is less than cooperative in providing either side with convincing results.

In order to empirically test crowding out hypothesis, researchers examine the impact of government debt or deficits on interest rates which provides a partial examination of crowding out proposition. There are also studies which establish a direct relationship between private and public investment. The crowding out effect of fiscal policy is not theoretically restricted only to private sector investment. It is applicable to private consumption and aggregate output of the economy as well. Empirical tests have focused on the effects of debt/deficits on private consumption and savings. As far as consumption demand is concerned, Barro (1974) has theoretically demonstrated that the effect of deficit financing on private consumption expenditure hinges, to a large extent, on whether consumers view government debt as net wealth or not. If consumers are connected to all future generations and can borrow and lend against their future income streams (no liquidity constraint), change in debt will not crowd out private consumption. In that case, consumers equate the bond-financed reduction in taxes with an increase in future taxes. Consequently, Ricardian equivalence proposition holds and choice between tax-financing and bond-financing deficits becomes irrelevant. The consumption expenditure and savings (income minus consumption expenditure) remain invariant with respect to debt-financed increase in public expenditure. Studies examining the relationship between public debt/budget deficits and consumption and saving activities in a Ricardian framework, are very few in developing countries. Empirical testing of Ricardian equivalence hypothesis mainly concerns industrial countries (Haque, 1988). Boskin et al. (1987) and Bagella (1987) have provided a detailed analysis of the impact of domestic debt for the US economy, where the saving rate has declined substantially with the increase in government debt over a period of time. Relating to the effect on private consumption, Feldstein (1974, 1982), Bernheim (1987), Blinder and Deaton (1985), Modigliani and Sterling (1985), Modigliani (1987), Reid (1985) and Feldstein and Elmendorf (1990) have provided evidence against the equivalence or invariance

---

our understanding of the impact of government debt logically as well frame models for capturing the impact of public debt empirically.

proposition while Kochin (1974), Barro (1978), Tanner (1979), Kormendi (1983), Seater (1985), Aschauer (1985), and Seater and Mariano (1985) and Kormendi and Meguire (1986) put forth their results as consistent with 'Ricardian Equivalence Proposition (REP)'. The general approach used in most of the studies has been to include either fiscal deficit and/or stock of public debt in the regression of private consumption along with other relevant variables viz income and wealth. Tax variable is also often included in order to test whether alternative methods of financing have different effects on private consumption. To a large extent, the result discrepancies occur due to the differences in the sample period of the studies, use of econometric techniques, and methods of measuring economic variables.

Empirical Studies Relating to Impact of Government Debt on Private Consumption:

In order to examine the effect of public debt on private consumption for U.S. during the period 1947-74, **Tanner** (1979) estimated Yawitz-Meyer model of private consumption. He hypothesises that if coefficient on debt variable is zero, then taxes are said to be completely discounted and if coefficient on lagged net worth of private sector exclusive of their holdings of government debt is equal to coefficient on lagged debt, one would conclude that discounting does not exist. Finding that coefficient of government debt is considerably larger than coefficient of net worth, he concludes that there is no evidence of even partial tax discounting for future. Further, he adopted an alternative life-cycle model. In addition to disposable income and stock of wealth at the beginning of the period, the model incorporated disposable income adjusted with current unemployment rate to closely approximate future disposable income along with other forms of accrued income such as corporate savings and stock of durables. Tanner further formulated the hypothesis that government debt is net wealth, if in addition to the coefficient on government surplus being zero, the coefficients on debt is approximately equal to the coefficient on capital stock. In contrast, a zero coefficient on government debt and a significantly positive coefficient on government surplus would imply that government debt is not net wealth. Estimating the model under the stated hypothesis, the result indicates that the coefficient on debt is not significantly different from zero and coefficient on government surplus is significantly positive suggesting that consumers perceive future taxes required to service the government debt as a liability that completely offsets the expected benefits.

In a major attempt, **Kormendi** (1983) differentiating between standard approach and consolidated approach to modeling private consumption, empirically examined the effects of fiscal policy variables on private sector consumption-saving behaviour in U.S. for the period 1929-76. Based on differing assumptions of respective approaches in terms of implications for government spending, current period taxation, government interest payment, and the stock of government debt on private sector consumption, Kormendi designed a test to discriminate consolidated approach from standard approach. Kormendi, before estimating private consumption equation under augmented/nested approach which nests both the approaches, estimates consumption equation only under the consolidated approach to permanent income hypothesis in three forms such as ordinary least squares (OLS) in levels, generalized least squares correction for first-order autocorrelation in levels, and OLS in first differences. The estimations reveal that the coefficients are the same across three forms of estimation and are almost invariant irrespective of inclusion or exclusion of IInd World War-related years (1941-46) confirming the predictions of consolidated approach. Then, he examines the impact of fiscal policy with the augmented approach to REH and finds that the result is against the standard approach.

Reid (1985) examines the impact of fiscal policy on private consumption for two sample periods, viz. 1890 to 1981 and 1913 to 1981 for the federal government and for all levels of governments (federal, state and local governments) respectively, once by using raw data and another time by using cycle-averaged data. The latter period estimates correspond closely to the sample spaces utilized by Feldstein (1982), Seater (1982) and Kormendi (1983) and offer some comparability in respect of empirical results. He hypothesises that if the coefficient of deficits is insignificant in influencing personal consumption expenditure, then there is said to be holding of future tax discounting or REH. Estimating the equation for both the sample periods, he finds that the degree of tax discounting with the raw data appears to be invariant with respect to the level of deficits of federal government and all levels of governments supporting Ricardian Equivalence Hypothesis (REH), but REH is strongly rejected with cycle-averaged data in case of all levels of governments as against federal government.

In another study, **Barth, Iden** and **Russek** (1986) replicated Kormendi's consolidated approach to private consumption modeling and tried to verify the results with those of Kormendi (1983) by considering different sample periods. The overall results support the implications of consolidated approach. However, when they bifurcate total market value of debt into federal and state government debt and use par value as opposed to market value of debt for different sample periods, the results offer mixed support for the consolidated approach.

Feldstein and **Elmendorf** (1990) noticing that Kormendi (1983) provides one of strongest evidences in favour of REH, consider the exact specification of Kormendi's nested approach and examine the sensitivity of private consumption-saving behaviour for the U.S. economy with a different data set. They compare their estimates with those of Kormendi where private consumption equation simultaneously includes both debt and tax as explanatory variables. With the inclusion of World War II years in the estimation, they find that even though results are not identical, coefficients are roughly similar to Kormendi's results. Taking the same sample period, they repeat the estimation with the most recent revised data. They find that the inclusion of war related years in the estimation, produces misleading results which is critical to the differences in results obtained rather than the revision of data. They justify the merits of the data series in the level over the differenced form. Further, the result shows that the choice between first-difference of variables and an autoregressive transformation does not affect the conclusion. The evidence of Ricardian equivalence rests on the inclusion of six years of IInd World War and when these years are excluded Ricardian equivalence is clearly rejected. In order to eliminate collinearity problem of fiscal variables with net national product, they alter the specification by scaling up each variable with current value of net national product. Comparing the coefficients of linear specification with ratio specification without the inclusion of war years, the study implies that the ratio specification provides even stronger evidence against Ricardian equivalence proposition than the linear equation. They also estimate the equation in the ratio form by using instrumental variable method in order to reduce the problem of endogeneity for the post war period. The pattern of coefficients was again incompatible with Ricardian equivalence proposition proving contrary to Kormendi's findings.

Kormendi and **Meguire** (1986) examine REH taking into consideration implicit restriction in Modigliani and Sterling's Life-Cycle (LCH) specification for U.S. during 1952-84. The result suggests that sum of coefficients of lagged tax revenue is not statistically different from zero although it is negative. On the other hand, sum of lagged government spending is significantly negative. They then proceeded to test the homogeneity for LCH specification taking the sample back to 1931. They find that the level data on government debt becomes insignificant and sum of lagged deficits becomes significantly negative, proving the results consistent with REP. Finally, the F-test rejects the test of homogeneity which may be due to low D-W statistics. With Kormendi's augmented consolidated specification estimated with levels, only the sum of lagged real interest payment is at the odds with the consolidated approach. This result again may be due to the problem of nonstationary residuals in the estimated result. But Kormendi's consolidated specification in differenced form of equation finds stronger support for REP.

Modigliani and **Sterling** (1986) criticize Kormendi (1983) heuristic derivation of consumption function on the ground that specification of consumption function is neither consistent with life-cycle hypothesis nor with REH. The specification does not include reasonably long distributed lags and estimated by differencing the variables. Modigliani et. al. derive a private consumption model based on life horizon life cycle hypothesis (LH-LCH) for examining the effect of fiscal policy on private consumption spending. The limiting form of LCH for an infinite planning horizon has implications for REH. According to them, private consumption spending should respond negatively to a weighted average of taxes and government expenditures. The consistent condition is that the coefficient of weighted average of taxes and government expenditures should be equal to minus that of income as a result the sum of coefficients of income and weighted average of taxes and expenditures add up to zero. They impose the condition that for the LH-LCH to hold, the weight of taxes should not be far from unity, and that of government consumption much less than unity, whereas for REP to hold, the case should be reversed. As far as the coefficient of debt is concerned, given the private net worth, it should be close to zero (even might be positive) under the LH-LCH, whereas it should be minus that of wealth for REP to hold. In other words, for REP to hold, the sum of deficit coefficient should be negative and equal in magnitude to

sum of the income coefficients, while for LCH the coefficient of deficit should be zero. Given these two frameworks, the study examines private consumption behaviour of the U.S economy for the period 1952-84. Using OLS estimates with all the variables in level form, the study finds that the result is consistent with LCH but not with REP.

Modigliani and **Sterling** (1990) criticise Kormendi and Meguire (1986) in response to their previous comment on Kormendi's (1983) work on the ground that Kormendi (1983) theoretically and empirically overlooks the effect of temporary taxes and uses differenced specification, unrepresentative sample, and less reliable data which lead to biased results with regards to LCH. Modigliani et al., in order to examine REH, consider the post war period data during 1952-84 for U.S. Based on Ricardian equivalence proposition (REP), they hypothesise that all transfers should have the same effect on consumption as all taxes, namely *no effect* at all. The estimation of consumption equation shows that coefficients of deficit and expenditure receive positive sign but are found to be insignificant. The effect of transfers is found to be extraordinarily large which in fact should be equal to zero under REH. The overall findings suggest that once temporary tax is included in the estimating equation, it reverses Kormendi and Meguire's (KM) finding.

Kormendi and **Meguire** (1990) brought out another study in reaction to the criticisms of Feldstein and Elmendorf (1983) and Modigliani and Sterling (1990). While Feldstein et. al. claim that the result obtained by Kormendi, with the exclusion of World War II period, is not robust, Modigliani et. al. claim that failure to take into account temporary taxes, biases the results against the life-cycle hypothesis. Therefore, considering these criticisms, Kormendi et. al. use improved definitions of variables, real data and take care of homogeneity problem. From their empirical evidence they further rediscover that the result is contrary to what both the authors predict.

Under the assumption of rational expectation, **Haque, Lahiri** and **Montiel** (1990) formulated a macroeconomic model for thirty one developing countries for a panel data over 1963-87. The specification of consumption model is similar to Haque and Montiel's (1989) version of permanent income model. Applying generalised least square (GLS) estimation technique to a partial consumption

demand equation, the study finds that the estimated coefficients of consumption equation are found to have expected signs. The interest rate is found to be significantly negatively related to consumption spending. The lagged consumption is close to unity and significant as expected in accordance with Hall's (1978) specification of permanent income hypothesis. However, contrary to Hall's hypothesis, disposable income is found to be significant in explaining consumption behaviour.

Similarly, **Islam** and **Wetzel** (1994) examined the impact of fiscal deficit on private consumption in the context of Ghana for the period 1960-90. They estimate consumption regression equation where current private consumption is expressed as a function of disposable income, public consumption, foreign savings (export minus import), real lending rate, and liquidity constraints proxied by credit to private sector. All the variables other than real lending rate are expressed as ratio to GDP. The estimated results suggest that all the variables other than real lending rate and liquidity constraint are found to be significant. The insignificance of both the variables is because of a weak financial market system and Ghanians generally do not borrow to finance consumption. When the insignificant variables are dropped from the regression, the relationship between current private consumption and current disposable income is almost one-to-one, supporting Keynesian hypothesis of private consumption. Public consumption is negatively related to private consumption implying that government's expenditure is passed on to private sector in the form of goods and services. Increase in public savings or decrease in fiscal deficits affects private consumption implying that Ricardian equivalence does not hold.

Faini (1994) examined private consumption for Morocco for the period 1972-88. He estimates the consumption function where private consumption is expressed as a function of output, consumption in the previous period, real rate of interest and real exchange rate. From the estimation, the result indicates that an increase in real interest rate and a real depreciation, leads to a decline in the propensity to consume. Later following **Sternberg** (1981), Faini amends the equation by incorporating fiscal deficit-to-GDP, liquid asset (currency plus bank deposits) and price variables. The study finds that real exchange rate, inflation and

budget deficits significantly affect private consumption and that real interest rate does not play any significant role in influencing private consumption in Morocco.

Haque and **Montiel** (1994) estimated the consumption function for Pakistan during the period 1963-87. They assume that consumption, besides being influenced by permanent income, disposable income, price level and interest rate, gets influenced by fiscal variables such as public consumption, fiscal deficit and permanent public sector saving. Permanent income per capita is approximated from the autoregressive moving average specification. Finding that there is presence of unit roots in almost all the variables, while ignoring which conventional estimation likely to yield misleading results, the relationship among the variables is tested through cointegration and error-correction technique. The result suggests that private consumption does not adjust fully to its long-run desired level. In the short-run, the increase in government consumption substitutes private consumption, and disposable income favorably influences private consumption, which suggest that consumption behaviour may be influenced by tax policy and liquidity constraint.

Cardia's (1997) model for the estimation of consumption function on a generated series is closely similar to the model estimated by Feldstein (1982), Kormendi (1983), Kormendi and Meguire (1986), Modigliani and Sterling (1986), Barth et. al. (1986), and Feldstein and Elmendorf (1990). Similar regressors such as current income, lagged income, wealth net of government debt, government consumption, tax revenue, and government debt are included in the estimation of private consumption equation. Three different specifications of consumption function are estimated depending on whether tax revenue and/or government debt variables are included or not, using either Cochrane-Orcut autoregressive transformation or using first differences of the variables. Under the null hypothesis that the coefficients on tax revenue and/or government debt are not significantly different from zero, Cardia puts forth the mean values of OLS estimates from 1,000 replications and the number of times, the results are consistent with Ricardian equivalence. The overall result is found to support Ricardian equivalence hypothesis more number of times than non-Ricardian alternative in level form as well as in differenced form of variables, irrespective of presence or absence of debt variable in the equation. Estimating the equations under the assumption of distortionary

taxation and infinite horizon, the study also arrives at similar result. When changes in the labour taxes only are included (fiscal spending and productivity keeping constant), Ricardian equivalence always gets rejected and is found consistent with non-Ricardian proposition. When the equations are estimated under the assumption of non-distortionary taxation and finite horizons, in most cases, Ricardian equivalence is rejected. The overall result suggests that the coefficient of tax revenue and debt variable are unstable, and the test for Ricardian equivalence is misleading whether Ricardian equivalence holds or not when coefficients on income, wealth, and government spending are found very robust across the simulations. The study concluded that this apparently conflicting result might be due to assumption of endogeneity of income and presence of distortinary tax in the model.

Testing Ricardian proposition in a dynamic optimization framework is a recent approach. **Leiderman** and **Razin** (1987) in an optimization framework, estimated Blanchard's (1985) version of consumption model using monthly data for Israel. Their test provides evidence against Blanchard's hypothesis of different planning horizons of government and private individuals, and therefore lends support to the Ricardian equivalence hypothesis. The only other attempt at empirically testing the Blanchard-Yarri model has been made by Wijnbergen (1986). Recognising that the Blanchard-Yarri approach in essence, implies that the difference between the discount rates of private sector and government, Wijnbergen has tested such differences among member countries of the Organisation for Economic Cooperation and Development (OECD). The result of this test assuming static expectation, suggests strong support for Blanchard-Yarri's hypothesis.

In contrast to the above studies, in the Indian context, **GopalKrishnan** (1991) attempted to examine the effects of domestic public debt on private consumption under the framework of REH during the period 1961 to 1981. The study divides aggregate domestic debt of central and state governments into various components such as monetised debt, market debt, small savings, provident funds and other liabilities. The study specifies private consumption as a function of any of these debt components or aggregate domestic debt in addition to the inclusion of basic variables such as Net National Product at factor cost, net

expenditure on goods and services and taxes net of transfers and subsidies in the model. Hypothesing that REH is said to hold when the coefficients of debt and tax are not significantly different from each other, he applies ordinary least square (OLS) procedure. The overall result suggests that except provident fund, where coefficient equivalence between tax and provident fund does not hold, there exist coefficient equivalences with regard to other components of domestic debt including total domestic debt. From this, the study implies that individuals perceive provident funds as a tax which reduces their present consumption by drawing additional resources from the individuals while they do not perceive other components of total debt as constituting their part of net wealth.

Mohanty (1995) examined the implications of rising public debt for consumption-saving activities in India under the framework of REH for the period from 1960-61 to 1989-90. Following Kochin (1974) and Buiter and Tobin (1979), he regressed private consumption on government deficits, expenditure, tax and national income through OLS procedure. The result does not yield firm evidence for Ricardian equivalence. Further, he modifies consumption equation along the lines of Modigliani and Sterling (1986) and Modigliani and Jappelli (1987) with government debt, private wealth, and government revenue deficit substituted for overall deficits. For taking into account structural characteristics of the economy, he introduces non-agricultural income to agricultural income. The estimation of modified consumption equation through 2SLS procedure provides evidence that government consumption (current account deficits) and transfer payments induce private consumption. The coefficient of government debt is neither negative nor equal to wealth coefficient implying a net wealth impact of government debt. Further, when the consumption equation is augmented with public investment it is seen that public investment along with interest payments dampens private consumption and contribute to national savings. These findings prove contrary to the predictions of neutrality of public debt as stated in Ricardian equivalence theorem. But like Modigliani et. al. (1986) model, one major criticism against this formulation of private consumption that can be advanced is that there is no basis why the coefficient of aggregate wealth should be equivalent to the coefficient of government debt for REH to hold.

In another study, **Singh** (1998) examined the impact of domestic debt on private consumption in India from 1971 to 1995. Under the framework of permanent-life cycle hypotheses, he divides the total wealth of the private sector into two components: (a) government bonds forming a part and (b) others are being the value of capital stock as measured by total value of stockholder's equity plus the value of housing stock, land and consumer durables; and reserves held at the central bank which are private sector's claim on the government. He hypothesises that the anticipated component of wealth has implications for the permanent income, while the unanticipated component affects consumption in the current period; but if none of the components affects private consumption, it would imply holding of REH. From the OLS estimation, finding that the coefficient of anticipated domestic debt is insignificant, the unanticipated component is significant and the joint coefficient is significant, the study implies that consumers in India do not exhibit Ricardian behaviour. Under the assumption of the rational expectation, the permanent income hypothesis seems to hold good for many reasons. The important reasons cited are the existence of imperfect capital market, and prevalence of regulated interest rate regime. But a major drawback of the above studies in the Indian context is that in their empirical formulation, they hardly take into account the true underlying dynamic effect of fiscal variables on private consumption and reasonable coefficient restriction to test REH.

Empirical Studies Relating to Crowding out of Private investment Hypothesis:

There are many studies carried out in various countries which focus on the issue of crowding out/in effect of fiscal policy on private investment. Mostly, the studies examine the partial crowding out hypothesis by tracing out the relationship between budget deficits and rates of interest under the Ricardian equivalence proposition (REP). The studies consider rate of interest as the dependent variable and budget deficit and/or public expenditure as independent variable(s) along with other exogenous variables in the regression equation. On the validity of the presumption that there exists significant positive relationship between budget deficit and rates of interest, the studies conclude that there is an evidence of partial crowding out of private investment through fiscal policy. The studies do not investigate the exact relationship between fiscal deficit/public debt and private investment. For instance, **Hoelscher** (1983), in his study, examines the relationship

between federal borrowing and short-term interest rates using the loanable funds model. The study finds that there is no significant relationship between federal borrowing and short-term interest rates. In another study, **Plosser** (1987) attempts to examine the association between changes in the real value of the public debt and the term structure on monthly data for U.S. economy. The study finds that there is no significant relationship between the variables during 1977-1985. Apart from these studies, hardly any other study even attempts to examine the relationship between public debt and rate of interest.

Although there is fewer numbers of studies looking at the impact of public debt on interest rates, there are many studies, which examine the impact of budget deficits on interest rates for verifying the crowding out hypothesis. **Evans** (1985) and **Hoelscher** (1986) attempt to establish the relationship between interest rates and budget deficits under the IS-LM and loanable funds model respectively for the U.S. economy. While Evan's study reveals that there is no positive association between budget deficits and interest rates, Hoelscher's study reveals that deficit causes higher long-term interest rate. Considering the conventional macroeconomic theory, **Evans** (1987) further tests the relationship between nominal interest rate and budget deficits for Canada, France, Germany, Japan and United Kingdom as well as US during 1974 to 1985. Using the OLS procedure, the study does not find any evidence of significant positive relationship between interest rate and budget deficit. Indeed of six countries studied, the study in one case finds significant negative relationship.

Later, **Gupta** and **Moazzami** (1991) attempted to assess the impact of budget deficits on interest rates for U.S. using ARCH model proposed by Wickens and Breusch (1988). The result suggests that budget deficits have positive and significant impact on interest rate, contradicting Ricardian neutrality proposition. Under the IS-LM model, **Saltz** (1993) verifies the impact of budget deficits on both ex-post short-term and long-term real interest rates for the US economy during the period 1955 to 1985. From the regression result, the study finds that deficits do not exert any significant impact on ex-post short-term real interest rates. However, it reports that deficits have significant impact on long-term real rates. The study by **Cebula** and **Belton** (1993) investigates the impact of government budget deficits

on two short-term interest rates and three long-term interest rates for U.S. under the IS-LM framework. The finding suggests that although deficits do not affect the short-term nominal rates but raises the long-term nominal rates.

Kulkarni and **Alfirman** (1999) examined the crowding out hypothesis for Indonesia during 1969 to 1995 using ordinary least square (OLS) procedure. The estimates reveal that rate of interest is neither influenced by budget deficit nor by domestic investment. In addition, they estimate another regression which reveals that budget deficits have positive influence on domestic investment, contradicting the crowding out hypothesis. From this, they concluded that expansionary fiscal policy or increase in budget deficit does not crowd out private investment for Indonesia. In contrast, **Haliassos** (1991) demonstrates that in most of the OECD countries budget deficits lead to higher interest rates. **Black** et. al. (1990) also observe crowding out effect for U.K. during 1793-1815.

Cebula (1978) examined the crowding out effect of government debt on private investment for U.S. and Canada for the period 1949 to 1976. Estimating a single equation model through OLS, the study supports the crowding out hypothesis in both the countries. Criticising Cebula's study on the ground that it is based on small sample size and that there is the presence of autocorrelation in the estimated equation, **Ostrosky (1979)** further examines the crowding out hypothesis for the U.S. and Canadian economy. The study considers quarterly data for the same time period instead of annual data and then modified the investment equation by taking profit as an explanatory variable instead of lagged investment in order to take care of the problem of autocorrelation. Using OLS on the modified investment function, the study reveals that the level of private investment in both the economies is significantly positively influenced by the rate of capacity utilization and previous period profit rate while it is significantly inversely related with the size of federal budget deficit. In another attempt, **Cebula** (1985) re-examines the crowding out hypothesis for the U.S. economy during 1970:1 to 1982:2. He expresses private investment to GNP ratio as a function of inflation rate, selling and retail trade prices, profit rate and budget deficit to GNP. The estimated equation suggests that overall deficit significantly crowds out private investment irrespective of whether other variables are included or not in the model.

The economic theory demonstrates that there may be a complementarity or substitutability relationship between government borrowings and private investment. The relationship depends on the economic condition and other factors such as the way borrowing is raised and the way it is being spent. But in the empirical literature as seen above, very few studies have attempted in examining the relationship between government borrowing and private investment. It may be due to the reason that it is quite difficult to know how the debt is spent. Economists of Keynesian orientation view that the degree of crowding out of private investment depends upon the sensitivity of private investment to changes in real interest rates. If an increase in government borrowing corresponds to an increase in interest rates, economists view that there is existence of partial crowding out of private investment. But in an economy where private investment is insensitive to the rate of interest due to the inherent institutional features of the economy, it is difficult to conclude about the relationship between public debt and private investment only by examining the relationship between rate of interest and public debt. One needs to examine the direct relationship between private investment and domestic public debt.

In the Indian context, limited number of studies has attempted to examine the relationship between domestic debt and private investment and domestic debt and interest rate. Even, there are very few studies that examine the partial crowding out impact of government debt in terms of the influence of budget deficits/debt on interest rate. The underlying logic is not far to seek. One of the reasons may be that the concept of crowding out through the effect of fiscal policy on interest rate had little relevance until 1992 in view of prevalence of a highly regulated financial interest rate structure; and further, recently interest rates have been left to the market. However, the concept of fiscal deficits in India is of recent interest. Using a cointegration technique, **Nachane** et. al. (1997) examined the relationship between interest rates, money supply and budget deficits from April 1992 to June 1996. Using nominal 91-day Treasury bill rate, the study strongly supports the proposition that budgetary deficits raise interest rates.

Notwithstanding the fact that very few studies investigate the direct relationship between government borrowings and private investment, the following

section surveys the literature relating to private investment with a view to identifying the determinants which significantly affect it in different economies. This is in keeping with intent for bringing out a basic private investment function for the Indian economy without leaving aside the main determinants of private investment. A number of hypotheses have been advanced to explain the observed variations in private sector investment activity in developing economies. The Neoclassical flexible-accelerator model has been the most widely accepted general theory of investment behaviour. **Bischoff** (1971), **Jorgenson** (1971) and **Clark** (1979) have applied the model in the context of many industrialized countries. However, the model has got limited applicability in the context of developing economies on account of key assumptions involved in the model and data constraints on certain variables which influence private sector investment. These are the complexities facing the economists in modeling private investment in developing economies. For example, assumption regarding the existence of perfect capital market is rare to be observed in these economies and computation of user cost of capital is tedious due to data constraints. Accordingly research has proceeded in several directions in finding out the determinants of private investment. Yet these efforts have not been translated into producing a full-fledged model for private investment behaviour in developing countries.

Recognising these problems, an alternative approach to modeling private investment behaviour was proposed by **McKinnon** (1973) and **Shaw** (1973). The approach viewed private investment in developing countries as a positive function of accumulation of domestic real money balances. The basic assumption underlying this hypothesis is that private investors must accumulate money balances before undertaking any investment project because of their limited access to credit and equity markets. As the real deposit interest rates have a direct bearing on real money balances, this approach visualizes a positive relation between real interest rates and private investment. This is in contrast to the neo-classical approach where real interest rate exerts a negative influence on private investment via user cost of capital. Despite these problems of conflicting theoretical formulations, there have been attempts to incorporate the features of the neoclassical theory of investment while explaining investment functions in developing countries. The studies by

Sundararajan and **Thakur** (1980), **Wai** and **Wong** (1982) and **Blejer** and **Khan** (1984) are notable among such attempts.

The study by **Sundararajan et. al.** (1980) highlighted the role of public sector investment in determining private investment and growth rate in developing economies. The study was carried out with a special reference to India and Korea for the period 1960-75. Adapting Jorgenson's investment model, the study brought out a dynamic modified framework for explaining the influence of public investment on private investment. Since their private investment function couldn't capture the net crowding out effect as public investment has positive impact on output which may offset the immediate crowding out effect operating through resource constraint, they examined the effect of public investment on total output and savings of the economy. From the estimated reduced form of structural equation, the study finds that in India there is a substantial crowding out of private investment in the initial period though in the subsequent period there is crowding in effect but crowding out in initial period outweighs crowding in effect in later period. The reason they give for the occurrence of crowding out is due to the enhanced requirement of resources by the government resulting in reduction of real resources for private sector and thereby crowding out private investment. From their dynamic simulation model, they infer that although in India public investment does significantly crowd out private investment in the short-run offsetting the positive impact in the subsequent long period, the crowding out is partial as the increase in public investment raises total investment and overall output. But the effect of increase in public investment on total investment and overall GDP is weak. In sharp contrast, in Korea, it raises output expectation and private sector investment to higher levels by raising the productivity of private capital stock and generating demand for private sector output.

Modifying the version of the flexible accelerator theory of investment, **Wai and Wong** (1982) examined the hypothesis that private investment in developing countries depends on government investment, change in net credit to private sector and net inflow of foreign capital to private sector (all as a ratio to the difference between the desired capital and the existing capital stock) with reference to Greece, Korea, Malaysia, Mexico, and Thailand for the period 1965-75. Using a recursive

model, their empirical results tend to confirm that government investment is subject to changes in bank credit and that foreign capital inflows play an important role in determining private investment. This implies that by varying the flow of credit, government can influence private investment in developing economies.

Blejer and **Khan** (1984) recognise that the data constraints relating to capital stock, labour wages, and user cost of capital make it extremely difficult to empirically test standard models in developing economies. Following Sundararjan et. al. (1982) and Wai and Wong's (1982) model, they developed a simple framework for studying the behaviour of private investment for twenty four developing countries with data pooled over the period 1971-79. The study intends to examine the impact of fiscal policy and derive an explicit relationship between the principal policy instruments-variations in bank credit, government expenditure (specifically, government investment) and private investment through a variant of flexible-accelerator model. From the empirical result, the study finds that the level of private investment activity is positively related to the change in expected real GDP, trend level of government investment, and availability of funds for private investment measured by change in bank credit plus the level of private capital inflows, but is negatively related to excess productive capacity. The study also finds that the influence of government investment on private investment depends on the type of government investment - infrastructural or other investment. The overall findings suggest that there is a long-run complementarity between private and public sector investments; however, in the short-run, there is a substitutability relationship.

In a neoclassical framework **Aschauer** (1989) investigated the differential effect of various government spendings on private investment and the rate of return on private capital for the U.S economy for the period 1953-1986. He considers private investment as a function of marginal product of private capital, public investment/capital account expenditure and government consumption/current account spending. The study uses full-information maximum likelihood estimating method in order to take into account the overidentifying restrictions implicit in the reduced form of structural model. The findings suggest that the stock of military capital or government consumption has no statistically discernable impact on

productivity of private capital and that the impact of nonmilitary capital on the return to private capital is four times as large as military capital. This implies that although public consumption carries only marginal explanatory power for the level of private capital accumulation and return to capital, the net impact of a rise in public investment spending is likely to raise private investment as public investment raises productivity of private capital.

Under the assumption of rational expectation, **Lahiri, Montiel** and **Haque** (1990) formulated a macroeconomic model for thirty one developing countries for a panel data over 1963-87. In modeling a partial investment function, they consider investment demand as a function of real rate of interest, real output, and lagged investment. Applying generalised least square (GLS) procedure, the study finds that the estimated coefficients of interest rate is negative as expected, contradicting McKinnon-Shaw hypothesis; and the growth of income is positively significant in keeping with the flexible-accelerator investment theories, with lagged investment being close to but less than unity.

Greene and Villanueva (1991) attempt to identify the determinants of private investment for twenty three developing countries including India for the period 1975-87. From the initial data analysis, they observe that the decline in growth rate of per capita income, public sector investment and worsening fiscal position significantly corresponds to the decline in private investment rates in 1980s and that the gross capital formation is, on an average, greater for developing countries specializing in manufactured exports than for countries exporting primary commodities. Because of the difficulty in identifying a theoretically correct specification for structural modeling and obtaining necessary data, the study, on an ad hoc basis, tries to econometrically measure the effects of fiscal policy and other macroeconomic variables on private investment for all countries. The results arrived through OLS procedure, using pooled time series and cross section data analysis, support the view that countries with higher growth rates, income levels, macroeconomic stability (low inflation rate), smaller debt burden, and higher rates of public investment have higher levels of private investment-to-GDP ratio.

Islam and **Weitzel** (1994) examined the impact of fiscal deficit on private investment for Ghana for the period 1960-90. The results suggest that public investment, corporate tax revenues, and credit availability to private sector as a measure of liquidity constraint, are statistically significant. The negative coefficient of public investment seems to indicate that public sector investment has mostly substituted for private investment. Using corporate tax revenues collected by the government as an indicator of tax burden faced by private firms, the study finds that it has a positive, rather than a negative sign. Since corporate revenues are correlated with profits, the authors conceive that these revenues serve instead as a proxy for profits rather than a proxy for tax. The flow of credit to private sector has a positive coefficient. The emerging proposition from the study is that one way to encourage higher levels of private investment in Ghana would be to ease the economy-wide credit ceilings or to reallocate credit from government to private sector. Interest rate does not have significant influence. The simulation result suggests that availability of credit seems to be the constraining factor for private investment, and that the lowering of public sector investment does not have significant effect on private investment.

Faini (1994) examined the impact of fiscal deficit on private investment for Morocco for the period 1972-88. The findings of the study suggests that private investment is significantly affected by the real cost of capital. The level of private investment is also affected by the credit availability as a proxy for the stringency of debt constraint and rate of interest, which play a crucial role in determining the macroeconomic outcome of different fiscal policies. Therefore, the study concludes that the fiscal policy can affect the investment decision through its impact on interest rates or more directly by changing the set of fiscal and financial incentives available to the investors.

Haque and **Montiel** (1994) estimated the investment function for Pakistan for the period 1972/73 to 1987/88. They consider private and public capital stock, the level of real output, and the rental rate of capital as determinants of private investment. The estimation is carried out using cointegration and error correction techniques. The long- run estimates support that government capital stock is positively correlated to private sector capital accumulation. The infrastructural build

up appears to facilitate private investment and an increased real cost of capital tends to depress private investment. The error-correction result suggests that private capital stock adjusts slowly to its long-run desired level and, while a positive level of government investment induces private investment, the rental return on capital adversely affects private investment. Therefore, their study concludes that fiscal policy in Pakistan has got both direct as well as indirect impact on private investment. **Argimon, Gonzales-Paamo,** and **Roldan** (1997) examined the effects of public consumption and public investment on private investment for 14 OECD countries for the period 1978 to 1989. The study reveals that although public consumption and public investment are negatively associated with private investment, only the public consumption is significant.

In another study, **Ahmed** and **Miller** (1999) studied the effects of aggregate as well as disaggregate government expenditure each as a share of GDP on investment to GDP ratio for a sample of developed and developing countries. By introducing government budget constraint into the model, they try to separate out the impact of tax-and debt-financed expenditure on investment in a similar line as adopted by **Miller and Russek** (1997). Using fixed-effect and random-effect regression estimation procedure, the study finds out that tax-financed government expenditure crowds out more private investment than debt-financed expenditure. Expenditure on social security and welfare reduces investment in all sample countries while expenditure on transport and communication induces private investment in developing countries and that the same does not induce investment in developed countries.

In the Indian context, **Gopalkrishnan** (1987) provides evidence that debt-financing crowds in private investment. In contrast, empirical investigation by **Krishnamurthy** et. al. (1982), **Bardhan** (1984), **Pradhan** et. al. (1990) have shown that while stepping up of public sector investment through market borrowings involves crowding out of private investment, but has a favorable impact on growth. Therefore, they conclude that crowding out, when considered in a wider perspective need not be undesirable for the economy. **Kulkarni et. al.** (1993-94) could not establish the presence of crowding out effect of budget deficit in India. Thus, in India, as seen above, the empirical studies investigating particularly the full

crowding out effect of public debt on private investment are scanty. Further, most of the studies examine the crowding out hypothesis by relating private investment with public investment ignoring the role of government borrowings in influencing private investment. The study by Sundararajan et. al. (1980) highlights the role of public investment and the role of resource availability for explaining private investment without considering the role of government borrowings. The role of government borrowing enables one to know whether resource absorption by the government affects private sector investment.

The investment function specified in the models of **Pani** (1984), **Krishnamurty, Pandit and Sharma** (1989) and **Pradhan, Ratha and Sarma** (1990) at the disaggregate level, specifically emphasis the role of public sector investment in influencing private investment behaviour in India. Subsequently, in a few studies, break up of investment into construction and machinery is also attempted. On a similar line, **Patnaik** and **Joshi** (2000) examined the relationship between public investment and private investment. From estimated regression result they found that inflation, government budgetary resource gap and public investment in manufacturing sector adversely affected private investment in the manufacturing sector during 1971-1993.

Pradhan, Ratha and **Sarma** (1990) undertook a study for the reason that most of the existing Indian literature [such as Sundararajan and Thakur (1980), Krishnamurthy (1985)] looked at the relationship between private investment and public investment without any reference to the modes of financing and the manner of allocation of public sector investment. The study tested the relationship between private investment and public investment and different modes of financing public investment through computable general equilibrium model by dividing the economy into 18 different sectors - 17 commodity sectors and one financial sector, and also into three classes - government, business and household. From the simulation result, the study concludes that with the increase in public investment, there is a complementarity effect on private investment. Even though it crowds out private investment in certain sectors, it raises the overall aggregate investment and income in the economy. The reason for an ultimate fall in private investment which is less than the increase in public investment is that public investment results in cheaper

capital goods which induce private investment. The extent of crowding out varies with different modes of allocation and financing of public investment. The crowding out is direct and highest when the mode of financing public investment involves market borrowings than money-financed. Moreover, the study concludes that crowding out from a wider perspective is not undesirable as it has favorable impact on the growth rate of the economy.

Mallick's (1999) study is an attempt to examine the long-run and short-run relationship between output growth, private investment and public investment with induction of several other relevant macro variables into the cointegration and error correction modeling approach in the Indian context for the period 1950-51 to 1995-96. The study finds that in the long-run private investment is positively related to bank credit for private sector, public investment, real interest rate, human capital; and in the short-run it is negatively related to real interest rate (deposit rate). The positive impact of real interest rates on private investment lends partial support to McKinnon and Shaw hypothesis in the long-run, while having an adverse effect in the short-run, provides empirical credence to Keynesian/Structuralist tradition. This review is done in order to find out the research gaps in the existing literature and to develop suitable models in the Indian context. Research gap is clearly discussed in the first chapter of the study.

From the above survey of empirical literature, it can be seen that most of the existing studies in India have examined the interrelationship between interest rates, price level, and money supply in relation to the change in budget deficits/fiscal deficits. There are also studies that examine the relationship between private investment and public investment. Studies in the Indian context examining the impact/effect of government borrowing on the other economic activities are highly limited. Particularly, there is a dearth of studies examining direct relationship between government debt and private consumption, and government borrowings and private investment; however, a few studies have attempted to examine the relationship between private investment and different modes of financing public sector investment. The present study, by making a humble attempt to fill these gaps, tries to arrive at appropriate fiscal policy implications.

Chapter 3

A Review of Trends and Composition of the Central Government Domestic Debt in India

In a conventional budget the revenue account is either balanced or expected to produce surplus.[19] The surplus or balance from current revenue (BCR) forms part of the receipts on the capital account of the government budget and is used for asset formation or for meeting capital expenditure requirements of the government. In a developing economy like India, a moderate level of capital account deficit is not considered harmful but rather desirable, especially when used for capital formation. However, it is observed from the experience of many developing economies including some of the developed ones that high level of fiscal deficit (consisting of revenue and capital account deficits) and consequent build up high level of public debt have been symptomatic of adverse economic performance (Dalamagas, 1995) depending upon the sources from where debt is raised, the utilization pattern (of debt) and the economic environment characterizing the economy.[20] Therefore, reduction of government deficits and controlling the rate of growth of outstanding stock of public debt have moved to the forefront of economic policy challenges facing many of the developing as well as industrialised nations in recent years. Similarly, this has also come to be of particular concern for the policy makers in India as a persistently high level of public debt results in instability and undesirable effects on the economy.

India has been experiencing a rise in overall level of deficit and debt of the central government over the decades. Although this problem began from the early 1960s, with the intensive evolution of developmental planning in the Indian economic system, the increase in fiscal deterioration has been observed to be more

[19]A balanced government budget in the traditional literature is otherwise known as "golden rule of government financing".

[20]The consequences of fiscal deficits and debt also depend on the choice of whether a country resorts to external debt or domestic debt. More dependence on the external debt directly prone to external account imbalances, reduces national savings and thereby leads to current account deficits. The choice of financing hinges on the availability of loans, the degree of development of domestic financial market and the terms and conditions (cost and risk) attached with the loans, macroeconomic and monetary policy conditions of the economy (Beaugrand, Loko and Mlachila, 2000).

intense especially from the early 1980's. Besides, there has been a significant compositional shift in total debt of the central government in favour of domestic sources of debt. More reliance on the domestic sources of debt of the central government is on account of the change in the external economic condition and the stance of external debt management policy.[21] However, a look at the overall financial position of the central government suggests that high level of government deficits and consequent mounting of public debt have resulted in an increase in aggregate interest liabilities of the central government. This has become a major drain of financial resources on the exchequer, and a cause of concern for growth prospectus of the economy. Given the behaviour of deficits and overall debt of the central government in the Indian economy, this chapter makes an attempt to present the background of the study by examining trends and compositional change in debt (with a special focus on domestic debt) of the central government and also tries to trace out the underlying causes of rise in overall deficits and debt of the central government along with addressing fiscal risks associated with unbudgeted liabilities of the central government.

3.1 Trends in Aggregate Debt of the Central Government in India

Looking at the trends in the level of debt of the central government, it is observed that the absolute amount of total debt (sum of internal and external liabilities) of the central government has been rising every time to attain new higher levels. The total debt taken as a proportion of GDP at current market prices, has also been showing an increasing trend barring a few years where it witnessed certain hiccups in its constant increasing path. This has risen from 36.84 per cent in 1960-61 to 41.24 per cent in 1970-71 and from 41.56 per cent in 1980-81 to 55.34 per cent in 1990-91. Although it registered a declining trend during the period 1995-96 to 1998-99, which could mainly be attributed to an impressive performance of the economy, rose further to around 53.42 per cent in 1999-2000 (see Table 3.1).[22]

---

[21]The decline in external public debt is due to the initiation of policy measures recommended by various committees of economic reforms along with other factors such as unavailability of concessional credits from abroad and imposition of restrictions on the levels of foreign borrowings. The approach to the external debt management that was adopted in India in the 1990s was broadly based on the recommendations of the Rangarajan Committee (1993). It was in respect of external commercial borrowings (ECB) as well as external public debt. It suggested measures to encourage non-debt creating financial flows, retirement of expensive external debt and to reduce short-term debt with controls to prevent its undue increase in future.

[22]In 2000-01, it is seen that the ratio of total debt-to-GDP has gone up to 56 percent.

Moreover, in the last decade, center's aggregate debt, on an average, has hovered around 53 per cent of GDP. This rise in public debt of the central government over the decades, both in absolute terms as well as in relative terms as a percentage of GDP, indicates a worsening financial position of the central government.

Table 3.1: Burden of the Central Government Debt in India

(In Percent)

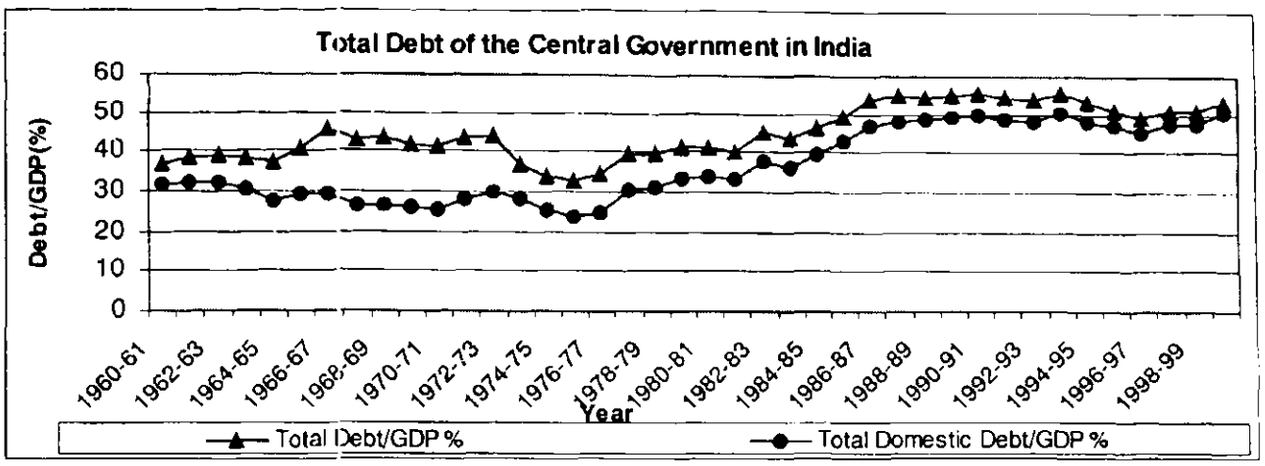
Years	Total debt /GDP	Internal debt /GDP	Other liability /GDP	External debt /GDP	Total interest payment on total debt /GDP	Net interest payment on total debt /GDP	Net interest payment on domestic debt/GDP	Total interest payment /Revenue receipts
1960-61	36.84	21.42	10.49	4.93	0.42	0.08	-0.06	7.18
1965-66	40.95	19.59	9.97	11.39	1.32	0.77	0.46	15.65
1970-71	41.24	16.35	9.08	15.82	1.33	0.76	0.38	18.28
1975-76	32.90	16.69	7.21	8.99	1.47	0.93	0.70	15.63
1980-81	41.56	21.47	12.23	7.86	1.81	0.94	0.76	20.86
1985-86	49.50	25.55	17.42	6.53	2.70	1.59	1.39	26.79
1990-91	55.34	27.08	22.72	5.54	3.78	2.87	2.54	39.09
1991-92	54.30	26.45	22.20	5.66	4.07	3.07	2.64	40.28
1992-93	53.71	26.60	21.45	5.65	4.15	3.10	2.63	41.93
1993-94	55.63	28.60	21.52	5.51	4.28	3.16	2.73	48.48
1994-95	53.18	26.31	21.84	5.03	4.35	3.25	2.85	48.25
1995-96	51.03	25.91	20.80	4.31	4.21	3.12	2.75	45.50
1996-97	49.38	25.18	20.24	3.96	4.35	3.24	2.93	47.15
1997-98	51.12	25.55	21.94	3.63	4.31	3.16	2.89	49.15
1998-99	50.72	26.14	21.32	3.26	4.43	3.22	2.97	52.12
1999-00	53.42	37.76	12.67	2.99	4.74	3.40	3.17	50.91

Note: Total domestic liability = Internal debt + Other liability, Capital receipt is net of debt repayment.

Sources: Indian Public Finance Statistics, Ministry of Finance

The increase in central government debt can also be observed from the trend path of level of aggregate government debt shown in Figure 3.1. This shows that the total debt as a percentage of GDP has increased, barring few years in mid-1970s and mid-1990s when it registered a declining trend. Corresponding to this, aggregate domestic debt as a percentage of GDP, also exhibited a similar trend in the mid-1970s, but the gap between the two relatively decreased in 1990s. This reflects that domestic debt as a major constituent of total debt has closely been moving with the total debt of the central government.

Figure 3.1: Aggregate Debt Of The Central Government As A Percentage Of GDP In India



3.2 Composition of Aggregate Debt Burden of the Central Government

The above section depicts that the government borrowing requirements have grown over the years. The level of public debt, reaching to a peak in the 1990s, has remained at a higher level as compared to the previous decades of 1970s and 1980s. From the composition of total central government debt, one can see that although external public debt shows a rising trend over the decades in absolute terms, it shows a rapidly declining trend in relative terms as a proportion of GDP as shown in Table 3.1. This clearly indicates that the share of external public debt in the total central government debt has drastically declined. The external public debt as a ratio to GDP, after reaching a peak level of 16.79 per cent in 1968-69, sharply declined to 8.88 per cent in the year 1973-74. This decline coincided with the world-wide oil crisis which had implication for appreciation of exchange rate of foreign currencies. Thereafter, it registered a continuous downward trend in the 1980s averaging around 6.72 per cent. The decline became sharper in the 1990s following India's balance of payments and fiscal crisis in the year 1990-91. It reached its lowest level of 2.99 per cent in 1999-00. This reflects that external public debt is no more an important source of financing central government deficits in the country. On the contrary, reliance on internal debt and other domestic liabilities, both constituting the total domestic debt of the central government, has been increasing over the years implying a shift in the sources of financing central government deficits, i.e., from the external to the internal/domestic sources.[23] The domestic

[23]The definition of domestic debt adopted here is the same as defined in the introduction chapter and this is in line with the budget documents of the central government of India published by the Ministry of Finance. The domestic debt or internal liabilities of the central government comprises internal debt (market borrowings plus borrowings from the Reserve Bank of India) and other liabilities. The internal debt (as well as external public

debt as a ratio to GDP, prevailing around 32 per cent and 33.70 per cent in 1960-61 and in 1980-81 respectively, went up to 49.80 per cent and 50.43 per cent in 1990-91 and in 1999-00 respectively. This gives a clear indication of the fact that the government had been heavily and relatively relying more on domestic sources of debt. This shift in financing, among many other factors, may be on account of a variety of implicit reasons such as (a) precaution against exchange rate risk associated with dependence on external debt financing, as this has implications towards the external balance of the economy, (b) interest rate risk; an increase in interest rate makes external borrowing more costly, (c) less availability of funds from abroad, less liquidity of government papers in the international market and ultimately the stance of external debt management policy of the central government.

Within domestic sources of central government debt, it could be seen from Table 3.1 that the internal debt, which mainly comes from the market and the Reserve Bank of India, as a proportion of GDP, stood at 21.42 per cent in 1960-61, slid down to 16.27 per cent in 1970-71, and notched up to 28.60 per cent in 1993-94. Thereafter, marginally declining to 26.08 per cent in 1998-99, it drastically rose to a peak level of 37.76 per cent in 1999-00. The provident funds, small savings and other reserve funds etc. constituting other domestic liabilities of the central government, (which come from public account liabilities), as a percentage of GDP, remained almost at a constant and higher level until 1998-99, (as compared to the previous decade of 1980s), but thereafter witnessed a sudden decline in 1999-00. Even though there was a fall in other liabilities at the end of 1990s, it was offset by a more than proportionate rise in internal debt during the same period. Given the huge size of internal debt and other internal liabilities of the central government, the resultant interest burden continues to strain the public finances of the central government.

The pattern of rise in debt has attracted increasing attention among the policy makers to analyse the burden arising on account of an increasing size of public debt and the factors leading up to such growth of public debt. The debt

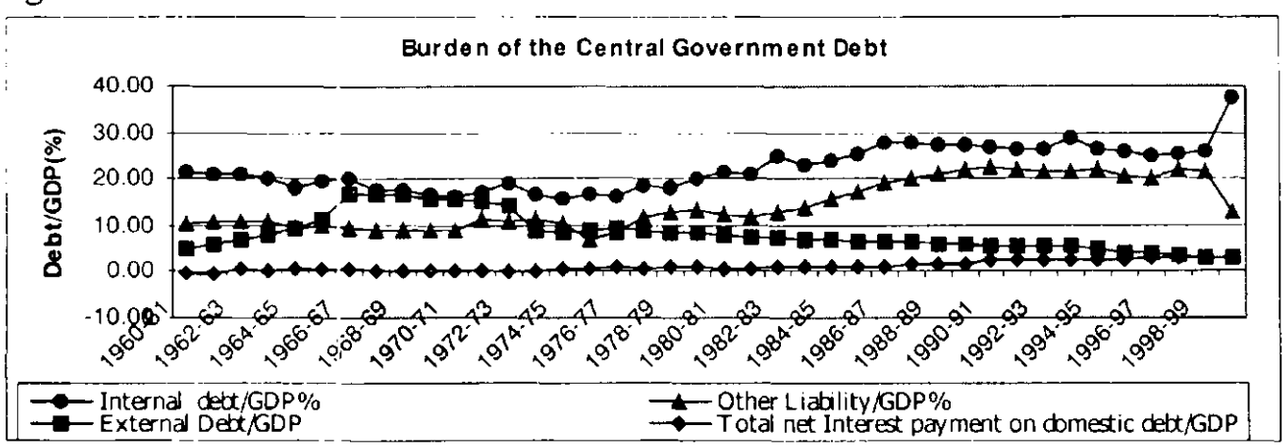
---

debt) is charged on the Consolidated Fund of India while other liabilities viz., provident funds, small savings, other accounts and reserve funds and deposits are charged on Public Account in respect of which the government

service, measured by net interest payment on total domestic debt as a proportion of GDP, increased from about 2.54 per cent in 1980-81 to about 3.17 per cent in 1999-00. The notable feature in the pattern of capital receipts over the last two decades is the increasing shares of both market debt and small savings - the most expensive sources of capital receipts of the central government. However, these two components together, on an average, constituting around 3.55 per cent of GDP and 73.75 per cent of total net capital receipts in 1980-85, accounted for about 5.25 per cent of GDP and 389.64 per cent of total net capital receipts in 1995-00.

The debt burden of the central government, as measured in terms of debt and interest cost (on debt), both separately, as a percentage of GDP, is shown in Figure 3.2. The figure shows that the trend of internal debt and net interest payment on domestic debt, both as a percentage of GDP at current market prices, is rising over the years. The other liabilities, which are part of domestic debt, also show a rising trend barring few years towards the end of 1990's. In contrast, the trend of external debt as a percentage of GDP is falling over the years. This indicates that in recent years, the fiscal pressure on the central government is specifically due to rising burden of domestic debt rather than external public debt.

Figure 3.2: Trends In The Debt Burden Of The Central Government In India



3.3 Composition of Domestic Debt of the Central Government: Relative Position and Growth Rates

In view of a drastic decline in the share of external debt to the total debt, the study mainly emphasizes on the domestic debt of the central government which has been a major source of financing the central government deficits over the years. In this

acts more as a banker (as cited n Report of Currency and Finance, 1995-96).

section, the study tries to trace out the pattern of compositional shift in total domestic debt of the central government in terms of each component as a ratio to total domestic debt as well as respective growth rates of debt.

3.3.1 Component-Wise Domestic Debt of the Central Government: A Relative Position

There are different components of domestic debt of the central government. Within domestic sources of government debt, market debt, small savings and provident funds are said to be the costliest forms of debt, whose share in total domestic debt increased in 1980s and 1990s, (after witnessing a falling trend towards the end of 1970's), exception being the end years of 1990s.[24] As the absolute size of these components has increased, with a higher rate of interest, the interest payment burden arising on these specific debt components, has also relatively increased as compared to the share of other components in total domestic interest payment. It can be observed from Table 3.2 that market debt and small savings and provident funds, which constitute the major components of domestic public debt were, initially in 1960's, at higher levels. After registering a declining trend for some period until the end of 1970's, these components went up further in 1990's (over their previous levels of 1980's) by a substantial amount.[25] This brings forth the concern of unsustainability of domestic debt of the central government. Corresponding to their expanding size, Table 3.3 shows that interest payments on market borrowings, small savings and provident funds have major shares in total domestic interest payment of the central government.[26]

---

[24]The end year of 1990s is exceptional, in the sense that market debt constituting the major portion of aggregate domestic debt witnessed an ever-increasing trend while other components have witnessed a falling trend.

[25]Till April 1999, the central government used to mobilize funds through small savings schemes and a major portion of net collection was being on-lent to the states. With a view to bringing transparency in the accounting system, the NSSF was created in April 1999, to collect small savings and invest them in special securities issued by the central and state governments. With the creation of the NSSF, outstanding liabilities of the centre towards small savers were undertaken by it. The centre, in turn, issued special securities of equivalent amount to the NSSF. Thus, outstanding balances as on March 31, 1999 became the liabilities of the NSSF towards small savers and the centre had equivalent liability towards the NSSF. Further, the proportion of outstanding balances, which were earlier on-lent by the centre to the states, continues to be the liabilities of the states to the centre (Report on Currency and Finance, 2002-03).

[26]The data on component-wise interest payment is not available prior to 1980-1981. Therefore, the computation of share of interest payments on different components of debt was not possible.

Table 3.2: Composition of the Central Government Domestic Debt (In terms of Percentage to Total Domestic Debt of the Central Government) in India

Years	Internal debt / Total domestic debt	Market loans and bonds / Total domestic debt	Outstanding treasury bills and floating loans / Total domestic debt	Small savings and provident funds / Total domestic debt	Other liabilities excluding small savings and provident funds / Total domestic debt
1960-61	67.12	46.93	20.19	32.88	0.00
1965-66	66.27	42.39	23.88	26.57	7.15
1970-71	64.30	38.20	26.09	26.99	8.72
1975-76	69.83	35.82	34.01	27.54	2.63
1980-81	63.70	34.00	29.70	21.92	14.38
1985-86	59.47	35.11	24.36	21.83	18.70
1990-91	54.38	49.23	5.15	21.81	23.81
1991-92	54.37	47.69	6.69	21.93	23.69
1992-93	55.36	43.11	12.25	21.41	23.23
1993-94	57.06	42.81	14.25	20.41	22.53
1994-95	54.64	42.16	12.48	21.82	23.54
1995-96	55.47	43.14	12.33	21.88	22.65
1996-97	55.43	41.86	13.57	22.36	22.21
1997-98	53.81	47.87	5.94	23.21	22.99
1998-99	55.74	50.25	5.49	24.74	20.18
1999-00	74.87	70.11	4.76	6.57	18.56

Sources: Indian Public Finance Statistics, Ministry of Finance

It is noted that within internal debt, it is the market debt, and within public account liabilities, it is the small savings and provident funds, which are the costly means of financing the central government deficits. In recent years, following the recommendation of Gupta committee, there is a change in the sharing of net collection of small savings. Gupta committee suggested instituting National Small Savings Fund in the Public Account of India, a corporate which is outside the central government purview, for managing small savings fund. As a result, there is a change in accounting procedure of the central government budget. This is done in order to reduce the fiscal pressure or debt burden arising on the central government, as the states and union territories (UTs) are the major users of this fund. With this change, while the fiscal deficit of the central government is drastically expected to come down, the deficits and debt of the states and UTs are likely to go up. In the year 1999-2000, the state governments shared 80 per cent of net collection of small savings and since 2002, the entire net collection has gone

towards the state governments and the UTs. Due to accounting changes, the small savings, as a component of central government liability, has come down drastically as reflected in the decline of outstanding small savings and provident funds towards the end of 1990s. This can also be observed from the compound growth rate of small savings and provident funds as shown in Table 3.4. Once provident fund is separated out from small savings, one can observe a clear falling trend of resource mobilization through small savings by the central government. Although there has been a drastic decline in the mobilization of resources by the central government through small savings in the recent years (1999-00 on), the fall in small savings is offset by a more than proportionate rise in market debt of the central government.

Table 3.3: Share of Interest Payments of Different Constituents of Domestic Debt in total Domestic Interest Payment of the Central Government

(In Percent)

Years	Interest payments on internal debt	On market loans	On 91/1832/364 days treasury bills	On small savings, provident funds etc.	On reserve funds	On other obligations
1980-81	36.61	21.61	14.92	24.10	1.31	1.44
1985-86	55.23	N.A.	N.A.	37.87	0.83	6.07
1989-90	33.75	21.90	11.85	32.50*		
1990-91	50.05	32.47	17.30	48.01	0.57	1.66
1991-92	47.71	31.01	15.97	50.94	0.58	1.49
1992-93	49.43	29.74	19.14	49.04	0.58	1.50
1993-94	47.42	28.16	18.82	51.52	0.52	0.98
1994-95	48.42	33.35	13.94	51.31	0.56	0.84
1995-96	49.40	34.30	13.47	50.18	0.56	1.49
1996-97	50.29	35.32	12.93	50.05	0.70	1.00
1997-98	53.68	38.06	10.00	50.07	0.87	1.00
1998-99	58.50	41.65	8.87	44.92	0.65	3.90
1999-00	57.91	44.78	7.27	46.47	0.39	1.10

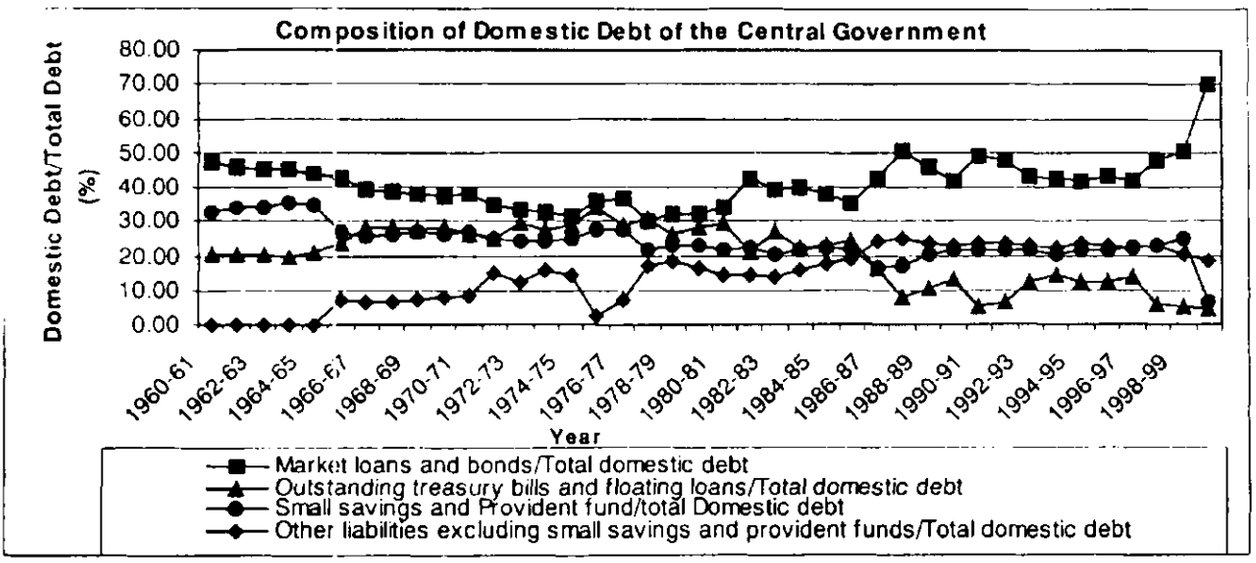
Note: The figure with asterisk sign in the above table indicates interest payment on three constituents of domestic debt as a per cent of total domestic interest payment.

Source: Computed from Report on Currency and Finance: Statistical Statements (1994-95) and RBI Bulletin on Finances of the Government of India: 2003-04 (May, 2003)

Figure 3.3 shows the trends in the movement of different components of domestic debt of the central government in India. This shows that market debt constitutes a significant portion of total domestic debt of the central government. The trend shows a declining trend of market debt to total domestic debt in the

1970's and an upward trend from 1980's through 1990s. In contrast, small savings and provident funds and outstanding borrowings from the Reserve bank of India (RBI), both as a percentage of total domestic debt, have been declining since the 1990's as compared to their previous levels. In particular, the borrowings from the Reserve Bank of India, through the issue of treasury bills, have drastically come down in the 1990s. But other liabilities exclusive of small savings and provident funds, as percentage of aggregate domestic debt, are at a higher level as compared to the previous decades though they show a declining trend towards the end of 1990's. These trends are ascribed to the changes in the government financing policy as detailed in Chapter 4.

Figure 3.3: Trends in Composition of Domestic Debt of the Central Government



3.3.2 Component-Wise Growth Rates of Domestic Debt of the Central Government

One can look at the composition of growth rates of total debt of the central government. While Table 3.4 provides a comparative picture of decadal compound growth rates of different components of domestic debt, Table 3.5 depicts a percentage annual variation of different components of domestic debt. On an overall basis, both the tables indicate that growth rates of market debt in 1990s dominate over other domestic debt components.[27] Although growth rates of all the

[27] A comparative behaviour of the growth rate of internal debt and other internal liabilities, the sum of both constituting the domestic debt of the central government vis-à-vis the external liabilities of the centre, shows that on an average, the growth rate of domestic debt has increased at a higher rate than the external public debt over the years. In contrast to the growth rate of domestic liabilities, the growth rate of external debt in 1990s has drastically declined.

components have registered a fall in 1990s over the preceding decade reflected in Table 3.4 but a drastic fall in growth rates of other liabilities including small savings and provident funds at the end of 1990's has led to a relative increase in growth rates of market borrowings reflected in Table 3.5.

Table 3.4: Decadal Compound Growth Rates of Different Components of Central Government Debt in India

(In Percent)

Year	Total debt	Internal debt	Other liabilities	Market debt and bonds	SS & PF	Outstanding treasury bills and special floating loans	Other liabilities excluding SS & PF	External debt
1960-70	10.93	7.01	7.79	4.90	4.95	10.81	0.00	23.16
1970-80	10.30	12.53	14.41	11.34	11.44	14.10	20.76	3.27
1980-90	16.20	15.75	19.75	19.88	17.09	8.39	23.00	9.63
1990-00	12.60	16.81	6.59	17.21	0.34	12.25	10.35	6.21

Sources: Indian Public Finance Statistics, Ministry of Finance

Table 3.5: Percentage Annual Variation in Different Components of Domestic Debt of the Central Government in India

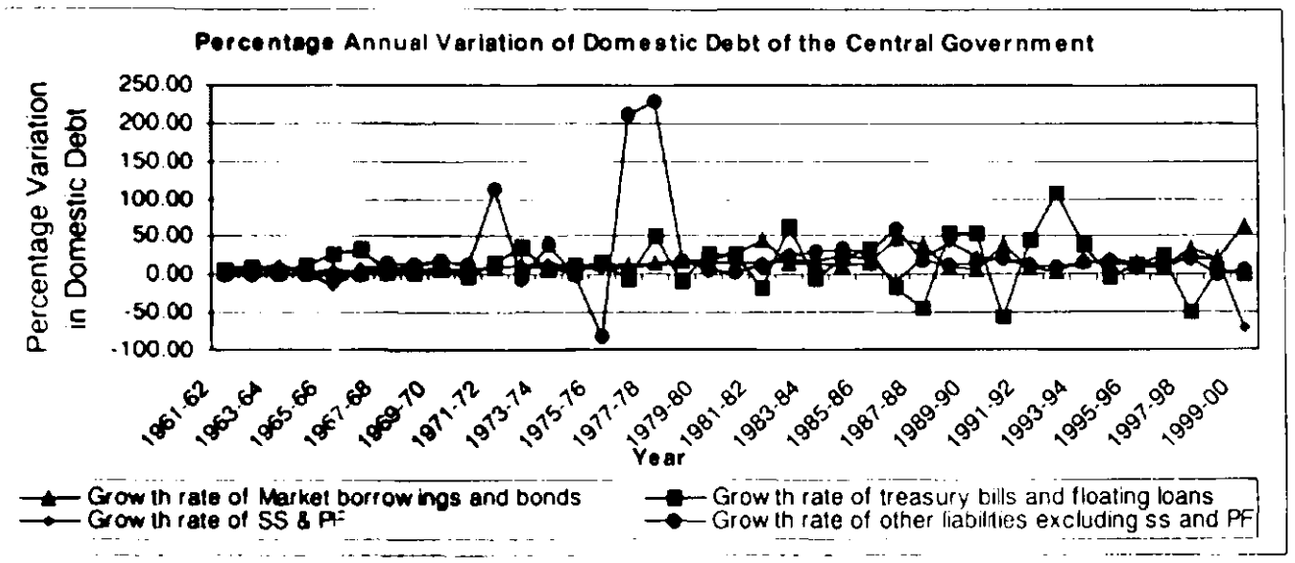
Years	Growth rate of total debt	Growth rate of internal debt	Growth rate of market borrowings and bonds	Growth rate of treasury bills and floating loans	Growth rate of SS & PF	Growth rate of other liabilities	Growth rate of external debt
1961-62	10.15	5.06	4.55	6.24	10.61	10.61	31.32
1965-66	16.48	13.89	7.57	27.15	-14.08	9.05	29.23
1970-71	5.55	3.16	6.89	-1.85	7.37	8.70	6.33
1975-76	4.10	15.65	14.60	16.78	10.17	-23.77	16.67
1980-81	18.99	20.91	26.89	26.94	14.73	10.39	13.39
1985-86	21.31	2 .36	14.80	32.25	22.35	26.54	9.11
1990-91	17.35	15.62	38.04	-54.67	20.00	21.13	11.23
1991-92	12.69	12.17	8.68	45.52	12.83	12.21	17.20
1992-93	13.33	15.25	2.33	107.43	10.51	10.76	14.40
1993-94	18.92	23.41	18.92	39.23	14.12	15.17	12.01
1994-95	12.69	8.45	11.52	-0.80	21.12	19.63	7.57
1995-96	12.55	15.54	16.45	12.46	14.08	11.71	0.63
1996-97	11.46	1 .89	8.66	23.21	14.44	12.08	5.83
1997-98	15.19	12.92	33.02	-49.07	20.74	20.58	2.02
1998-99	14.58	18.17	21.17	6.71	23.05	12.24	3.47
1999-00	15.58	58.50	62.70	1.19	-69.04	-34.77	0.61

Note: SS-small savings, PF-provident Funds. *Sources: Indian Public Finance Statistics, Ministry of Finance*

An examination of the trends of percentage variation of domestic debt of the central government indicates wide fluctuations across the growth rates of different

components of domestic debt. It is very difficult to derive any definitive conclusion about the pattern of growth trends of different components of domestic debt from Figure 3.4. But what can be observed is that while the growth rate of market debt and other liabilities exclusive of small savings (SS) and provident funds (PF) are found to be always positive, the growth rate of outstanding borrowings from the RBI is more often negative along with a negative growth rate of small savings and provident funds towards the end of 1990's. The next section substantiates the phenomenon responsible for the rise in overall debt of the central government.

Figure 3.4: Trends in percentage variation of domestic debt of the central government



3.4 Underlying Causes for the Rise in the Central Government Domestic Debt in India

The genesis of rise in central government debt lies in the corresponding rise in fiscal deficit of the central government. This has persistently been increasing and has reached a substantial level. Although this problem has been well recognised in the past it is still persisting on account of government's failure in fiscal management operation. Although it is a truism that an increase in government expenditure and shortfall in revenue receipts are the two important principal sources contributing to the fiscal imbalances, it would be more pertinent to examine how there has been a fiscal slippage over the years by analysing the facts with the help of descriptive statistics and graphs. This would help in tracing out the direction and pattern of government expenditure and revenue receipts. The following section clearly brings out an account of the sources of fiscal imbalances of the central government in India.

3.4.1 Pattern of Expenditure and Revenue Receipts of the Central Government

The total revenue earned by the central government has been persistently falling short of its total expenditure for the last four decades. Broadly, one can say that the rise in deficits and debt are due to an ever-increasing size of public expenditure. More often than not economists attribute the rise in public expenditure to the increasing size of the government (and economic growth) based on the philosophy of Wagner's (1883) "Law of Increasing State Activity". But as far as the last decade of the century and the recent period of the Indian economy are concerned, this is contrary to the actual fact. In recent years, there has been a withdrawal of government participation/equity in many areas of economic activities in India. This partly gets reflected in the realised disinvestment proceeds of the central government as shown in Table 3.9. The realisation of proceeds is due to withdrawal of government ownership/equity from the public sector enterprises or different economic activities. But this has not resulted in any discernible reduction in government expenditure, making the increase in government expenditure a poor proxy for the increasing size of the government. It is sometimes argued by the policy makers in India that the resources raised through disinvestment must be utilized for repaying past government debt and, thereby bringing down the interest burden of the central government (Rangarajan, 2001).[28] On the contrary, stepping up of disinvestment program over the last few years, {initiated by the government in the early phase of 1990's in many areas of economic activities under the realm of New Economic Policy (NEP, 1991)},[29] has not resulted in any significant decline in aggregate level of government debt as well as debt-to-GDP ratio on the expected lines. Rather, the government continues resorting to borrowings. Along with the notion of rise in public expenditure for explaining the increasing size of the government, there is also another view which encompasses Keynes psychological law of consumption. This view holds that as the developing countries strive to progress economically, there may be an increasing need for public expenditure in the initial stages of planned development. The increasing need for public

---

[28]Cited in "Indian economy since Independence" edited by Kapila, U. (2001-02), Academic Foundation, Delhi.

[29]The objective of the NEP of July 1991 in India was to give a larger space to the private sector to operate in some of the areas which was earlier reserved exclusively for the public sector. This was with a view to promote

expenditure gets absorbed in certain sectors of the economy due to higher marginal propensity to consume in most of the developing economies.

The severity of the problem can be gauged from the fact that the government has failed to cover up its revenue expenditure from revenue receipts. The principal factor responsible for unbridled rise in fiscal deficit in India is the rise in revenue deficit over the years. This phenomenon has also been observed by Sheshan (1987), Bhattacharya (1990) and Lahiri et. al.(2001). Revenue deficit, (escalating to a sizable proportion of fiscal deficit), has forced the country to go in for more and more borrowings. Government tries to fill up its budgetary gap by acquiring resources through capital receipts. It is also noticeable that government borrowings continue to be the major source of capital receipts. This is reflected in the change in stock of domestic debt as a percentage of net capital receipts as shown in Table 3.6. This is growing at a faster rate since 1980s to bridge the fiscal imbalances in the government budget.

Table 3.6: Revenue Receipts and Expenditure Pattern of the Central Government in India

(In Per cent)

Years	Tax revenue /GDP	Direct taxes /GDP	Indirect taxes /GDP	Non-tax revenue /GDP	Capital expenditure /GDP	Revenue expenditure /GDP	Change in total domestic debt / Net capital receipts
1960-61	4.25	1.18	3.08	1.59	4.53	5.55	29.86
1965-66	6.45	1.69	4.76	2.00	6.01	7.30	81.20
1970-71	5.37	1.10	4.26	1.89	3.44	6.90	49.91
1975-76	7.22	1.76	5.46	2.22	4.70	8.49	0.34
1980-81	6.53	1.38	5.15	2.15	5.64	9.22	129.95
1985-86	7.62	1.35	6.27	2.47	6.05	12.09	129.92
1990-91	7.57	1.21	6.35	2.10	4.81	12.93	125.48
1991-92	7.68	1.57	6.11	2.43	3.92	12.60	98.58
1992-93	7.23	1.61	5.62	2.67	3.99	12.39	116.22
1993-94	6.23	1.46	4.77	2.59	3.86	12.63	129.16
1994-95	6.66	1.82	4.84	2.36	3.19	12.08	91.50
1995-96	6.90	1.88	5.02	2.36	2.90	11.76	123.65
1996-97	6.85	1.86	4.99	2.37	2.52	11.61	123.06
1997-98	6.28	1.79	4.50	2.49	1.82	11.82	1296.93
1998-99	5.95	1.83	4.13	2.55	1.96	12.31	109.90
1999-00	6.55	2.15	4.50	2.75	2.26	12.91	124.50

Sources: Indian Public Finance Statistics, Ministry of Finance

competition and achieve efficiency with a shift towards reliance on the market economy (Rangarajan, 2002). This policy was announced in response to the macro-economic crisis faced by the Indian economy in 1990-91.

The absolute revenue balance which had a surplus as late as 1970's, started showing deficit in the early 1980's when there was a significant rise in public expenditure. The problem was more severe in mid-1980s, when all the deficits - revenue deficit, primary deficit and, fiscal deficit - increased enormously leading to the macroeconomic crisis of 1990-91. The striking fact to be noted is that revenue deficit, one of the major components of fiscal deficit even in the aftermath of crisis, has continued to grow to an unbridled level indicating that revenue earnings accrued to the central government are inexorably lagging behind its revenue expenditures. Even assuming that there is no intent on the part of the government in cutting down the level of capital expenditure, given a level of deficit in the capital account of the government budget, as the revenue deficit increases, it requires more and more government borrowings in order to support the financing of both revenue and capital account deficits. Although there have been efforts to stabilise the fiscal situation from both expenditure and revenue sides, government has not been able to contain the overall expenditures and mobilise resources to bridge the budgetary gaps. Resource mobilisation effort, as reflected in revenue receipts as a percentage of GDP, has remained at a lower level. In fact revenue receipts comprising tax and non-tax revenue as a proportion of GDP, declined from 10.11 per cent in 1991-92 to 8.48 per cent in 1998-99 (see Table 3.6) indicating that the resource mobilisation efforts of the central government are not satisfactory.[30] There is lack of sufficient buoyancy in revenue generation even in the periods of higher economic growth. This indicates that the revenue receipts are not commensurate with the corresponding increasing need of public expenditure of the central government. Further, if the revenue receipts are split into two broad categories (a) tax revenue and (b) non-tax revenue, the share of tax revenue in the total revenue receipts has been declining, despite a realised increase in direct tax revenue collection in the 1990s. It is seen that there is some improvement in the accrual from the direct taxes in 1997-98 due to the tax reform policy of the government. The loss of total revenues has taken place as a result of a sharp decline in revenue from indirect tax collection such as customs and excise duties along with service

[30]From an international perspective, if the central government of India is compared with the central government of developed nations such as Canada, US, Australia, Norway, Switzerland in two time points i.e.1990 and 2001, the tax revenue and expenditure position as a percentage of GDP in India is far behind, and at the same time the gap between the two fiscal indicators in India is the highest. Even the developing countries like Mexico, Indonesia, Philippines, and South Africa outperform India in respect of their fiscal scenario in the same period.

sector largely remaining untaxed. The overall decline in tax revenue adds to the fiscal policy concern, for which the policy makers have to find out avenues for increasing revenues. In recent years, policy makers are trying to increase tax collection from the service sector, as it has emerged as the major contributor to the aggregate national income of the country.

The contribution of non-tax revenue to total revenue is meager. The non-tax revenue as a ratio to GDP has stagnated at around 2.6 per cent to 3 per cent since the mid-1980s. This is due to less accrual of return on government investment from public enterprises. The total expenditure reduction being downwardly inflexible on the one hand, and increase in expenditure being upwardly biased in favour of current expenditures on the other, the axe of deficit reduction has fallen on non-tax revenues in the receipt side, and on capital expenditure in expenditure side of the budget for closing up the overall budgetary gap. The government has to plan for raising receipts from non-tax sources.

An important question concerning public debt relates to the utilization pattern of public debt given its increasing size. It raises the question that whether a higher proportion of public debt is preempted in incurring productive expenditures rather than unproductive expenditures? The question has no direct answer as it is difficult to know what proportion of financial resources borrowed at a certain point of time is allocated for which purpose of expenditure, and further, classifying expenditures into productive and unproductive is an arduous task. But this can indirectly be answered by relating the expenditure side of the government budget to its capital receipts. There can be some revelation of utilization pattern of public debt if one looks at the pattern of expenditure under different heads in relation to total capital receipts. This would indicate the quality of fiscal management and the direction of the economy.

A sound expenditure management policy is one which gives rise to returns such that the addition of returns in the future can match the current period expenditure. It can be noticed from Table 3.6 that a major portion of central

---

They are better positioned than India in terms of their lower level of debt-to-GDP ratio and higher level of realized revenue-to-GDP ratio (see 2004 World Development Indicators, The World Bank).

government total expenditure constitutes current expenditure. Notwithstanding the fact that the government has not been able to generate adequate revenues, it implies that the government has failed with regard to the quality of expenditure management which has got implication for the quality of fiscal adjustment. The expenditure trend of the central government reflects that capital outlay and capital expenditure, both as a percentage to net capital receipts, drastically declined in 1990s with exception being the year 1997-98; the exception is due to less net capital receipts of the central government (see Table 3.7). The net capital receipt of the central government as reported by the ministry of finance, excludes receipts accrued due to draw down of cash balances with the RBI, issue of treasury bills to the RBI and disinvestment proceeds which are found to be highest in 1997-98.[31] If all the excluded items are included under the net capital receipts, the ratio would sharply decline for the entire period of 1990s including the year 1997-98. In spite of a simultaneous increase in both the level of capital outlay and net capital receipts over the years, the capital outlay as a percentage of capital receipts, has gone down as shown in Table 3.7. The proportion is higher before 1990s and very less during 1990s. This has occurred mainly because of the disproportionate rise in the share of capital outlay in the total expenditure in relation to the increase in capital receipts. In some years, there are sharp cuts in capital outlays. Capital outlay as a proportion of net capital receipts was 46.04 per cent in 1970-71, declined to 38.81 per cent in 1980-81 and further declined to 13.79 per cent in 1998-99. This may also imply that there is a relative expansion of current expenditure at the cost of capital outlays in the economy. Similarly, capital expenditure as a proportion of net capital receipts, which stood at 121.90 per cent in 1970-71 increased to 132.08 per cent in 1979-80. Since then it has recorded a declining trend. By 1998-99 capital expenditure constituted 47.77 per cent of capital receipts. This also implies that the capital receipts which is meant to be spent for augmenting capital formation in the economy, is being diverted to current expenditures, which are attributed by the fiscal experts as less contributory to capital formation. But the key point to bear in mind is that all the current expenditures are not unproductive. For instance,

[31] The reason for exclusion of receipts in the form of draw down of cash balances and issuance of treasury bills to the RBI under the heading of capital receipts in the analysis is that the inclusion of these items under the head of capital receipts would deviate from the definition of capital receipts provided in the 'Indian Public Finance Statistics', by the Ministry of Finance, GOI. The figures shown are directly taken from the report published by the Ministry of Finance, GOI. Another principal reason for low net capital receipts in 1997-98 was partly due to

expenditure on education and health services raises productivity and thereby contributes to the aggregate output. The acceleration in the government current expenditure appears to be the main cause for escalation of domestic public debt (Bhattacharya et. al., 1992). The revenue expenditure as observed from the Union Budget documents, indicates that a major share of unproductive expenditure is allocated to defense, subsidies and interest payments. Further, as observed under these three heads of current expenditures, the major share goes towards incurring interest payments on the past debt. A major portion of capital receipts mainly emanating from borrowings bearing interest charges, is being diverted to revenue budget for meeting current expenditures. Thus, this leads to a vicious circle - higher borrowing leading to higher interest burden which, in turn, forces the government to go in for more borrowings.

Table 3.7: Broad Indicators of Utilization Pattern of the Central Government Receipts

(In Percent)

Years	Total interest payment /Revenue expenditure	Total interest payment /Net capital receipts	Capital outlay /Net capital receipts	Capital expenditure / Net capital receipts	Revenue deficit/ Fiscal deficit	Capital expenditure /Change in domestic debt
1960-61	7.56	9.15	51.64	98.86	-8.31	
1965-66	18.13	33.39	70.78	151.64	-33.02	186.74
1970-71	19.22	53.91	83.77	139.86	-11.57	280.21
1975-76	17.37	46.11	91.28	147.05	-29.28	43511.11*
1980-81	19.64	41.27	104.39	128.53	8.74	98.90
1985-86	22.35	43.08	74.24	96.40	24.87	74.20
1990-91	29.23	62.24	59.52	79.11	41.57	63.05
1991-92	32.32	75.95	53.15	73.14	44.77	74.19
1992-93	33.53	86.11	61.37	82.65	46.24	71.11
1993-94	33.86	66.87	46.55	60.40	54.29	46.77
1994-95	36.01	70.65	41.35	51.78	53.77	56.60
1995-96	35.82	91.95	50.53	63.39	49.35	51.27
1996-97	37.45	110.14	47.84	63.95	48.93	51.97
1997-98	36.47	838.49**	230.86	353.44	63.45	27.25
1998-99	35.99	76.70	20.91	33.90	74.15	30.84
1999-00	36.70	82.13	25.13	39.23	67.52	31.51

*Indicates a low net capital receipts in the form of government debt. This is due to surpluses in the revenue account. ** indicates net capital receipts exclude draw down of cash balances and disinvestment proceeds etc.

Sources: Indian Public Finance Statistics, Ministry of Finance

the fact that a larger portion of capital receipts by means of market borrowings were repaid on old debts arising from different sources.

Figure 3.5 shows the trends of expenditure and revenue of the central government in India. The trends reflect that although there is some close association between the movements of revenue expenditure and tax revenue of the central government, both expressed as a percentage of GDP at current market prices, the revenue expenditure is found to be always at a higher level and the gap between the two widening since early 1980's through 1990s. In fact, the tax revenue has decreased during the 1990s as compared to the previous decade of 1980s. A closer look at the figure reveals that the gap between the two has diverged at a higher level of expenditure. In contrast, the trend in the non-tax revenue as a percentage of GDP at current market prices, has remained almost constant throughout the period while capital expenditure, attaining its peak level towards the end of 1980s, has registered a dramatic decline in the 1990's. The overall fiscal outcome has resulted in growing fiscal deficit of the central government over the years.

Figure 3.5: Trends in Expenditure and Revenue of the Central Government

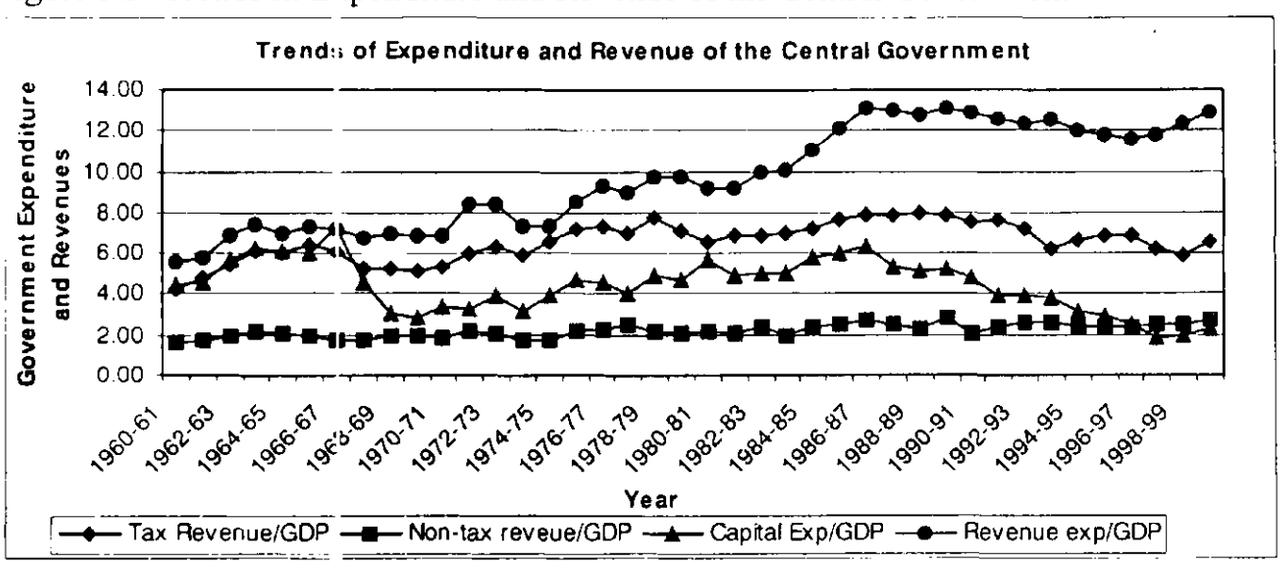
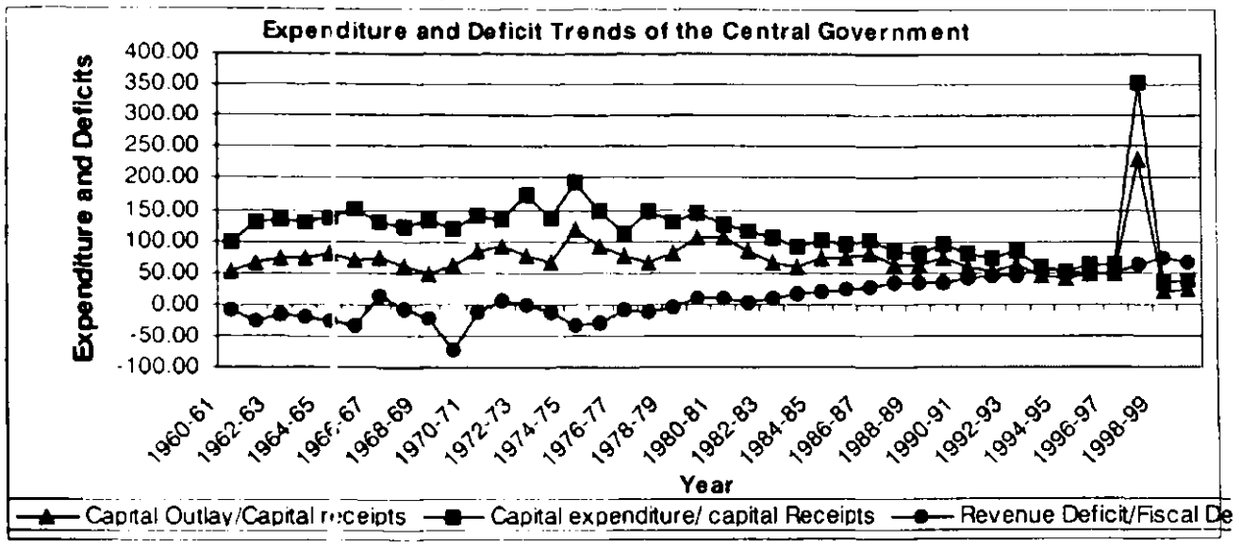


Figure 3.6 reflects that the trend of capital outlay and capital expenditure, each as percentage of capital receipts, have been declining in the 1990s. The peak of the trend in the year 1997-98 is due to the low net capital receipts in the form of market borrowings and other liabilities. The definition of net capital receipts is in line with the ministry of finance which excludes borrowings from the RBI through the issue of treasury bills, draw down of cash balances from the RBI and disinvestment proceeds. The shortfall in capital receipts, after accounting for market borrowings and other liabilities, is found to be heavily abridged by borrowings and

by draw down of cash balances from the RBI during the year 1997-98. In contrast to the downward behaviour of capital outlay and capital expenditure as a percent of net capital receipt, the trend of revenue deficits to fiscal deficit is increasing over the years. This proves the proposition that the increasing proportion of capital receipts is absorbed in revenue expenditure of the central government.

Figure 3.6: Composition of Expenditure and Deficits of the Central Government



The composition of fiscal deficit gives a difference in outlook about the pattern of productive and unproductive expenditure of the central government. The revenue deficit, as a percentage of fiscal deficit, shows an upward trend (shown in Figure 3.6) indicating that the capital receipts, which should have been incurred for the capital expenditures, are being absorbed in the current expenditures. From a position where the revenue deficit accounts for less than 50 per cent of gross fiscal deficit (GFD) till as late as 1992-93, forms almost 68 per cent of GFD during 1999-00. This implies that for every Rs 100/- that the government borrows, as much as Rs 68/- is not going to generate any return as it is going to finance current expenditure at the cost of capital expenditure. The remaining Rs 32/ must earn Rs 7/ just to service the debt (principal) - a return of 22 per cent of Rs 32/-. But practically, it is unbelievable that any government investment can generate this much percentage of return.

For a developing country like India, the productivity of public investment expenditure depends, *inter alia*, on the ratio of capital expenditure to current expenditure of the government. An adequate flow of current expenditure of the

government may lead public investment to have an adverse impact on growth. Public expenditure has a greater bearing towards the growth of private sector investment as well as overall growth rate of an economy. Government borrowing spent, on infrastructure investment, serves as a basic stimulant for higher private investment and further, private investment is a crucial factor in achieving higher growth rate of the economy. Moreover, a disproportionate rise in current expenditure to capital expenditure would adversely affect the average optimal productivity of investment and thereby affecting the rate of growth of the economy. The optimal ratio of current to capital expenditure can be defined as the ratio that makes the average productivity of public investment equal to or higher than the average productivity of private investment.[32] One of the striking facts about the Indian case is that resources allocated to capital expenditure have not generated adequate returns. Therefore, the growth of public debt has arisen, not merely because revenue expenditure is running ahead of capital expenditure, but also capital expenditure financed by borrowing has not yielded adequate returns (Chelliah, 1991).

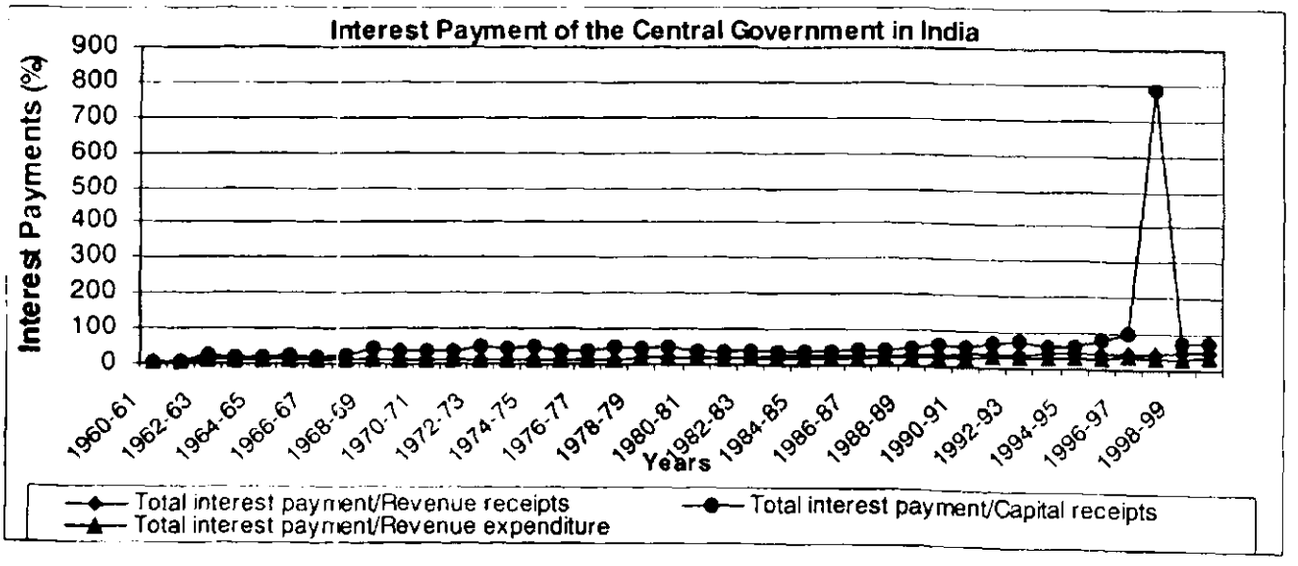
The increase in expenditure is also attributed to large repayments of past loans along with the rise in debt service burden caused by the prevalence of high real interest rates on certain debt components. Further, this implies that if fresh borrowing is raised at higher interest rates, in one way, affects the finance of the government, and in another way affects private investors' sentiments as it makes the cost of borrowing dearer. Thereby, it adversely affects capital formation and growth rate. The total interest payment of the central government as a percentage of GDP, has been rising. It was 0.42 per cent and 1.32 per cent in 1960-61 and 1970-71 respectively but then increased to 1.81 per cent in 1980-81 and further to 4.74 per cent in 1999-00 (see Table 3.1). Another way of looking at the burden of public debt relates to the interest payment as a percentage of revenue receipts. Interest payment as a percentage of revenue receipt has also witnessed an upward trend from 18.28 per cent in 1970-71 to 39.09 per cent in 1990-91 and further to 51 per cent in 1999-00. This means the interest liability which represents the past legacy of the government, is persistently taking away more than a half of the total

[32]Cited in "The Economic of Public Spending: Debts, Deficits and Economic performance", edited by Hassan Bougrine, Pp.159.

revenue receipts of the central government. Therefore, growing public debt and its resultant burden in terms of servicing has had a serious implication for the sustainability of the government finance and for the economy itself. The rising interest payment burden on the past government debt constitutes an important portion of unproductive expenditure of the government as it does not contribute to any asset formation in the economy. The portion of expenditure allocated to interest payment on past public debt in India can also be expressed as a percentage of net capital receipts of the central government. The trend shows not only a higher percentage of capital receipts going towards interest payment but also exceptional fluctuations over the years as shown in Table 3.7.

Figure 3.7 reflects that interest payment which constitutes a sizeable proportion of total revenue expenditure taken as a percentage of capital receipts, and revenue receipts, has been rising over the years. The peak of the trend around the year 1997-98 is due to the aforesaid reasons. It is due to low capital receipts in the form of market borrowings and other liabilities during the year. The increase in interest payment as a per cent of capital receipts also proves that increasing proportion of capital receipts in the form of government borrowings is spent on paying interest liability on the past loans. Revenue deficit in the government budget approximately to the extent of interest payment, indicates that India is facing a debt-trap like situation. The government borrows further for paying only interest liability, assuming that aggregate revenue receipts are meant for all other revenue expenditures of the government.

Figure 3.7: Trend of Interest Payment of the Central Government in India



As a persistent high level of public debt can produce instability in an economy, some maintain the view that monetary policy is the sole or the main determinant of equilibrium price level. Such a strong monetarist position implies that control of fiscal policy is unnecessary to achieve price stability. But this holds true as long as the fiscal policy can be prevented from producing any impact on monetary policy. Monetarists recognize that fiscal problems are often the root cause of high inflation, owing to the seigniorage revenue that can be obtained from rapid money growth. Hence, fiscal control exercise assumes utmost importance, before the economy being pushed further into a crisis situation. The debt burden of the government would not rise as a proportion of total expenditure, if the investments made by the government from borrowings result in adequate returns either through the generation of non-tax revenues or through tax revenues. Improvement in public infrastructure should lead to improvement in efficiency and private investment, and hence that would lead to buoyancy in tax revenues. Similarly, non-tax revenues should be raised through increasing dividends from public enterprises, investment in infrastructure and other activities. If, however, resources borrowed for investment activities do not yield adequate returns, debt service payments will rise continuously as a proportion of total revenue. In case of no returns on such investments, debt servicing is bound to pose an increasing burden.

3.5 Relative Debt Position of State and UTs Governments in India

With the increase in debt of the centre, there is an increase in debt of the state and UTs governments in India. Table 3.8 shows the extent to which the state and UTs governments rely on the center for meeting their resource needs. The states and UTs raise resources through a large scale borrowing from the central government. It can be seen from Table 3.8 that the state and UTs governments own debt (states and UTs total debt net of their debt from the center) to their total debt inclusive of debt from the center was as much as 27.43 per cent in 1960-61, declining to 24.87 per cent in 1970-71, then went up to 29.03 per cent in 1980-81 and further to 41.79 per cent in 1999-00. This indicates that although the states and UTs are consistently dependent, to a large scale, on the center, with a market oriented borrowing program being in place, the state and UTs governments are now able to borrow more from the market unlike the preceding decades (of 1990s). In contrast, if one would examine the states and UTs own debt in aggregate domestic debt

inclusive of state and center's domestic debt (net of centre's lending to states and UTs or states and UTs debt from centre), it varies within a lower bound. It was 11.65 per cent in 1960-61, 15.20 per cent in 1970-71 and came down to 12.60 per cent in 1980-81 but increased to 15.38 per cent in 1999-00. This shows that center is a major borrower compared to the state and UT governments. Similarly, if one would examine state and UTs governments own debt as a ratio to centre's total domestic debt, it becomes clear that state and UTs governments debt forms a minor proportion of the centre's domestic debt. Hence, this justifies that an analysis of central government domestic debt is crucial for the economic policy of the country.

Table 3.8: Relative Debt Position of State and Union Territory Governments in India

Years	State & UTs government's own debt /Total debt of the state governments inclusive of debt from the centre (%)	State & UTs government's debt from the Centre / Total debt of the state governments inclusive of debt from the centre (%)	States & UTs own borrowing /Aggregate domestic debt of center and states (Net of Centre's lending to the states) (%)	State & UTs government's own debt/ Centre's domestic debt	State & UTs government's total debt inclusive of debt from the center /Centre's domestic debt	State and UTs debt from the center /Centre's domestic debt
1960-61	27.43	72.57	11.65	.13	.48	.35
1965-66	25.56	74.44	14.70	.17	.67	.50
1970-71	24.87	75.13	15.20	.18	.72	.54
1975-76	28.72	71.28	16.38	.20	.68	.49
1980-81	29.03	70.97	12.60	.14	.50	.35
1985-86	27.62	72.38	10.78	.12	.44	.32
1990-91	32.34	67.66	11.08	.12	.39	.26
1991-92	31.47	68.53	10.77	.12	.38	.26
1992-93	35.00	65.00	12.16	.14	.40	.26
1993-94	36.12	63.88	11.89	.14	.37	.24
1994-95	36.75	63.25	12.21	.14	.38	.24
1995-96	38.04	61.96	12.70	.15	.38	.24
1996-97	38.63	61.37	13.12	.15	.39	.24
1997-98	38.58	61.42	13.05	.15	.39	.24
1998-99	40.41	59.59	14.21	.17	.41	.24
1999-00	41.79	58.21	15.38	.18	.43	.25

Sources: Indian Public Finance Statistics, Ministry of Finance

3.6 Contingent Liabilities and Fiscal Risks

Contingent liabilities represent potential financial claims against the government. This is contingent on the occurrence of particular events. High level of contingent

liabilities of a government is an important source of fiscal risks. The central government provides guarantees to the sub-central governments, public sector units, banking sector and private corporate sector but there is a chance that they may fail to discharge their financial obligations. When they default and the central government is obliged to repay, it becomes a liability on the part of the central government. In this context, Polackova (1999) points out that when sub-national governments in a country find themselves unable to meet their obligations, the central government comes to their rescue. Whether or not a government is obligated by law or simply forced by the circumstances to provide public financing to cover such contingencies, resorting to large amount of contingent liabilities, can lead to large increases in public debt and fiscal instability. Therefore, fiscal adjustment aimed solely at keeping projected expenditure levels down is not enough to prevent fiscal instability in countries with large unbudgeted contingent liabilities.

While there is a large body of empirical literature avalable in other countries, it is a neglected area of research in India. Very few studies have addressed the fiscal problems arising on account of increase in contingent liabilities of the central government. This may be due to unavailability of adequate information on the contingent liability position of the government. Lahiri's (2000) study provides an important motivation for further research in this direction. Like in the context of other countries, contingent liability is not accounted for as part of the liability of the government in the existing accounting practice in India. The outstanding guarantees extended by the central government are mainly in the form of loans/credits guarantees comprising implicit as well as explicit liabilities.

3.6.1 Explicit Contingent Liabilities

Explicit Contingent liabilities are legal obligations for the government, created by law or contract to settle the payments only if particular event occurs. Because their fiscal cost is invisible until they become due, representing a hidden subsidy and a drain on future government finances, and hence can complicate fiscal analysis. State-guarantees and financing through state-guaranteed institutions may, in the short-run, be more attractive than outright budgetary support because of their hidden nature. Such contingent explicit liabilities, however, may well turn out to be

more expensive in the long-run. Moreover, they may create a moral hazard in the market, particularly if governments guarantee all (rather than a part of) underlying assets (such as a credit to an enterprise) and all risks, rather than selected political and commercial risks.

3.6.2 Implicit Contingent Liabilities

Implicit contingent liabilities are not officially recognised until after a failure occurs. In most countries, the financial system represents the most serious contingent implicit liabilities. Experience tells us that when the stability of a country's financial system is at risk, markets usually expect the government to provide financial support that far exceeds its legal obligations. Implicit liabilities involve moral obligation or burden that, although not legally binding, is likely to be borne by the government because of public expectations or political pressures.

Thus, fiscal authorities are often forced to cover the uncovered losses and obligations of the central bank, sub-national governments, state-owned and large private enterprises, budgetary and extra budgetary agencies, and other politically significant institutions. Greater the weaknesses in a country's macroeconomic framework, financial sector, regulatory and supervisory systems, and information disclosure practices, larger are the country's contingent liabilities. Such weaknesses increase the risk associated with the private capital flows because of difficulties in asset valuation and distortions in intermediation and borrowing behaviour. Theoretically, it is easier to distinguish the contingencies on the basis of their implicit and explicit characteristics, but in real practice, it is very difficult to compartmentalize. The increase in these contingent liabilities adds to the financial burden of the government as it involves uncertainty with regards to the repayment. Contingent liability burdens the government just as debt does. In India the budget does not account for the contingencies. If we add contingent liabilities to debt of the center, it would reflect the full fiscal burden of the central government. But there is no detailed information available on the total amount of contingent liabilities of the central government. Therefore, the analysis is restricted only to observe the behaviour of central government guarantees, which may pose fiscal risks in the future. It can be noticed from Table 3.9 that the level of guarantees of the central government is increasing over the years which needs to be controlled. Unless policy

measures are undertaken, this would pose serious policy challenge in the future along with an expansion of debt burden.

Table 3.9: Contingent Liabilities and Disinvestment Proceeds of the Central Government in India

(Rupees in Crores)

Year	Outstanding Central Government Guarantees	Receipt of disinvestment proceeds during the financial year
1990	NA	N.A.
1991	N.A.	3038
1992	50,575	1961
1993	58,088	-48
1994	62,834	5078
1995	62,468	362
1996	65,573	380
1997	69,748	912
1998	73,877	5874
1999	74,608	1724
2000	83,954	2125
2001	86,862	3646

Source: *Annual Report of RBI (2001-02)*

3.7 Conclusion

From the foregoing analysis, the study finds that there is a widening gap between total expenditure and total revenue of the central government in India. The increasing gap has worsened the debt position of the central government. As the experience of economies suggests that more reliance on external debt leads to external crisis and as India has suffered external imbalances due to fiscal problems, there is a change in sources of financing the central government deficits i.e. from the external to the domestic sources. Further, within the domestic sources, with the change in fiscal policy, the central government is relying more on market borrowings. This has pushed up the debt burden of the central government as market debt is a costlier form of borrowings.

The key area for taking action in correcting the fiscal imbalances relates to curbing the current expenditure and rising debt servicing obligations of the central government. The rigidity of public expenditure is a major obstacle in improving the quality and targeting of public expenditure. Increasing flexibility for public expenditure is an essential condition for the continuity of fiscal adjustment and for

the improvement of quality of public expenditure. Due to various rigidities, spending cuts necessary for fiscal adjustment have not focused on programs that should be cut but instead programs that could be cut. Cuts in investment and maintenance spending are expected to affect efficiency. Better targeting of social expenditures could improve the quality and sustainability of fiscal adjustment.

The debt service burden as a proportion of total expenditure can come down if the investments made by the government through borrowings, give rise to adequate returns either through the generation of non-tax or tax revenues. Improvement in public infrastructure would augment private investment, output and hence would lead to buoyancy in tax revenues. Non-tax revenues should increase through increases in dividends from public enterprise investments. The off budget borrowings in terms of contingent liabilities which put additional burden on the central government have to be controlled. Expenditure reduction being downwardly inflexible on the one hand, and increase in expenditure being upwardly biased on the other, the axe of deficit reduction partly puts pressure on the non-tax revenue in the revenue side, and partly on the capital expenditure in the expenditure side of the budget in the current fiscal adjustment program. This implies that although non-tax revenue has stagnated at a lower level, in the event of relative decline in tax revenue receipts, emphasis has to be placed on various ways of raising non-tax revenues for adjusting the fiscal imbalances of the central government. In view of a continuous and large increase in current expenditure, where a large proportion of revenue receipts is going for interest payments without generating corresponding returns, there exists a serious policy concern towards sustainability of the central government finance in India. Against the backdrop of high level of outstanding domestic debt of the centre and the resultant increase in interest burden, the present study demonstrates that there is a need to asses the budgetary policies of the past that have led to such a burgeoning rise in public debt, examine the issues relating to sustainability of domestic public debt, and to examine the impact of domestic public debt on key macroeconomic variables in India. The change in the composition and observed growth of domestic public debt to a large extent is influenced by the government debt management and interest rate policy. These policies are examined in the succeeding chapter.

Chapter 4

Interface between the Central Government Domestic Debt Policy and Interest Rate Regime in India

Government debt management policy refers to a process of establishing and implementing a strategy for prudently managing the government debt in order to meet financing needs, cost and risk objectives, and any other debt management goals the government may have set, such as developing and maintaining an efficient government securities market and overall development of domestic financial market (Wheeler, 2004). Therefore, the aim of debt management is to ensure that the government borrowing needs are met efficiently and that the stocks of government debt, and the incremental debt flows arising from budget and non-budget sources, are managed in a manner consistent with government's cost and risk preferences.

It is well known that cost of debt essentially relates to the size of debt, composition, interest rate and maturity structure. As noticed earlier, one of the striking features of the central government borrowing program in India is that there is a change in composition of total debt due to a shift in the specific sources for financing the central government deficits. External finance is no longer an important source for financing the central government deficits as it can be observed that the share of external public debt in total debt of the center which was as high as 38.35 per cent in 1972-73 declined to 18.19 per cent in 1980-81 and further to 5.59 per cent in 1999-2000 (see Appendix Table 4.1).

The shift in finance policy in India is, to some extent, directed by financial crises experienced by many countries of Latin America and East Europe in the 1980s. The change in debt financing policy in India was designed partly due to the experience of the economies around the world as well as to avert the balance of payments difficulties faced during 1980s[33] and early 1990s. In 1990-91,

[33]Following the second oil price shock in 1979, considerable pressure was placed on the balance of payments position of India in the 1980s. Unlike the first oil price shock, no significant current account adjustment could have been possible, and a large macroeconomic imbalance developed in the second half of the 1980s. Particularly

accompanied by internal macroeconomic problems such as large fiscal deficits and high inflation rate, India had run into huge current account deficit in its external balance. Policy makers attribute this rise in external sector imbalance to higher level of government deficits (GOI, 1990-91). Following this turn of major macroeconomic event, the government undertook major policy steps in order to insulate and stabilize the economy from internal economic distortions and external economic vulnerability. As part of a controlling measure on the external account imbalance, the government relatively reduced its reliance on external debt on the one hand, and stepped up efforts in the direction of maintaining a sound volume of foreign exchange reserves, on the other. This was well in accordance with maintaining a sound external debt management policy and external account balance (foreign exchange reserve management policy) in the economy.

As the government found it difficult to reduce deficits, it shifted its reliance more on domestic financing instruments since 1980's with an administered structure of interest rate regime until the early 1990s. In order to control internal economic distortions arising on account of continuance of a repressed interest rate regime (and which again was mainly with an intent to facilitate heavy government borrowings), the government launched a slew of measures in 1990s in order to liberalize interest rates in the economy.

An analysis of public debt and interest rate policy assumes increasing importance for a developing country like India in the context of fiscal reforms and structural adjustment process of the economy in general, and controlling and managing public debt in particular. In this context, the present chapter makes an attempt to critically examine the relationship between changes in interest rates and debt management policy of the central government in order to examine whether all the changes have any bearing on the monetary and fiscal policy of the economy.[34]

---

with a deterioration in public finances, the current account deficit rose to a peak of 3 per cent of GDP in 1990/91(Callen & Cashin, 2001).

[34]This chapter theoretically addresses the domestic debt management policy of the central government and interest rate policy. The study does not attempt to examine the nexus between the two policies empirically due to unavailability of relevant data for a long time series analysis.

4.1 History of and Initiatives on Government Debt Management Policy in India

Prior to 1960's, the policy makers in India were inclined towards the principle of fiscal prudence. As such, historically public debt was incurred only for productive public works and for meeting contingencies of war. Over the years, the structure of domestic public debt has undergone dramatic quantitative and qualitative changes. The increase in domestic debt reflects government's growing recourse to public borrowing as a means of financing economic development under the five year plans. The objective of fiscal prudence is abandoned, and the expanding size of public debt since 1980's is greatly determined by the need for developmental finance for an expanding economy, and society's capacity to spare resources through market loans and small savings. It has been realized by the planners that a higher level of savings is necessary for supporting growing requirements of the public sector for its increasing role in augmenting capital formation in the economy. Savings would be voluntary depending on the level of income; savings can be forced through higher taxation but this is not an efficient means of raising savings. Individuals save in the form of bank deposits, financial and real assets. Among other financial assets, holding of government securities constitutes a large proportion of private sector savings. This is because the government securities assure risk free return and also are highly subject to statutory regulations. Therefore, government security market constitutes a larger segment of total financial market in India.

It is noticed in Chapter 3 that within domestic sources of financing, there is a further compositional shift (in government borrowings). To reduce the financial burden arising from market borrowings and small savings, the government has consistently raised resources through monetization since 1970s. In early 1980s the pressure of government's borrowing requirement continued and in fact, it got accentuated. Since later half of 1980s, there has been a considerable emphasis on reducing monetization of fiscal deficits as well as overall government deficits, as higher level of deficits exacerbate instability and uncertainty in the economy. There exists a close connection between monetization of deficit, rate of interest and size of total government debt. Monetisation lowers the interest rate, keeping the cost of debt low and hence the size of debt at a lower level. In a coordinating monetary-

fiscal policy framework, if the interest rate is at a higher level, the central bank prescribes expansionary monetary policy in order to bring down the interest rate to a lower level and thereby cooperate with the government in adjusting its financing constraints. Thus, higher interest rate induces monetization of government debt.

With the realization that monetisation and controlled interest rate hinder the economic progress, and in order to determine the rate of interest in a market driven financial regime, reduction of monetization is one of the urgent measures outlined in the monetary policy stance of the Reserve Bank of India in 1990s. As a result, with an uncontrollable fiscal deficit, there is an increasing reliance of the central government on market borrowings and other internal liabilities. The other internal liabilities, in respect of which government acts as a banker to the public, dipped in the year 1999-00 after witnessing an increasing trend over a long period. This change is noticed due to recent changes in the fiscal policy of the central government as there is a steep decline in the reliance on small savings and provident funds in the aggregate other internal liabilities, from the year 1999-00.[35] Corresponding to this change, market borrowings witnessed a dramatic increase in the year 1999-00. This indicates that the compositional shift in domestic debt is partly due to the conversion of central government other liabilities (small savings and deposits, and public provident funds) into central government securities (GOI, 2001-02). Excepting the period from 1999-00 onwards[36], prior to 1999-00, the aggregate other internal liabilities of the central government mainly comprised receipts in the form of small savings, provident funds, reserve funds and deposits etc.[37] Small savings and provident funds are extremely expensive forms of

[35]The decrease in small savings at the end of 1990's was due to conversion of small savings into market debt. The fiscal trend for the latter years could be observed from the report of the Ministry of Finance, Government of India.

[36]For the period after 1999-00, the budget document of the union government of India is noted.

[37]The public account liability (PAL) is one of the major sources of financing the central government deficits. 'Other liabilities' from the PAL constitutes one of the major liabilities of the aggregate debt of the central government. The government is obliged to pay back the amortization along with interest payments thereon to the entities involved in lending to the government. Further, within aggregate other liabilities, small savings and provident funds are important components of PAL. Major portion of small savings was shared by the state and UTs governments from the centre until April 1, 1999. With the recommendation of Gupta Committee "National Small Savings Fund (NSSF)" was established in 1999 for the management of small savings and public provident funds. Prior to April 1, 1987, two-thirds of the net collections of this fund from a state were passed on as long-term loans to that state. The share of states was enhanced to three-fourths from April 1, 1987, and increased further to four-fifths of the net collections from April 1, 2000. With the recommendations of Reddy Committee, the entire net proceeds from small savings collected after March 31, 2002 is transferred to the state governments. On a similar basis, loans were also released to UTs governments since April 1, 1994. To the extent that the state

borrowings of the central government. Along with higher rate of interest charged on small savings and provident funds, the associated tax benefits permitted to the savers on these instruments have made the government borrowing program more expensive.[38] A high yield on small savings scheme has also been one of the principal reasons of higher real interest rate in the economy. Therefore, the debt service burden caused by rising government debt has been compounded by prevalence of higher real interest rates on certain components of government borrowings. The rising interest payment also reflects both rising debt and higher interest rates (GOI, 1996-97). Higher interest rate on market borrowings in some years is also attributed to a significant effort made for imparting financial liberalization. This was done with an intent that market interest rate would shoot up under a freer financial policy regime and bolster up financial pressure on the government. As a result, the government would reduce its large scale borrowings by using the resources more prudently and that more resources would flow to the private sector for productive investment.

However, high interest rate under the liberalized regime is a shackle from both sides. High real interest rate entails an unsustainable financial burden on the central government as well as the real investors, constricting the capital formation and economic growth. Although in certain softening interest rate scenario, monetary authority, in coordination with the government of India, has taken measures for aligning interest rates with market rates, the downward movement in interest rates on the expensive contractual savings is constrained by the rigidities inherent in the administered interest rate regime. To a certain extent, the benefit of reduction in interest rates on small savings deposits in recent years has been passed on to the states as the states share with the central government a major portion of resources

---

and UTs governments have shared from this fund from the center until April 1, 1999, they are obliged to pay back the principal and interest liability to the central government according to the apportionment of funds. After April 1, 1999 the borrowings by the state and UT governments as well as by the central government from the NSSF are required to be repaid to the NSSF in accordance with the amount they have borrowed and terms and conditions attached with the borrowings (as cited in Economic Survey of GOI, 1999-00 & 2001-02).

[38]The centre has to pay interest liabilities on the outstanding small savings and public provident funds to the National Small Savings Fund (NSSF) as the centre has issued government securities to the NSSF on its outstanding liabilities arising on account of withdrawal of funds from the public through small savings and public provident funds. The repayment share of state governments and UTs on these liabilities which were incurred until April 1, 1999 will be paid to the centre by the state governments and UTs and after April, 1999, all the governments borrowing made from these funds will be paid to NSSF on the basis of apportionment of these funds between the centre, the state and the UTs governments.

from small savings in the form of long-term loans for financing the state plan.[39] The decline in interest rate on market borrowings towards the end phase of 1990s was due to an increase in liquidity in the system.

Concern over rising government indebtedness has been a major factor behind debt managernent reform in India. Prior to 1990s, government debt management did not have clear objectives for it was based on political consideration as well as on achieving lowest annual debt-servicing cost regardless of portfolio risk. Among several motivating factors for prudently managing government debt and stronger financial markets in India, an increasing understanding that a prudent debt management strategy along with sound macroeconomic and structural adjustment policies essential for containing the impact of financial market shocks, is the most crucial one.

Recently, policy makers in India have placed greater emphasis on James Tobin's (1963) interpretation of role of fiscal and debt management policy for bringing out a clear cut division of roles between the two.[40] Tobin sets out that total government debt is the net accumulation of past deficits and surpluses of the government and the course of the total public debt depends on budgetary policies that determine the balance of receipts and expenditures. Thus, while the size of public debt is determined by the fiscal policy, its composition and maturity structure are determined by the debt management policy.[41] The monetary impact of debt depends more on who holds government debt than its initial magnitude. The monetary impact is determined by the effect of debt on aggregate demand. The fiscal effect depends on the rate at which debt changes rather than the absolute

---

[39]As the states will get additional loans against small savings collections under the recommendations of Reddy Committee, the states should mandatorily prepay their outstanding loans to the centre. In doing so, states would be effectively replacing the outstanding high cost borrowings by low cost borrowings in a softening interest rate scenario. This is known as 'debt swap' which in recent years has been much emphasized as a strategy to reduce the financial pressure of both the state and central governments in India.

[40]Seen in RBI Bulletin (2000) "Fiscal policy and Monetary Interface: Recent Developments in India by Y.V. Reddy.

[41]In contrast to the objective of government debt management policy which ensures that expected cost and risk of the debt portfolio remain within tolerance limit acceptable to the government, fiscal policy is concerned with the effects of government expenditure and taxation on macroeconomic variables such as investment and output keeping in view the objective of improving welfare, optimal resource allocation and higher growth rate in the economy.

size of debt itself. Government debt-management policy can only alter the composition of government debt but not its total size (Tarapore, 2002; Reddy, 2000).

The Reserve Bank of India (RBI) manages the central government debt and issues new loans on behalf of the central government (as well as the state governments) in accordance with the provision of RBI Act, 1934, and Public Debt Act 1944. Given the growing volume of internal public debt, the Indian authorities, as far back as 1980s, had recognized the problem of government debt and its implication on monetary control. The RBI 'Working Group on Internal Debt Management' (1981) had recommended the activation of debt management policy and urged a one shot three percentage point increase in interest rates on government dated securities and treasury bills. The 'Committee to Review the Monetary System' under the chairmanship of S. Chakravarty (1985) made various recommendations to ensure a positive real rate of interest on government papers. The response of the authorities was reflected in a gradual increase in interest rates on government paper (although by the time of formal introduction of financial-sector reform in 1991, the administered interest rate structure on government securities could be said to be close to the market-related rates of interest). While the authorities had been taking various measures in 1980s, the first clear initiative for a cohesive monetary and debt-management policy was set out in Rangarajan's Indian Economic Association presidential address on 'Issues in Monetary Management' (1988) which provided an analytical framework for the government and the RBI (Tarapore, 2002).

The RBI, till the early nineties, had little control over some facets of debt management like the volume and maturity structure of securities marketed and relationship of the yield offered on them to those offered by the market. With regard to the functions, which earlier were executed by the Finance Secretary Department, there was a change of guard in the management of internal/domestic debt of the central government in October 1992. With a view to efficiently managing domestic debt and liquidity in the economy, the Internal Debt Management Cell (IDMC) of the RBI was specifically entrusted with the power to manage public debt in October 1992. This marked a new era in the history of public

debt management in India. The functions relating to debt management policies and operations encompass raising of resources from the market, open market operations, smoothening of maturity structure of debt, placing debt close to the market related rates and improving liquidity of government securities by developing an active secondary market and retirement of rupee loans and interest payment thereon. Further, raising resources depends on the availability of resources (mainly based on growth in deposits with the banks, premium income of insurance companies and accretion to provident funds) and the absorptive capacity of the market. In India, banks, insurance companies and provident funds are statutorily required to invest a portion of their liabilities, premium income or accretions (as the case may be), in government and other approved securities. The borrowing needs of the government get reflected in the budget; but the interest rate, timing and manner of raising loans are conditioned by the state of liquidity in the economy and expectation of the market. Internal Debt management has become an active instrument of policy with the initiation of economic reforms in the 1990's (RBI: Working and Functions, 2001).

With the introduction of financial-sector reforms in 1991-92, an increasing role is being given to the open market operations (OMOs) as an instrument of monetary policy; and accordingly, various steps have been undertaken to alter the composition, maturity structure and yield of government securities. A concerted effort was made to move over to an auction system for 91-day and 364-day treasury bills, as also dated securities in 1992-93. In an evolving system, RBI manages both primary debt issuance and open market operations to reduce volatility and enable orderly condition in financial markets. The RBI, in its credit policy announcement of April 1993, indicated the formation of Securities Trading Corporation of India (STCI) to promote and develop secondary market in government securities and public sector bonds (Report on Currency and Finance, 1992-93). The weak link in the system, however, was the automatic monetization which remained open through the mechanism of *ad hoc* treasury bills. Rangarajan, in his Kutty Memorial lecture on 'Autonomy of Central Banks' (1993) set forth specific policy suggestions to eliminate the pernicious practice of automatic monetization.

The growing budget deficits and their absorption by the RBI highlighted the need for a close coordination between the fiscal policy and the monetary policy. Ideally, internal debt management should be optimised within the parameters of given fiscal-monetary policy. Following Rangarajan's recommendation on forging a coordination between monetary policy and fiscal policy, there emerged a reform initiative in respect of internal debt management policy. The RBI took measures to develop, integrate and enhance efficiency in the money and government security markets constituting an impressive array of reforms. The significant reform measures for development of government securities market in 1990s included: (a) adoption of the auction system for selling of government securities, (b) reductions in the statutory pre-emption by way of statutory liquidity ratio (SLR), (c) abolition of the system of automatic monetization of deficits by the RBI (d) shift from fixed to market-related yields, (e) introduction of new instruments etc. (Tarapore, 2002).

4.2 Interest Rate Regime in India

The increase in fiscal deficits from 1960s (in India) made the central role of monetary policy as one of the crucial instruments in containing the adverse impact of government deficits. One of the major roles of the RBI was to raise resources for the government under the borrowing program at substantially below-market rates of interest. This objective resulted in an emergence of an administered structure of interest rates. The government borrowing program was supported by altering statutory liquidity ratio (SLR) requirement of the banks (Tarapore, 2002). These factors helped in maintaining a low interest rate policy. However, a lower interest rate policy creates financial distortion and disturbs the economy by affecting the macroeconomic fundamentals from their equilibrium growth path. With the realization in 1970s that government failure was a pervasive feature of planned economies (Krueger, 1995), the neo-liberal view on financial market development started gaining prominence. The most well-known proponents of this view were McKinnon (1973) and Shaw (1973) who argued that in the context of a typical developing country, financial repression - a combination of heavy taxation, interest rate controls and government participation in the credit allocation process - would lead to a decrease in the depth of the financial market as well as efficiency with which savings are intermediated. Therefore, McKinnon-Shaw paradigm of financial repression, which implied complete liberalization of financial sector, is considered an

essential prerequisite for successful economic development of an economy. This paradigm impacted the Indian economic planners in late 1980s as it is thought that financial liberalization would be beneficial for the Indian economy (Sen & Vaidya, 1997); and under a controlled financial regime money finds its way into speculation and hoarding or conspicuous consumption instead of credit market, and in the process hinders the growth process by creating chaos in the operation of various transmission channels. It was realised that with regulated interest rates, directed and often subsidized credit, financial markets were far from competitive.

Thus, the financial market in India was characterized by a regulated interest rate regime during 1958 to 1985 (Bhole, 1999). In late eighties, attempts were made by the policy makers to deregulate and develop key financial markets such as money and T-bills. The initial impetus to reforms in the financial sector came with the submission of two influential committee reports to the RBI - Chakravarty Committee (1985) and Vaghul committee (1987). The first 'Committee to Review the Monetary System' (1985) set up by RBI, of which Rangarajan was a key member, emphasized the reduction of net RBI credit to the government. The report, *inter alia,* suggested simplifying the structure of interest rates and recommended a structure of rates based on real rates of interest. Its main recommendations to the RBI were to (i) develop treasury bill (TB) as a monetary instrument so that open market operations could gradually become an effective instrument of monetary policy; (ii) to revise upward the yield structure of government securities so as to create a demand for public debt outside the RBI, limiting the degree of monetization of government debt; and (iii) to adopt monetary targeting as an important monetary tool with price stability being the ultimate objective of monetary policy and for an effective mobilization and allocation of savings. Subsequently, the second committee known as 'Vaghul Working Group on the Money Market' (1987) was constituted to study the money market structure in India. It recommended a phased decontrol and development of money market with other short-term markets such as treasury bills (Sen & Vaidya, 1997). With this there was freeing of interest rates on money-market instruments and a number of new instruments were also introduced. An initial attempt to move to an auction system for 182-day treasury bills was made in November 1986 which resulted in a sharp rise in auction bill interest rate over fixed rate. In May 1989, as a further step

towards liberalization of the money market, the ceiling on call money rates was withdrawn, and certificate and deposits (CD) as a new source of short-term funds for commercial banks was introduced (Tarapore, 2002).

However, a more comprehensive liberalization of the financial sector had to wait till the initiation of structural adjustment-cum-stabilization program by the Indian government in 1991. In 1991, the Indian government launched a set of comprehensive market oriented reform programs, on the recommendations of Narasimham Committee Report (1991). A phased deregulation of the financial sector along with a market oriented government debt management program[42] was at the core of reforms. The main recommendations of the committee were in respect of interest rate structure of financial market in keeping with the coordination of fiscal control exercise. In order to impart greater flexibility to the banks and to make the monetary and financial system stronger, the recommendations of the committee included: (a) to bring down the statutory liquidity ratio (SLR) in a phased manner to 25 per cent over five years; (b) to use the cash reserve ratio (CRR) as an instrument of monetary policy and not as a means of controlling the secondary expansion of credit brought about by monetization of fiscal deficit; (c) to bring the interest rate on government borrowing in line with other market-determined interest rates and to phase out concessional interest rates. With the adoption of the reform package, two important pre-conditions for financial sector reform were fulfilled. With sharp reduction in the central government's fiscal deficit in the first year of the reforms, there was less need to use the banking sector as a captive source of funds, leading to availability of scarce investible funds to the private sector (Sen & Vaidya, 1997). Important elements of the financial liberalization program related to lifting of several interest rate ceilings on both the credit and bond markets, an easing of the requirements that had made mandatory for banks to hold a part of their portfolio in non-interest bearing reserves and low yielding government securities. However, inspite of the efforts being made by the central government to reduce its fiscal deficit, the decade witnessed a drastic increase in it, barring a few years in 1990s when it stagnated or declined marginally.

[42]Interest rates are influenced by the size and the composition of public debt and persistent high real interest rates are a threat to a sustainable fiscal policy and economic growth (The World Bank, 2004).

The increasing reliance on non-conventional market borrowings had led to an increase in average interest cost on internal debt during the period 1990-91 to 1994-95. The interest rates on 182-day and 364-day T-bills were market determined ever since their introduction into the government bond market in November 1986, while the dated securities were sold on auction basis from April 1992. In order to make the government security market more vibrant, a new instrument of 364–day treasury bill was introduced in April 1992 sold on auction basis, with the withdrawal of 182-day treasury bill in the same year. With a view to further developing capital market by offering investors a wide range of choices and moving towards a market related interest rate regime, the auction system was extended to the issue of 91-day treasury bill from January 1993. Before the introduction of the auction system in 91-day TBs for the improvement in liquidity position of the government security market, RBI had announced conducting of auctions of Repurchase Agreements (Repos) for the Central Government dated securities from Bank's portfolio (RBI Annual Report, 1993).

An important step was taken both by the Government of India and the RBI in the year 1993-94 by fixing a cap on net issue of *ad-hoc* treasury bills for the year 1994-95 proposing a complete phase out of *ad-hoc* treasury bills by the year 1997-98 (Report on Currency and Finance, 1993-94; RBI Annual Report, 1994-95). The process of automatic monetization through *ad hoc* T-bills was replaced with the system of ways and means advances in April 1997, and gradual policy steps were taken by the RBI and the government to develop the financial market since 1994 following Rangarajan's recommendations (1993). A shift from a regime of administered interest rates to a market-based pricing of securities attracted larger participation including the non-banks in the money and government securities markets. This enabled RBI to gain a significant degree of autonomy in the implementation of monetary policy. In consonance with the objective of bringing down reserve requirements of banks to prudential levels, the SLR was progressively brought down and banks were free to determine most of the lending rates and all deposits rates excepting savings deposits and certain lending rates. Besides, all money markets were also deregulated. The number of interest rate slabs on bank advances along with controlled floor interest rates on bank advances and ceiling interest rates on term deposits were reduced in the financial year 1993-94.

A very significant development related to the reactivation of the bank rate by linking it to all other rates including the refinance rate of the RBI in Oct 1997. In order to facilitate the emergence of a more comprehensive yield curve, a scheme of a new category of 14-days TB on auction basis was approved on May 1997. The Bank Rate (BR) emerged as a reference rate as well as a signalling mechanism to reflect the stance of monetary policy during 1997-98. The signaling impact of changes in BR was felt on deposit and lending rates in the credit market. A reduction in BR in March 1999 promoted major public sector banks to reduce their deposit rates.

In order to control floating of TBs with varying maturities, the RBI resorted to an active Open Market Operation (OMO) in the year 1999. This strategy was intended to neutralise large amount of private placement of government securities and to maintain an orderly flow of liquidity in the market. With increased government borrowing from the capital market at the end of 1990's, there has been a gradual increase in the real interest rates on government of India securities. The maximum interest rate on dated securities in the 1990s moved over to the 1980s from 4.6 per cent to 8.5 per cent (Tarapore, 2002). Recently, RBI brought some changes in the interest rates on small savings and provident funds to bring them with other market rates. The interest rates on small savings instruments were reduced with effect from January 2000 in line with the recommendations of a committee of experts on small savings (RBI Bulletin, 2000). In the recent period 2001-2004, interest rates on deposits and lendings have been brought down in order to create a healthy environment for investment.

4.2.1 Deregulation of Indian Financial Market and Evolution of Yield Curve

The Indian financial market under a highly regulated system was characterized by an administered structure of interest rates and restrictions on various market players such as financial institutions, mutual funds, and corporates till the early 1990s. The domestic rupee yield curve did not exist till as late as the end of 1990s.[43] In case of government securities, the yield curve was predetermined and

[43]The yield to maturity (YTM) is the true rate of return investors would receive if the securities were held until maturity. This is a discount rate that determines the present value of a single payment at a given time. When rate

not market related. The entire spectrum of interest rates both on asset and liability sides was determined by the authorities in order to ensure a comfortable spread. Since lending and borrowing operations did not involve any interest rate risk, there was no incentive for the market players to actively manage their assets and liabilities. There were restrictions on portfolio allocations in terms of specified targets. That apart, lack of depth and liquidity in the securities market, non-availability of instruments with varying maturities and infrastructural deficiencies in terms of trading and payments and settlements systems were also major impediments in the emergence of rupee yield curve. The slope and shape of the yield curve along with guiding the financial institutions to manage their portfolio helps the RBI manage the government debt. A steep yield curve indicates that the government can reduce the costs of borrowing by shortening the maturity of debt, and a flat curve indicates that the government can reduce the costs of borrowing by lengthening the maturity structure of debt.

Correspondence between the changes in monetary policy and the movement in yields of money market securities, treasury bills and government dated securities is realized recently. An important measure for enabling the emergence of yield curve was the exemption of inter-bank liabilities for maintenance of CRR and SLR in April 1997. While introduction of auction system has helped in market development and emergence of yield curve, cut-off yields in primary auctions are yet to be truly market determined.

4.3 An Interface between Domestic Debt Management Policy and Interest Rate Policy in India

Just as the effectiveness of monetary policy cannot be ensured without having a sound fiscal policy in place, the effectiveness of public debt management policy cannot be ensured without the existence of a strong financial market. A strong financial market, *inter alia*, requires a sound interest rate policy. It implies that debt management policy requires a sound interest rate policy for effective management of government debt as it helps in raising resources from the market as well as

---

of return on bonds is plotted against the residual maturity, the curve is called yield curve. Yield curve reflects the level and changes in rates of interest across the maturity structure of debt. For measuring yield to maturity, the most suitable bonds are the pure discount bonds viz. treasury bills and zero coupon bonds, which do not involve periodic coupon payments.

minimizing the cost of funds. In this connection, Tarapore (2002) points out that monetary policy and debt management policy are inextricably interrelated and that in a sense, both can determine the composition of public debt. The central bank determines the rate of interest at which it provides refinance and also prescribes the reserve ratios. Although these are essentially monetary tools, the manner of use of these instruments has an impact on the structure of domestic public debt. It is in this context that domestic debt-management policy and monetary policy are mutually reinforcing. In other words, if these two important segments of financial policy do not move in tandem, there can be a major attenuation of monetary control. It is, therefore, vital to ensure coordination of instruments of monetary and debt management policies in terms of their technical design in order to create an economic environment with minimal financial distortions as the fiscal policy is essentially formulated by the government or the Ministry of Finance with the RBI being assigned the role of formulating the debt management policy and interest rate policy; ignoring each other's policy can result in distortions in the system. In India, the financial market was not well developed and organized for a long period (until 1980s). It runs counter to the argument that for achieving a higher rate of economic growth, a sound and developed financial market is a prerequisite. To impart efficiency and development in the financial market, the RBI, in recent years, has been undertaking a number of policy measures in the direction of new debt schemes and other related policies. Hence, in an economic environment where a number of policy measures are being undertaken in respect of fiscal adjustment along with monetary policy measures to impart gradual liberalisation to the financial market, it is imperative to examine the interaction between the debt management policy and interest rate policy.

Historical analysis of the movement of interest rates gives an insight into the depth of competition in the Indian capital market and hence, provides an idea on government debt management. Over the period from 1961-62 to 1981-82 the yield on 5 year maturities rose from 3.58 to 5.81, while on 10 year maturities the yield rose from 3.96 to 6.75 and on 15 year maturities it rose from 4.13 to 6.89. The noteworthy point is that during 1971-72 to 1974-76 although yield on central government securities of 10 year maturity continued to exceed the yield on 7 year National Savings Certificate, the increase in rates on commercial bank deposits was,

however, much higher than the gilt edged securities. Because of this yield structure, despite the rising interest rates on government securities, government securities could not succeed in diminishing the attractiveness of private securities. The average yield on 5-10 year maturity securities for most part of 1980s, outstripped the yield on 15 year securities, while this was reversed in 1990s in the reported figures shown in Table 4.1.

The number of administered interest rates on bank advances had been reduced from 20 in 1989-90 to 2 in 1994-95. Government borrowings from commercial and corporate banks in the form of sale of securities and TBs increased by 25.5 per cent during 1993-94 over 1992-93. This was almost twice the growth rate of 14.1 per cent rate in 1992-93. That apart, the maximum interest rate of 7.0 per cent which was offered on 30 year government securities in 1979-80, was raised to 14.0 per cent in 1995-96 by shortening the maturity of government securities to a maximum of 10 years.

Table 4.1: Weighted Average Yield and Maturity for Market Loans of Central Government

(Per cent/year)

Year	Ranges of YTMs at Primary Issues			Weighted Average Yield
	Under 5 years	5-10 years	Over 10 years	
1992-93	12.91	11.23	11.58	12.46
1993-94	12.35	-	-	12.63
1994-95	10.88	11.58	12.88	12.00
1995-96	13.25-13.73	13.25-14.00	-	13.75
1996-97	13.40-13.72	13.55-13.85	-	13.69
1997-98	10.85-12.14	11.15-13.05	-	12.01
1998-99	11.40-11.68	11.10-12.25	12.25-12.60	11.86
1999-00	-	10.73-11.99	10.77-12.45	11.77

Source: Annual Report 2003-04, RBI

Table 4.2: Maturity Structure of Central Government Dated Securities or Rupee Loans outstanding

(In Percent)

Years	Below 5 years	Between 5-10 years	Above 10 Years
1990-91	8.6	5.6	85.8
1991-92	7.4	16.8	75.8
1992-93	8.0	14.2	77.8
1993-94	21.4	22.3	56.3
1994-95	25.3	27.4	47.3
1995-96	38.4	30.3	31.3
1996-97	45.2	29.0	25.8
1997-98	41	41	18
1998-99	42	42	16
1999-00	37	39	24

Source: RBI Annual Reports, Various Issues

In relation to interest rate changes, there has also been a shift in maturity structure of governmer t debt, specifically for market loans. In the pre-liberalisation period, the composition of central government securities was in favour of long-dated securities. The share of long-dated securities was 48.8 per cent in 1970-71 which increased to 72 per cent in 1980-81 and further to 85.8 per cent in 1990-91, while there was a decline in the share of short and medium-dated securities. During liberalization, the outstanding rupee loans under 5 years maturity and 5-10 year maturity witnessed a rise in their share in total rupee loans until 1998-99 (see Table 4.2). The share of 5 year maturity went up from 8.6 per cent in 1990-91 to 25.3 per cent in 1994-95 and further to 42 per cent in 1998-99. As against this, longer term maturity loans i.e those with over 10 years declined from 85.8 per cent in 1990-1991 to 47.3 per cent in 1994-95 to 16 per cent in 1998-99. The shortening of maturity period took place because an increased recourse to borrowings from the market had put pressure on interest rate and triggered concomitant policy response to minimize the cost of borrowing by placing a large part of it on the shorter end of the market. Even after the maximum maturity was set at 10 years, a large amount continued to be raised at shorter maturities. The outcome of shortening of maturity period of market borrowings of the central government resulted in bunching of redemption and rollover risks. Finally, the much-reiterated and dreaded internal debt trap arrived in 1998-99. Had a Consolidated Sinking Fund (CSF) been instituted around the year 1980-81, the country's fiscal plight would not have reached to such an extent. The rollover risks further prompted the government to elongate the maturity profile of the securities in softening interest rate conditions of 1999-00.[44] Yield curve flattened as the long-term yields fell in the wake of surplus liquidity conditions.

The interest rate changes in 1990s were brought about by activating the internal debt management policy. The monetary policy of April, 1992 had heralded a new approach in the internal debt management policy by introducing market orientation schemes with regard to absorption of government of India dated rupee securities and longer term TBs which were to be facilitated by the overall reduction in borrowing program in 1992-93. A significant development related to a rapid

[44]The elongation of maturity profile of government securities is observed to continue until 2003-04 for minimizing the cost and the rollover risks with a falling interest rate condition (RBI Annual Reports, 2003-04).

decline in the share of RBI investment in government securities from 20.3 per cent in 1991 to as meager as 2.0 per cent in 1995 brought about by an active internal debt management policy {although with an insignificant improvement of the share of non-captive investors in the investment of government security market (RCF, 1995-96)}. Two changes in the system made the cost of borrowings much higher for the central government in the 1990s. Before 1990's, a substantial portion of the fiscal deficits was financed through monetization. This was no longer resorted to from 1997-98 due to its inflationary effect and hence the explicit interest cost of a fiscal deficit increased. Second, interest rate deregulation made the cost of government borrowings equivalent to market rates, which was not the case earlier, when banks had to lend to the government at lower than market interest rates.

Often it is viewed that there was a clear need for the government to control the deficit on a more permanent basis before making the transition to market determined interest rates in the government securities market. It can be noted that the central government, until recently, was dependent heavily on public account liabilities including small savings and provident funds considered as the most expensive sources of capital receipts of the government. Despite policy exercises, capital market was not so well developed in India until recently as reflected in the composition of capital receipts of the central government. The small savings and provident funds being costly sources of capital receipts (funding government deficits), a continuous and relatively heavy reliance on them, barring the end years of 1990s when was a reversal, implies prevalence of an unfavorable capital market condition or low demand for government securities. This development was against the main pursuit of the market oriented internal debt management policy for enhancing the attractiveness of government dated securities and disciplining the use of borrowed funds at relatively high rates of interest.[45] The behaviour of interest rate and inflation rate and their interaction (interaction of real interest rate) with the growth rate of different borrowing components are presented with a view to examining their nexus between them and implications for the macroeconomic policies.

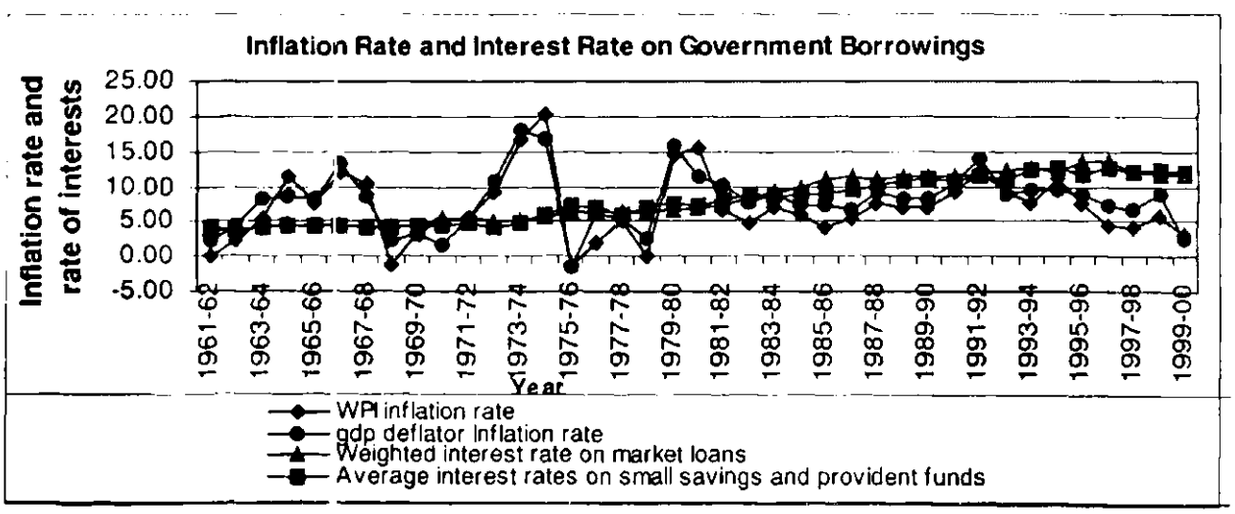
---

[45] As part of prudent debt management policy strategy, the government had swapped the low cost borrowings with the higher cost borrowings incurred in the past with a reduction of interest rates on market loans in 2002-03.

4.3.1 Inflation Rate and Interest Rates on Government Domestic Debt

Before examining the relationship between the movements of inflation rate and nominal interest rate to get a fair idea about the behaviour of real interest rates on different components of domestic debt, the behaviour of two inflation rates is examined – one derived from (a) Wholesale Price Index (WPI) and the other derived from (b) GDP deflator. Looking at Figure 4.1, one can inspect that there was a close association between the movements of both the inflation rates. When one was falling, the other one was also falling and vice-versa. It is observed that since the early 1980's, barring certain time periods, inflation rate derived from WPI fell below the inflation rate derived from the GDP deflator. This wedge between the two might be due to an increase in prices of services as they were not captured in WPI rather captured in GDP deflator. In relation to the movements of prices, the nominal interest rates showed that until the mid-1980's the interest rates (price of money/capital) charged on government debt instruments, on an average, were below the inflation rates. This was because of a controlled financial regime. Thereafter, the initial attempt for a free financial regime was enforced and gradually the behaviour of interest rate took the natural course. This is clearly reflected in Figure 4.1. The interest rate, over the course of time (after mid-1980s), continuously increased with a few cyclical fluctuations towards the end of 1990s leading to the realization of price of capital for the bondholders. There was an encouraging sign for the investors to invest their money in securities with a realization of an increase in real interest rate (based on WPI) in the economy although it witnessed a declining trend towards the end of 1990's.

Figure 4.1: Inflation Rate and Nominal Interest Rates on Government Domestic Debt



4.3.2 Government Domestic Debt and Real Interest Rates

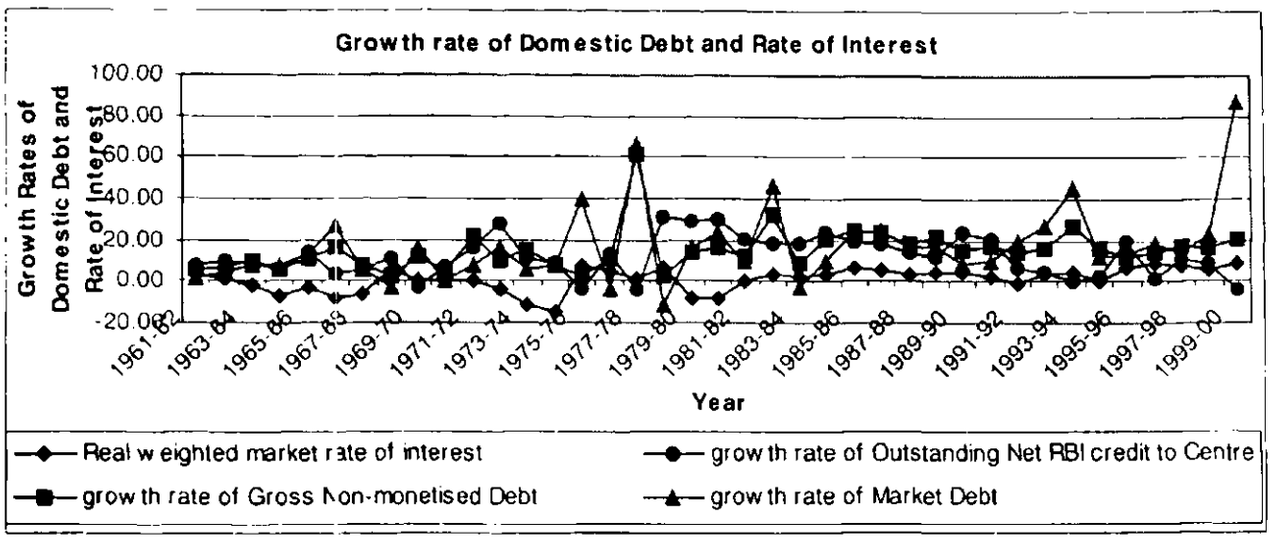
If one could decompose aggregate domestic debt of the central government on the basis of monetised and non-monetised debt, the growth rate of monetised debt, which refers to outstanding net credit of RBI, grew substantially until 1992-93. Although growth rate of non-monetised debt, which refers to all components of liabilities in the government budget exclusive of monetised debt, had a fluctuating trend over the years, after 1992-93 it showed a higher level than the growth rate of monetised debt. Within the non-monetised debt, the growth rate of outstanding market borrowings was higher than the other non-monetised components such as small savings and provident funds and other forms of liabilities such as borrowings from postal insurance, life annuity fund, tax annuity deposits, reserve funds of railways, department of telecommunication posts, deposits of local funds, department and judicial deposits, civil deposits etc. Corresponding to such growth rates, the market real rate of interest, which was suppressed to a lower level until 1985-86, started moving in the upward direction giving a right signal for the domestic investors to invest their money on government bonds or securities in their asset portfolio.

There is no doubt about the fact that an increase in monetsied debt[46] leads to more liquidity in the economy. Given the nominal interest rate, this exacerbates inflation and thereby brings down the real interest rate. But contrary to the effect of large monetised debt, large market borrowings put upward pressure on real interest rate, thereby, affecting the cost of government debt. It can be noticed from Figure 4.2 that there was a sharp decline in the monetised debt in 1990's as a result of the coordinated actions of monetary and fiscal policy. In contrast, the growth rate of market debt registered an increasing trend during the same period and put upward pressure on interest rates (based on WPI). A large proportion of monetised debt resulting from the dominance of fiscal policy actions had resulted in negative real rate of interest for many years prior to 1990s. However, in the recent period, decontrolled financial policy resulted in market determination of interest rates. This is an encouraging step by the government as libaralisation of financial policy would

[46]Monetised debt refers to government borrowings against the issue of treasury bills or dated securities picked up by the RBI which result in creation of reserve money. This is the sum total of the net increase in the holdings of treasury bills by the RBI and its contribution to the market borrowings of the government (GOI, 1990-91).

help free flow of resources to productive channels improving the growth rate of income.

Figure 4.2: Growth Rate of Monetised and Non-Monetised Debt and Market Real Rate of Interest

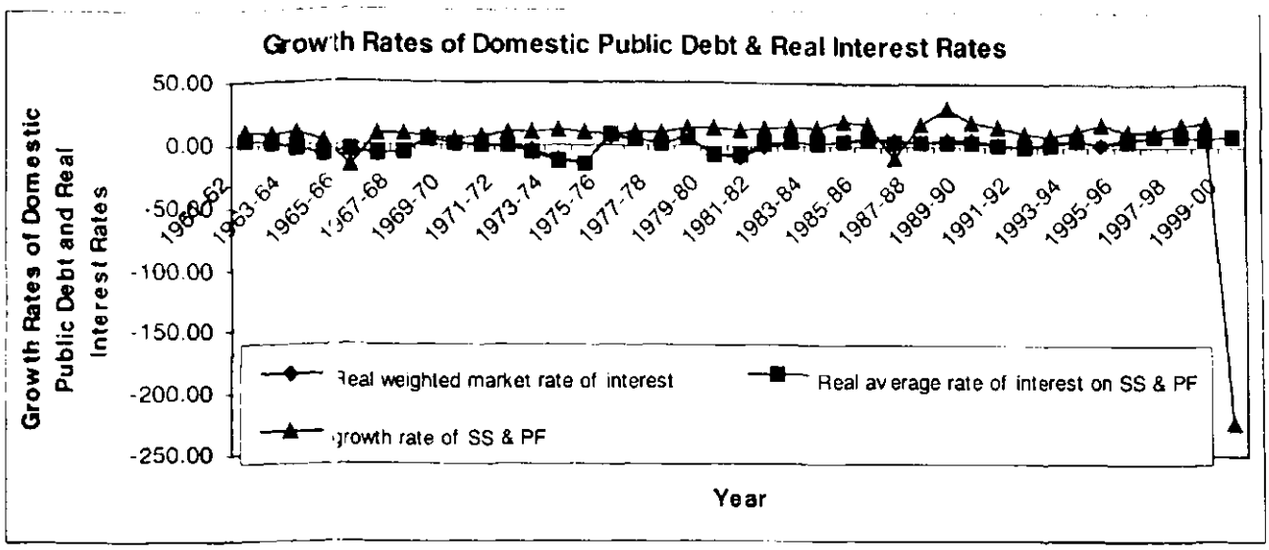


4.3.3 Growth Rate of Small Savings and Provident Funds and Real Interest Rates

Looking at Figure 4.3, it can be observed that the movements in real rates of interest (based on WPI) on small savings was not in accordance with the movements in the growth rate of small savings and provident funds component of domestic liabilities of the government.[47] This was because the rate of interest contracted on this loan was arbitrarily fixed by the government. People, willingly and partly by compulsion, invested their money on these, with a view to benefiting from tax-free interest rate return. The actual imputed yield was higher than the nominal interest rate on these components. From the trends of average real interest rate on small savings and provident funds, it can be observed that the average real interest rate was, more often than not, positive and almost constant during the period 1981-82 to 1995-97. Thereafter, it was found to be positive but fluctuated with the market rate of interest which was not the case before the mid-1990s.

[47]**The drastic fall in outstanding small savings and provident funds at the end of 1990's was due to conversion of small savings and public provident fund into market debt.**

Figure 4.3: Growth Rate of Small Savings and Provident Funds and Real Rate of Interest



From Appendix Table 4.1, it can be noticed that commercial banks invested a significant proportion of their deposits in government securities. The proportion was expected to decline during the financial liberalization, but the proportion was found to be increasing over the years reflecting the underdevelopment of security market in India. The reason for this could be that before liberalization, banks by regulation, had to maintain reserves with the Reserve Bank of India (RBI) in the form of government securities, and after liberalization even the required reserve ratio came down drastically but the banks find it riskier to spread their deposits in the private sector, rather, they find it safe to invest in government securities. Thus, the situation at present is no different from the pre-financial liberalisation. The government needs to come up with certain policy changes in order to widen the scope of the Indian capital market. This can be possible only by changing the domestic debt policy of the government. The government has to rely on the market rather than banks. This would help the growth of capital market and thereby promote investment and growth of the economy. Thus, the government debt management policy should aim at achieving higher investment and growth rate rather than achieving the short-run objectives.

The above discussion on monetary policy strategy suggests that since 1990's, the RBI has taken strong policy measures to bring down the heavily placed monetised government deficits. The reason is not far to seek. An excessive accommodation of fiscal policy in the monetary policy through heavy monetisation

allows little flexibility for the RBI in discharging a right course of monetary policy action and takes away the freedom of monetary authority in exercising timely and desirable policy measures. The higher level of monetisation is a hurdle for an effective operation of open market operations (OMO) on two counts. Higher level of monetization lowers the interest rate as well as destabilizes the price level. This makes it difficult for the RBI to execute correct policy measures in order to achieve macroeconomic stability (Rangarajan, 1998). On the other hand, financing an increasing level of government deficits through market borrowings provides little option for the RBI to stabilise the interest rates. However, after 1994-95, due to strict measures on monetization, the RBI has been able to reduce the level of monetised deficits signaling flexibility in its policy operations. This suggests that the RBI has gradually been pursuing the policies to reduce the heavily placed monetised deficit of the government in order to support market determined interest rate in the economy (aiming to create a healthy investment climate).

It is to be emphasised that the development of markets for government securities helps not only monetary policy but also fiscal policy and development of financial markets in general. In most of the countries, the central bank acts as a financial adviser and agent for the government. For that reason the central bank is often in charge of all operational matters of public debt management. The finance ministry, however, normally retains the final responsibility of deciding the amount, type, and maturity of government securities in primary markets. Coordination committee is critical to ensure a forum for discussion between the two institutions on matters of public debt and monetary management. It is not only the budget deficit that puts a burden on monetary management but also poorly conceived monetary instruments, such as reserve requirements and rediscount policies, which can make it extremely difficult for developing a sufficiently deep and active government securities market.

4.4 Critical Evaluation of Debt Management Policy of the Central Government in India

In certain fiscal years, the total targeted borrowings of the central government for the entire year was accomplished in first half of the year, resulting in substantial surplus of funds with the government. The Finance Ministry, for the fiscal 1997-98,

had placed a significant portion of these surpluses with the RBI, which in turn, invested them providing some 10 per cent rate of return. Thus, when the government was already groaning under an interest payment burden, incurring borrowing at 13 or 14 per cent and investing the surplus at 10 per cent, made little sense in keeping with an efficient government debt management policy. As investment in government securities is less risky, it induces the public sector banks to shy away lending to the productive sectors. This emphasizes the fact that a higher interest rate structure is detrimental to the healthy growth of the economy.

The cost of borrowing to the government - the weighted average yield on government securities - was in the range of 10.50 per cent to 12.50 per cent in 1990-91. The yield rose to 13.25 per cent to 14 per cent in 1995-96. Despite a significant deceleration in inflation, the yields continued to remain at high levels. Interest payments pre-empted a large share of revenue receipts of the central government. Such high yields on government securities would have been justifiable, had they resulted in widening and deepening the primary market in government securities. Unfortunately, the market continued to be dominated by captive investors. Investment by commercial banks in government securities constituted nearly 70 per cent of the stock of government dated securities at the end of March 1995, as against nearly 60 per cent at the end of March 1991. The share of insurance companies rose from 12.3 per cent in 1991 to 16.2 per cent in 1996. In recent years also, banks continued to hold a major portion of government bonds (as shown in Appendix Table 4.1). Thus, the objective of involving the non-banking sectors like the corporate and the household in the government debt market for deepening the capital market and higher growth, has been found to be marginally successful (Mujumdar, 2002).

Further, the RBI recently effected significant changes in the debt management policy and an activation of internal debt management policy post-July 1991. But the RBI, by superimposing a veneer of market on the financial system, might have adversely affected not only the government finances, but also the banking sector and hence the future growth of the economy. In this context, Mujumdar (2002) opines that emergent hybrid system of public debt management has neither the element of 'public' nor an element of 'debt management'. Not

'public' because an overwhelming proportion of government borrowings continue to be subscribed by captive investors such as commercial banks and financial institutions; and again the misplaced emphasis on the market determined interest rates has led to the rising yields thereby increasing the cost of borrowings to a high level. In other words, inspite of all efforts to develop the market by RBI, it has not been able to penetrate other segments of the financial sector. High yield (with zero-risk) and transaction cost almost being nil in investing on government securities, is indirectly promoting a 'colonial' type of banking system. Such artificially high yields on government securities has led to compounding of debt servicing problems as well as encroaching on the credit requirement of the private sector for private capital formation. The basic approach to debt management adopted in the last four or five years is flawed. In an effort to move towards market related rates, the RBI continued to raise yields on government securities, the maximum reaching to 14 per cent. This approach was based on the assumption that higher cost of borrowing would make the government fiscally more prudent. But this has not materialized in practice. In fact, the target of the budget deficit was 5 per cent of GDP in 1997-98 but it rose to 6 per cent. On the other hand, such high yields underpin a high interest rate structure which leads industries to groan under the burden of high lending rates of banks.

Perhaps, the most serious adverse impact of high yields on government securities was that banks, particularly the public sector banks became reluctant to lend to private sector. Investing in a zero-risk and zero-transaction cost instrument such as government security was preferred to lending to even highly rated corporates. That is how the private sector experienced the credit crunch. Priority sectors, including the small-scale industries, were the victims of this misconceived public debt policy (Mujumdar, 2002). The government 'debt' does not ensure instant liquidity for investing on government gilt-edged security. Investment on government securities continues to be a dead investment. Once funds are invested, one has to hang on to the security till it matures. Even in recent times it is observed that a public sector bank with surplus investments - surplus after stipulated SLR requirements- has to borrow from the call money market, say at 25 per cent interest rate to meet the cash reserve ratio (CRR) requirements. This is because it can neither sell nor borrow against government securities. With the recent ongoing

effort of financial reforms in aligning interest rates on government securities with market determined interest rate, RBI claims that a major prerequisite for the development of the government securities market has been met. On the contrary, 14 per cent yield on government securities is totally out of alignment with the interest rate structure and the macroeconomic fundamentals, thereby leading to several distortions in the economy.

There is an infirmity in Article 292 in that while market loans, treasury bills, and external debt are covered under the public debt ceiling, borrowing through small savings, provident funds, deposits, etc. are left out, and thus warranting an amendment of the Article 292 to incorporate them in order to control the growth of total government debt. Successive annual reports of RBI have referred to the need of a legislative ceiling on public debt. The RBI annual report for 1996-97 argued that ideally there should be a ceiling on total liabilities but, this is pending for a constitutional amendment. The government should commit to parliament that it would provide the information on contingent and other liabilities and ensure that such liabilities do not grow in a manner to subvert the statutory ceiling on public debt. The main argument in favour of limiting public debt is that excessive government borrowings raise the rate of interest and crowd out private investment. While some economists argue that there is no inter-generational transfer of the debt burden, it is clear that the amortization and interest burden of debt incurred during previous periods have adverse effects in that the government has to garner resources to service the debt. The overall ratio of total debt to GDP of the central government should not exceed 50 per cent as targeted in 10^{th} plan. Some academicians, on the theoretical and practical ground, argue that a statutory ceiling undermines the potency of fiscal policy and that the way to tackle this problem is to priorities the expenditure rather than putting ceilings on debt (Tarapore, 2000).

The fiscal problem at present is because of lack of coordination between borrowing ability and returns on the activity. The ability to borrow greatly depends on fiscal health of the entity. The continued high level of public borrowings also has an effect on the rest of the economy through prevalence of high interest rates. Just because there is necessity to finance government deficits, the RBI keeps the level of CRR and SLR at high levels on deposits of commercial banks; but this compels

banks to keep higher margins on their commercial activities thereby subjecting the rest of the economy to high interest rates. Moreover, because of garnering more resources by the government from the whole financial sector, including small savings, insurance and the like, the continued high fiscal deficits impede financial sector reforms which are necessary for the economy to achieve higher efficiency.

However, an issue, which remains unaddressed, is the need for measures to ensure smooth repayment of government debt. The present practice of financing repayments on past debt out of fresh borrowing is clearly unsustainable. It is in this context that there is a proposal for setting up of a Consolidated Sinking Fund (CSF) which would be financed by general contributions by the government out of fresh borrowings, disinvestment proceeds and RBI profit transfers. If this is done, the CSF may have sufficient funds by March 2011, the target period for FRBMB, to ensure repayments without resorting to fresh borrowings.

4.5 Ingredients of an Active Internal Debt-Management Policy

Where there is dominance of fiscal policy, more often monetisation is erroneously considered as being least burdensome and as the last resort, merely because there is a supreme authority for the central bank i.e. the government. Under a controlled regime, the government has the power to easily access funds from the RBI at a cheaper rate on the issue of treasury bills. Government should not recourse to such soft policy options as it erodes monetary control and will have deleterious impact on the economy. If there exists excessive monetized deficit, reduction of such deficits is desirable for maintaining a balance between monetary policy and fiscal policy. Otherwise, postponing adjustment renders it more difficult in the future. The extent of monetization should independently be determined by the monetary authority. The right course of action should not be obstructed by the biased decision of the owner of the institution at the cost of the economy. It is important to ensure that debt-management policy is oriented towards financing the government requirements from the open market, thereby enabling the central bank to use open market operations for regulating monetary growth. A prerequisite for developing an active government securities market relates to a move towards market-clearing interest rates on government securities. Market-related rates on government securities provide a strong benchmark for other interest rates in the system and

thereby ensure that money is priced correctly in the entire economy (Tarapore, 2002). In a free market, interest rates are determined by forces of supply and demand. The supply of government securities is basically determined by the size of government deficit and debt rollover, while the demand depends not only on economic conditions but also characteristics of the instruments, such as liquidity. The interest rate on government securities, however, has an impact on the deficit as well as other interest rates in the economy.

The skill of debt-management policy is to insulate internal debt from the short-term effects of monetary policy. An efficient debt-management policy has to take into account composition of debt and optimal average duration of debt. If debt is high and maturity is kept short, debt renewals put pressure on the debt-management policy and unless interest rates are raised continuously, it becomes difficult to ensure that the loan floatations are fully subscribed. As such, in the context of a high level of public debt, lengthening the average maturity of the debt gives greatest freedom of action to monetary and debt-management policy.[48] Such a policy may not always be workable as market may perceive ever-increasing financing requirements of the government and under a system of market-related interest rates on government papers, the market may demand and get a high premium on lengthening the maturity of debt. It is, therefore, a basic principle of debt-management policy to avoid static maturity and rate policy. Periodic variations in lengthening and shortening of maturities and raising and lowering of interest rates are integral to an active debt policy. While undertaking such changes, the responsibilities of internal debt-management policy and monetary policy need to be clearly delineated and at the same time, co-ordination between the two needs to be strengthened. At a higher rate of interest, the debt manager shortens the maturity of debt and conversely, at a lower rate, the debt manager lengthens the maturity of debt. The art of good internal debt management takes into account the inevitable movements in interest rates (Tarapore, 2002). The feasibility of incurring debt should be based on economic parameters such as total investment and economic growth rates.

[48]In recent years there are significant gains in terms of minimization of cost and elongation of maturity profile for limiting the rollover risk. The elongation of maturity profile of government securities in falling interest rate conditions is in consonance with institutional participants increasing demand for longer tenors of government bonds. The yield curve has fallen in the wake of surplus liquidity conditions (Annual Report 2003-04, RBI).

4.6 Conclusion

From the review of policies it can be observed that before financial liberalization, debt management policy was confined to the objective of raising debt and reducing cost of debt, undermining the role of monetary policy in strengthening financial and capital markets. Following recommendations of several committees in 1980s and 1990s, there was a gradual reform initiatives in respect of internal public debt management with a view to achieving effectiveness in monetary policy and a strong debt market. This resulted in a move towards introduction of auction system in government securities, market-related rates of interest, elimination of *ad-hoc* monetization and institutional developments. In some years, this development has also led to a rise in the cost of fiscal adjustments due to a rise in cost of market debt.

Government's debt portfolio is the largest financial portfolio in the economy. Inspite of the efforts being made by the RBI to enhance the private sector participation in the government security market, market for government debt is resrticted to few entities. Government debt servicing cost is often high and as making timely debt servicing payments is a priority for the government, it reduces the volume of resources availabile for other uses. Interest payments entail a large drain on public resources, thereby reducing the government capacity to spend on social sectors and developmental activities. As noticed in Chapter 3, interest payment, as a proportion of GDP, edged up from 4.6 per cent in 1994-95 to 4.7 per cent in 1995-96. Interest payment can be reduced either by retiring debt, particularly higher interest bearing debt or by curbing the growth of new debt (GOI, 1996-97). Therefore, the study emphasises on prudent management of government debt. Efficient government debt management can reduce government's debt-servicing cost by reducing credit and liquidity premium in the term structure of interest rates for government securities. It can also build larger participation of investors in the domestic bond market and strengthen the efficiency of domestic financial market. Government debt management policies have got important bearing for the effectiveness of macroeconomic policies. Prudent debt management can make the country less susceptible to contagion and financial risks. The government can reduce risks associated with its debt portfolio by choosing an appropriate composition of debt, interest rate structure, and maturity profile.

An important point that needs emphasis is that interest rate and government debt are very much interrelated. For a good financial or monetary environment, there is a necessity of equilibrium interest rate in the economy. For an undistorted equilibrium interest rate structure and capital market, government debt is one of the instruments in the development of financial market which needs adequate policy attention. It is evident from the economic literature that deviation of interest rate either in the upward or downward direction from its market determined equilibrium position, is considered as one of the pertinent factors contributing to macroeconomic instability in developing economies. The higher interest rate structure not only presages the danger of recession, but also pushes the economy into a debt trap situation (Morley et. al, 1987). In contrast, a lower interest rate structure discourages private savings and hence constrains investment by engaging the private sector to utilize their surpluses on speculative activities. Above all, an appropriate interest rate policy which is sufficiently realistic, stable and flexible, can lend more strength to the monetary authority in curtailing short-term demand for funds for speculative purposes, and thus can help achieve financial stability. To maintain a positive interest rate, two methods can be employed i.e. (i) issue of index loans, and (ii) manipulation of nominal interest rates. The interest rate reflects the opportunity cost of holding different kinds of assets determined by what the asset holders would receive under alternative uses of their savings, and an equilibrium occurs when returns on various assets converge. A realistic structure of interest rates should ensure growth with stability. Realistic rates of interest on government borrowings have to take into account social opportunity costs. Therefore, besides ensuring fiscal adequacy for developmental expenditures, government debt policy should be oriented towards maintaining monetary stability. Government debt management policy should not interfere with interest rate policy and overall monetary policy for ensuring a strong financial environment in the country.

Appendix Table 4.1: Outstanding Deposits and Investments of Scheduled Commercial Banks on Government Securities

Year	Aggregate Deposits (Rs crore)	Scheduled Commercial Banks' Investment in government securities (rs crore)	Scheduled Commercial Banks' Investment in Government Securities to their Aggregate Deposits (%)	Total domestic debt / Total debt (%)*	External debt / Total debt (%)*
1970-71	5906	1362	23.06	61.6	38.35
1975-76	14155	3283	23.19	72.7	27.34
1980-81	37988	9219	24.27	81.1	18.91
1985-86	85404	19045	22.30	86.8	13.19
1990-91	192541	49998	25.97	90.0	10.02
1991-92	230758	62727	27.18	89.6	10.42
1992-93	268572	75945	28.28	89.5	10.52
1993-94	315132	101202	32.11	90.1	9.91
1994-95	386859	117685	30.42	90.5	9.46
1995-96	433819	132227	30.48	91.5	8.45
1996-97	505599	158890	31.43	92.0	8.03
1997-98	598485	186957	31.24	92.9	7.11
1998-99	714025	223217	31.26	93.6	6.42
1999-00	813345	278456	34.24	94.4	5.59

***Note**: * debt picture is presented in the above table for convenient reference.*

Source: Handbook of Statistics on Indian Economy (2001), Reserve Bank of India.

Chapter 5

An Assessment of Sustainability of the Central Government Domestic Debt in India

In recent years, no issue in public finance has drawn as much attention among the policy makers as the sustainability of fiscal policy. This has become a major subject of intense debate and discussion relating to the economic policy of most of the indebted economies. The government of a country finances its deficits through various ways. Considering the fact that there is a limit to taxation, external sources of financing the deficits, and monetization of public debt[49], when a government runs budget deficits beyond these three ways of financing, ultimately resorts to other domestic sources of borrowings. There are three other principal domestic sources of government borrowing in India. They are: (a) public/households, (b) commercial banks and other financial institutions and (c) governmental institutions other than the RBI.[50]

As noted in the preceding Chapter 3, with a continuous and phenomenal increase in fiscal deficit, there is a corresponding build up of domestic debt of the central government in India. A continuous rise in government debt not only has implications towards the financial position of the central government, but also towards the growth and stability of the economy. In this context, the issue of sustainability of public debt assumes critical importance in a country like India chronically dependent on domestic debt as an instrument of financing its growing revenue deficit (out of total fiscal deficit).

An unsustainable fiscal policy may lead to a recessionary situation which can result in deep-rooted macro economic evils such as unemployment and low growth

[49]Monetisation of debt refers to the process through which an increase in government debt results in an increase in money stock. This is done through borrowing from the central bank of a country. The limit for monetization of public debt can be defined as the level of monetization which gives rise to maximum seignorage revenue within a certain tolerable inflation capacity of the economy.

[50]The government borrowing from governmental institutions or departments is known as intra-governmental borrowings.

rate; further it erodes the potential taxable capacity of the economy forcing the government to persistently rely on further borrowings for bridging its resource gap. Chronic accumulation of debt leads to insolvency affecting adversely the confidence and credibility of the government. As a result, it becomes very difficult for the government to discharge its responsibilities in terms of allocating financial resources for developmental and welfare enhancing activities. Government faces difficulties in investing resources on yield enhancing long-term and short-term capital investment projects and servicing the accumulated debt arrears. Rapid accumulation of government debt puts pressure on monetary policy resulting in macroeconomic distortions (deadweight losses) and ultimately, can lead to unsustainability of public debt and the economy itself. In view of a sustained relative increase in domestic debt, this chapter attempts to evaluate sustainability of domestic debt of the central government in India. This is examined by looking into broadly defined components of domestic debt as well as the aggregate domestic debt of the central government over the last four decades. A period of four decades is considered to be long enough to judge the long term perspective of fiscal policy in the economy.

In order to empirically examine the issue in the Indian context, the study, at first, brings out in nutshell the conceptual and analytical framework underlying the issue of sustainability as discussed in the literature and then generalize in the Indian context with a view to empirically ascertain whether the current pattern of government domestic debt is sustainable or not and derive implications for the future fiscal policy of the country.[51]

5.1 Concept and Measurement of Sustainability of Domestic Public Debt

A sustainable situation is generally referred to as a continuation of an action (the action refers to the act of borrowing by the government) without any breakdown. This can indirectly be interpreted as an action consistent with other economic targets. When it is inconsistent with other economic targets, the action raises the question of its own continuation. On the contrary, an unsustainable situation is defined as one under which, circumstances economic variables cannot continue

[51]Sustainability may relate to prospective/future fiscal policy or past fiscal policy. Since future is uncertain and prediction against future on the basis of present is also uncertain; the study tries to evaluate sustainability of past fiscal policy in order to analyse that if the given fiscal policy continued into the future what would be its

indefinitely on their historical path as implied by the current policies and private sector behaviour. This means for future policy to be sustainable, the current policy is required to be on the sustainable line or the overall fiscal policy is required to be intertemporally consistent with desired fiscal targets and other economic parameters.

Quite contrary to the classical line of thinking, which argues that debt should not be incurred in normal situations by a government as it is perceived to be wasteful and burdensome on the future generations, Keynes maintains that debt incurrence would not pose any problem as long as it is within a threshold limit. The threshold limit would be breached when debt liability is in excessive proportion of aggregate national income. Under such circumstances borrowings would be undesirable, as it presages dangerous macro-economic consequences, such as crowding out effect, lower economic growth (Afonso, 2000). Thus, the level of public debt should always be seen in relative terms as a proportion of GDP of an economy (since the tax base of an economy principally depends upon the GDP; and with a higher level of GDP, the capacity of a government to impose taxes becomes higher and therefore its ability to service the past debt becomes much certain and easier).

On the Keynesian line of thinking, it is argued that public borrowing is usually not harmful for an economy where the resources are lying idle/underutilised. Rather it improves the economic position by utilising the untapped resources of the economy. Moreover, unsustainability of public debt does not arise as long as an increase in public debt is accompanied by an increase in growth rate and expansion of the economy.

Following Keynes's contention on sustainability, Domar (1944) treats the problem of public debt as one of an expanding national income i.e. how national income rises in relation to the level of public debt. According to him, government debt creation would be unsustainable if the after-tax real interest rate on

---

theoretical implication towards the future fiscal policy (assuming that what is happening in the present is likely to happen in the future).

government bonds exceeds the real growth rate of the economy.[52] Given the level of primary deficit, if the rate of interest is above the growth rate of the economy, it leads to a steady rise in the debt level which is known in the literature as the violation of Domar's debt stability condition. The government debt to be sustainable, Domar's debt stability condition has to be fulfilled (Report on Currency and Finance, RBI, 2002). The stability condition would get fulfilled when the growth rate of income exceeds the rates of interest on government debt, and if there exists any primary deficit in the government budget the fulfillment of this condition would help in improving the fiscal situation at least by keeping the primary deficit-to-GDP ratio at a constant level. Moreover, it can be generalized that the growth of public debt to be sustainable, fiscal policy should not compromise on the growth rate of the economy as well as expenditure and revenue generation capacity of the government in the future.[53]

In the recent period, economists began to opine that the feasible fiscal policies must be considered in a framework in which government is subject to an intertemporal budget constraint (Buiter, 1983; subsequently presented in the analytical framework). The level of government debt is sustainable if it does not violate the intertemporal budget constraint (Wilcox, 1989). It should be intertemporally consistent with future fiscal policy. If it violates the budget constraint over the long-run, then an expansionary fiscal policy at present must involve either contractionary fiscal policy at some point in the future or an increase in the seignorage revenue from money creation. Otherwise, debt eventually becomes excessively large relative to other macroeconomic indicators. It is implausible to gauge under such circumstance whether investors would be willing to continue acquiring government bonds indefinitely without there being a conceivable way out for the government to meet its debt service payments without further borrowing (Masson, 1985). Unsustainability becomes a more and more pronounced

[52]Since the interest receipt is also subject to taxation, the taxable income of a country depends on both GDP and interest receipts of private individuals on the holdings of public debt (Domar, 1944).

[53]In contrast to Keynesian viewpoint, the rational expectationist, Barro (1974) viewed public debt from the perspective of Ricardo's debt neutrality theorem. Barro contended that under the assumption of rational behaviour of the individuals a tax-cut bond-financed public expenditure in the current period would result in an equivalent increase in the present value of future taxes in the latter period, leaving other parameters of the economy unaltered. Hence, on account of this conception, the increase in debt-financed public expenditure does not entail the public debt becoming unsustainable. The issue has not been intensely discussed by the new classicals.

problem as time goes on along with the rise in debt as it leads to an increase in interest payments. In a similar vein as Domar did, other economists began to point out that if the government is running a primary deficit, and at the same time, real rate of interst exceeds the economy's real growth rate, the tax rate increase is necessary to offset the increase in deficit and to stabilize the government debt. If tax revenue cannot grow as to offset the the growth of deficit or there cannot be cut in revenue expenditure, then the debt would explode and a situation may arise where government, in order to meet interest payments on its past debt, has to resort to further borrowing - a situation in the literature popularly reckoned as '**debt trap**', which indicates debt unsustainability or fiscal policy unsustainability.

Moreover, higher the outstanding stock of government debt, the greater would be the need for fiscal retrenchment or monetisation. Higher monetisation would result in inflationary expectations and this in turn, may lead to an increase in nominal interest rate on bonds as a compensation against inflation. As a result of these rippling effects, it may have deletorious impact on the economic growth by weakening and destab lising the economic fundalmentals. On the other hand, given the increasing tendency of deficit, if there is no fiscal retrenchment and increase in the monetised deficit, t implies higher debt level. Higher debt inducing the rate of interest to a higher level would result in lowering the level of steady-state consumption and capital stock (Spaventa, 1987).

The experience of economies around the world reveals that there is a changing perception about the stance of fiscal policy. The shift towards fiscal restraint has begun n the early 1980s in several Organisation for Economic Cooperation and Development (OECD) countries. In the United States, for instance, the Balanced Budget Act of 1997, forbids congress authorising any expenditure that exceeds government revenue. The Maastrict treaty fiscal convergence protocol sets the benchmark limit for gross value of debt and deficits not to exceed 60 per cent and 3 per cent of GDP respectively. This is declared to be the required norm for the European countries to join the European Monetary Union (EMU) (Buiter and Patel, 1997). The countries that have already attained this threshold limit are considered fiscally unsustainable and are debarred from joining the union, as their entry into

the union is perceived to have destabilising impact on fiscal and monetary policy of the member countries. In Canada, even though there is no constitutional framework preventing the fiscal authorities in running deficits, balanced budget and achieving surpluses are now a firm commitment not only of the federal government but also the provincial governments (Bougrine, 2002). Since economic development differs across countries, it is not justifiable and feasible to apply the same benchmark limit for all the developing countries. The implementation of these fiscal convergence criteria for assessing sustainability depends on the extent of economic development of the countries concerned. Further, measuring economic development and fixing sustainable limits on the fiscal indicators for the economies is also not an easy task. However, following these norms, some countries have arbitrarily gone in for fixing the fiscal limits. In India, the fiscal responsibility and budget management bill (FRBMB) is being currently enforced.

Another popular approach to evaluate sustainability of public debt is to look at the behaviour of different indicators of sustainability - known as indicator approach. This approach evaluates debt sustainability in terms of capacity of a country to raise debt and discharging the debt obligation. It employes a number of proximate measures of real life debt service problems (Hjertholm, 2003). One can also compare the total costs (liabilities) associated with government borrowings with total assets of the government.[54] This is called net worth approach to assessing sustainability. If the cost borne on borrowings exceeds, over time, the present discounted value of returns on the utilisation of borrowed funds, it is an indication of debt unsustainability (Buiter, 2001). But this method of measuring debt sustainability has got limitations. Evaluating fiscal sustainability through this approach has been ruled out due to the practical problems involved in getting the data especially on the future returns associated with a particular level of government borrowing incurred at a particular point of time. If the borrowings made in a year are invested in the same year, may not generate immediate returns but may give rise to returns over a period of time. Under such circumstance, it is difficult to distinguish returns associated with different levels of borrowings at different points of time. If the government uses the borrowed funds for investment

[54]There are practical difficulties in valuing the total assets of the government.

in areas such as infrastructure, education, health care etc., the sustainable level of debt not only depends on the relationship between the marginal social returns on the investments and marginal cost of borrowings, but also on government's ability to appropriate domestic resources (through tax revenues) for debt services. That apart, the public sector debt service ratio, public debt-to-GDP ratio, interest payment-to-GDP ratio, debt-to-tax revenue ratio and the interest payment-to-tax revenue ratio are considered as fundamental indicators of debt sustainability under the indicator approach.

Domestic Debt Sustainabilty in India: Indicator Approach

Following the above conceptual analysis, before outlining an analytical framework for examining sustainability, a look at the popular fundamental indicators of debt sustainability in the context of India, would enable us to get a preliminary idea about the present stance of fiscal policy in the country. In this context, a look at the sustainability indicators reveals that the fiscal position of the central government presents a worrisome picture. Table 5.1 provides a comparative picture of the level of aggregate domestic debt of the central government in relation to the level of GDP of the economy on a five yearly average basis. As we have seen from the earlier analysis in Chapter 3 that in contrast to the increase in nominal growth rate of domestic liabilities, the nominal growth rate of external debt of the central government drastically declined in the 1990s. The decline in external debt was observed to be dramatic especially after the macroeconomic crisis of 1990s. Contrary to the growth rate of external public debt, the growth rate of domestic public debt had been increasing over the years and even in many years outstripped the growth rate of GDP raising the fear of unsustainability of fiscal policy. Further, a component-wise analysis of domestic debt shown in Table 5.1 indicates that all the components of domestic debt such as market debt and other liabilities taken as percentage of GDP registered a phenomenal increase during 1980s and early 1990s over their previous levels. In the later part of 1990s on account of some degree of fiscal restraint exercise and good performance of the economy, the overall domestic debt-to-GDP ratio had been kept under control and in fact it marginally declined to 47.50 per cent. The decline was observed to be more from RBI's ways and means advances[55] and from small savings. The drastic decline in small savings component

[55]Ways and means advances consist of advances of RBI through floating loans (issue of special securities) and loans against the issue of treasury bills, which are short-term in nature.

of centre's liability got obscured in Table 5.1 due to the combination of small savings and provident funds. The reason for the decline in ways and means advances was due to the limit put on the automatic monetization of government debt. The monetisation component does not pose a threat of unsustainability as it is abolished and rate of interest charged on these loans is very marginal. Rather, it serves as a source of revenue for the government and its withdrawal poses a threat for other forms of debt. The decline in small savings in 1990s was due to changes in the institutional and fiscal policies. In the preceding years, the central government had taken the major responsibility of mobilizing resources for the states and union territories. From the year 1999-00 (with recommendation of Gupta committee in 1998), the central government does not need to mobilize resources through the channel of small savings for the state and union territory governments. As a result, this would reduce the large scale borrowing requirements and deficits of the central government in the long-run if not in the short-run. In the short-run, the reduction of debt and deficit may not be possible in a significant way because of large committed expenditure along with interest payments on outstanding liabilities which is a major concern of the central government at least for next few years.

The abolition of automatic monetization along with prevention of resource absorption through net small savings resulted in increase in centre's market debt. The market debt continued to increase attaining the highest limit of 24 per cent of GDP towards the end of 1990s. As a consequence, interest payment on domestic debt also increased over the years as can be seen from net domestic interest payment (defined as the total domestic interest payment of the centre minus repayment of interest liabilities by the states and union territories to the centre) as a percentage of tax revenue and also as a percentage of GDP. This raised the fear that India was not far off from the debt trap. Had there been adequate GDP growth (more than what was realized), adequate generation of tax revenues would have brought down the level of public debt. The fact that the growth rate of the economy was not coping up well with the growth rate of domestic debt and other developments in fiscal policy, implied a lower taxable capacity of the economy and hence government's absorption of resources through increased borrowings. Given the growth rate and structural features of the economy (where the contribution of service and agricultural sectors to total tax revenue is minimal, although their

contribution towards the GDP growth being significant), it is difficult on the part of the government to impose taxes beyond a certain limit. If the government exceeds in its taxing capacity beyond a certain tolerable limit, it would discourage the workers' interest to work as well as affect the willingness and the capacity of the investors to invest their resources (Wheeler, 2004). The latter consequence follows due to the adverse impact of higher taxes on profit margin of investors. Further, higher the tax rates, more would be the tax evasion. Higher tax rates following higher growth of public debt would adversely affect the economic growth. Sometimes it is argued that even in periods of good performance of the economy as reflected in the increase in growth rate of GDP, the government has not been able to mobilize tax revenues, because of other dimensions to the issue of low tax revenue accrual to the government. This is beyond the analysis of the present study as it deviates from our main discussion, but generally it is believed that tax revenue base depends upon the GDP of a country. Recently, policy makers have envisaged bringing more number of services under the tax net. Nothing can be concluded from these indicators unless the issue is dealt with at length and with more vigour. On the one hand, there is an increase in the share of market debt, and on the other hand, there is a decrease in certain components of domestic debt. Given the present stance, it becomes difficult to decide as to what would be the future stance of fiscal policy in the economy. Considering the above conceptual and theoretical analysis, the study moves further to bring out an analytical framework for assessing sustainability of domestic debt of the central government in India.

Table 5.1: Indicators of Domestic Debt Sustainability of the Central Government in India (5 yearly annual averages)

(In percent)

Years	Market Borrowings and Bonds /GDP	Outstanding Treasury Bills & Special Floating Loans/GDP	SS & PF /GDP	Other Liabilities exclusive of SS & PF/GDP	Market Borrowings and Bonds plus Aggregate Other Liabilities /GDP	Net Domestic Interest Payment /GDP	Net Domestic Interest Payment /Tax Revenue
1960-65	14.08	6.29	10.58	0.00	24.66	0.26	4.25
1965-70	10.84	7.52	7.28	1.97	20.09	0.39	6.85
1970-75	9.37	7.58	6.90	3.70	19.97	0.43	7.15
1975-80	9.50	8.43	6.98	3.80	20.29	0.96	13.24
1980-85	13.98	8.86	7.77	5.48	27.23	0.96	13.87
1985-90	20.46	6.72	9.16	10.85	40.48	1.56	19.85
1990-95	22.04	4.97	10.51	11.44	43.98	2.68	38.18
1995-00	24.22	3.95	9.29	10.14	43.65	2.94	45.39

Source: Long Term Fiscal Trends in India 1950-51-to 2000-2001: A Conspectus, NIPFP (2002).

5.2 Sustainability of Domestic Public Debt: Analytical Framework

There are two approaches to analyse sustainability of government debt: (i) the accounting approach and (ii) the present value borrowing constraint (PVBC) approach / intertemporal budget constariant (IBC) approach (Hamiton and Flavin, 1986; Cuddington, 1996; Gupta, 1992; Buiter et al., 1992, Auerbach and Kotlikoff, 1998). The straightforward method for analysing sustainability of public debt under both the approaches is to start with the budget constraint of the government.

i) Accounting Approach to the Government Budget Constraint

In the absence of external loan-financing and money-financing the deficit (inflationary financing), let the government's budget constraint be expressed in real terms as:

$$B_t = (G_t - T_t) + (1+r_{t-1})\, B_{t-1} \qquad (1)$$

$$B_t - B_{t-1} = -S_t + r_{t-1} B_{t-1} \qquad (2)$$

where $B_t - B_{t-1}$ is the real amount of net interest-bearing government debt held by the private sector and other financial institutions in the economy at the time period t, or it is the change in the stock of government debt between two time points; r is the *ex post* real interest rate on government loans; G and T are real government expenditures net of interest payments and real tax revenues respectively. S denotes the non-interest real surplus (-S denotes real primary deficit, that is, the difference between real government expenditures and real revenue receipts exclusive of interest payments on government debt). The real government deficit can be defined as the change in the real value of government debt over time. The government budget constraint is adjusted for inflation so that changes in its components do not reflect the price variation. Based on the preceding conceptual framework, expressing the budget constraint (2) as a proportion of real national income[56], it would yield the following equation as in (3)[57].

$$\frac{B_t}{Y_t} = (1 + r_{t-1}) \frac{B_{t-1}}{Y_{t-1}} \frac{Y_{t-1}}{Y_t} + \left(\frac{G_t - T_t}{Y_t} \right) \qquad (3)$$

---

[56] In a growing economy, public debt should be seen in relative terms as a proportion of GDP of the economy (Afonso, 2000).

[57] Income is divided throughout the budget constraint in order to account for the effect of growth on borrowing capacity of the government.

$$b_t = \frac{(1 + r_{t-1})b_{t-1}}{\frac{Y_t}{Y_{t-1}}} + \frac{(G_t - T_t)}{(Y_t)}$$

$$b_t = \frac{(1 + r_{t-1})b_{t-1}}{\frac{Y_t}{Y_{t-1}} - 1 + 1} + \frac{(G_t - T_t)}{Y_t}$$

$$b_t = \frac{(1 + r_{t-1})\, b_{t-1}}{1 + \eta_{t-1}} + \frac{(G_t - T_t)}{Y_t} \qquad (4)$$

The small case letters in (4) represent the real value of corresponding variables as a ratio to real national income. Using the approximation $(1+r)/(1+\eta) \approx (1+r-\eta)$, where r and η are very small fractional values, we will get the following as represented in (5).

$$b_t = (g_t - t_t) + (1 + r_{t-1} - \eta_{t-1})\, b_{t-1} \qquad (5)$$

Where *b* represents the real value of the stock of domestic debt of the central government. The small case letters g and *t* are real government expenditures (exclusive of interest payments on government debt) and real tax revenue, each as a proportion to real national income, respectively. The *r* is the *ex post* after-tax real rate of interest and η is the rate of real income growth. According to the above budget constraint, the evolution of the domestic debt-to-income ratio depends on two factors: (a) primary deficit-to-income ratio ($g_t - t_t$), and (b) the product of the accumulated debt-to-income ratio (b_{t-1}) times the difference between real rate of interest and real income growth rate $(r - \eta)$. If the difference between r and η is positive, primary surplus is needed to maintain a constant debt-to-income ratio. If the difference is negative, it is possible to run a certain level of primary deficit and maintain a constant debt-to-income ratio. In other words, when the after-tax real rate of interest is greater than the economy's growth rate, a positive primary deficit will induce a growing stock of government debt and therefore, growing interest payments have to be met by an ever increasing tax rate or by reducing government expenditure.

Moreover, the budget constraint reveals that given the level of primary deficit to income ratio (in the context of comparing the real rate of interest with the real growth rate of income), debt level would be considered sustainable if the real

income growth rate exceeds the real rate of interest and makes the debt-to-income ratio decline or at least bounded one. Putting alternatively, a level of government debt would be sustainable if debt-to-income ratio decreases or at least remains constant over time. According to budget constraint expressed in (5), the debt-to-income ratio would remain constant when $b_t = b_{t-1}$, which implies that $-(g_t - t_t) = (r_{t-1} - \eta_{t-1})b_{t-1}$. Clearly, when the real rate of interest exceeds the growth rate of the economy, the government would have to run a primary surplus in order to maintain a constant debt-to-income ratio over time. In steady state, with constant primary deficit-to-GDP ratio i.e. (pdef = g - t), the equation (6) would hold.

$$b^* = (pdef) / (\eta_{t-1} - r_{t-1}) \qquad (6)$$

The above equation (6) tells that b*(the steady state value of debt/gdp) would be stable if $\eta > r$ and unstable if $r > \eta$. In the event of a given amount of primary deficit-to-GDP, ratio if r exceeds η, it would lead to an increase in debt-to-GDP ratio and would make the debt level unbounded, an indication of instability of fiscal policy. Let's examine the PVBC approach to sustainability which is believed to be a stronger condition for debt sustainability.

ii) Present Value Borrowing Constraint (PVBC) Approach

The PVBC approach reveals that the willingness of the lenders to hold government bonds operates as a binding constraint for the government to raise funds for financing its deficits. On the other hand, if willingness of the borrowers does not operate as a constraint, and government keeps on borrowing, this would necessitate more interest payments in the future. The required level of government borrowing eventually would exceed the real wealth of the economy. The bottom line for the government to borrow would be till the government eventually pays off the bill. The government's budget is balanced in expected present-value terms, when current value of debt is equal to the sum of expected present value of future primary surpluses. The fulfillment of this condition, in the literature, is called the solvency condition.[58] This condition requires the government to collect, over time,

[58]A government is solvent if and only it is able to generate in the future a stream of primary surpluses that are sufficient to repay (in present value terms) the stock of outstanding debt that it has inherited from its predecessors. Such a condition will hold if and only the present discounted value of debt converge itself toward

net taxes that are large enough, in terms of present value, to cover the present value of its expenditure and the initial debt. In other words, this implies that if the government purchases more now without raising net tax payments, it must either reduce its future purchases or alternatively increase future net taxes by an amount that has an equal present value. As long as government makes this compensating change, its intertemporal budget would remain balanced.

Considering the equation (4) as derived from the budget constraint equation (2), and for the sake of simplicity, assuming for the moment that the real rate of interest on government securities (r) and the rate of income growth (η) are constant, the government budget constraint can be expressed in the following form (7).

$$b_t = -s_t + \left(\frac{1+r}{1+\eta}\right) b_{t-1} \qquad (7)$$

$$b_{t-1} = \left(\frac{1+\eta}{1+r}\right) s_t + \left(\frac{1+\eta}{1+r}\right) b_t$$

where $r \equiv i - \pi$ stands for the real rate of interest i.e. nominal rate of interest net of inflation rate. If the equation (7) is iterated once, it will take the form of the following equation (8).

$$b_t = \left(\frac{1+\eta}{1+r}\right) s_{t+1} + \left(\frac{1+\eta}{1+r}\right) b_{t+1} \qquad (8)$$

If the equation (7) is iterated twice, it would take the form of equation (9).

$$= \left(\frac{1+\eta}{1+r}\right) s_{t+1} + \left(\frac{1+\eta}{1+r}\right)\left[\left(\frac{1+\eta}{1+r}\right) b_{t+2} + \left(\frac{1+\eta}{1+r}\right) s_{t+2}\right]$$

$$= \left(\frac{1+\eta}{1+r}\right) s_{t+1} + \left(\frac{1+\eta}{1+r}\right)^2 s_{t+2} + \left(\frac{1+\eta}{1+r}\right)^2 b_{t+2} \qquad (9)$$

---

zero in the long-run. If this is the case then this condition implies that the debt is "repaid" asymptotically and that there would always be a chain of investors willing to refinance the government (so long as they are certain that the government will continue to implement the set of primary surpluses that generate such an outcome) (D. Cohen, 2002).

With the above equation (8) recursively forwarded for N period (N≥1), the present value borrowing constraint can be expressed in the following equation form as in (10).

$$b_t = b_{t+N}\left(\frac{1+\eta}{1+r}\right)^N + \sum_{j=1}^{N} S_{t+j}\left(\frac{1+\eta}{1+r}\right)^j \qquad (10)$$

Letting $B_{t+N} \equiv b_{t+N}\left(\frac{1+r}{1+\eta}\right)^{-(t+N)}$ and $S_{t+j} \equiv S_{t+j}\left(\frac{1+r}{1+\eta}\right)^{-(t+J)}$ it would yield the following intertemporal budget constraint (11).

$$B_t = B_{t+N} + \sum_{j=1}^{N} S_{t+j} \qquad (11)$$

The relevant question that arises is what creditors expect to happen to B_{t+N} as N gets larger. Taking expectations as of time t of equation (11) and applying the limit as N goes to infinite yields, then the equation will be as in (12).

$$B_t = \lim_{N\to\infty} E_t B_{t+N} + E_t \sum_{j=1}^{N} S_{t+j} \qquad (12)$$

The equation (12) implies that debt is sustainable if the transversality (no-ponzi game) condition i.e. $\lim_{N\to\infty} E_t B_{t+N} = 0$ is satisfied. The condition can be restated as debt to be sustainable requires the government's budget balanced in expected present-value sense[59] where the current value of outstanding debt gets offset by the sum of expected discounted future primary surpluses. The version of equation (12) forms the basis for applying the empirical test which is presented in a later section.

Alternatively, according to equation (12), government's budget is balanced in expected present-value terms, when current value of stock of debt is equal to the sum of expected discounted future primary surpluses. This is the case when

[59]The discount factor is used to convert future expenditures and net tax receipts into their present values. The present value borrowing constraint approach does not require the government ever fully pay off the total debt. One way to satisfy the constraint is to make zero purchases/expenditures through time and simply collect taxes each period to cover interest payments on the debt. The policy leaves the stock of debt unchanged through time, but it satisfies the present value borrowing constraint, since in present value, paying interest forever is equivalent to paying off the debt immediately (Auerbach 1998).

$\lim_{N\to\infty} B_{t+N} = 0$. This is the familiar 'no ponzi finance'[60] terminal boundary condition constraining the growth of public debt in the long-run. It states that, in the long-run, the growth rate of debt-to-GDP ratio must be less than the excess of domestic real interest rate over the long-run growth rate of real GDP. If $\lim_{N\to\infty} B_{t+N} < 0$, it implies that the expected discounted future primary surpluses exceed the current value of stock of government debt by a certain amount, implying debt sustainability. The situation indicates that the government accumulates enough revenues to clear off its deficit in the future.

In the opposite case, $\lim_{N\to\infty} B_{t+N} > 0$, the current value of the government's stock of debt exceeds expected discounted primary surpluses. This implies that the government is borrowing on a continuous basis in order to meet interest payments on its debt, which will grow, *ceteris paribus*, at the rate of interest. Such a Ponzi scheme would violate the optimality condition of debt. But, when $\lim_{N\to\infty} B_{t+N} = 0$, the government is asymptotically using the resources allowed by its budget constraint, no more and no less. It means the current face value of debt is no greater than the present discounted value of all future augmented primary surpluses.

5.3 Methodology Applied in the Literature for Assessing Sustainability

As noticed earlier, broadly there are two major approaches in the literature to ascertain fiscal sustainability, namely, (a) Accounting approach and (b) Intertemporal Budget Constraint (IBC) or Present Value Budget Constraint (PVBC)/Present Value Borrowing Constraint (PVBC) approach. Besides these two approaches, there are also various indicators to ascertain sustainability of fiscal policy for a country. Hamilton and Flavin (1986) pioneered the IBC approach to evaluate fiscal policy sustainability. Under this approach, they carried out Dickey-Fuller's unit root test on the undiscounted value of public debt and deficit series under the assumption of a constant real rate of interest. Finding both the series stationary, the study concluded that fiscal policy was sustainable for the U.S.

[60]Ponzi financing scheme means where government continually borrows just for repayment of its past loans. Ponzi finance is ruled out if the present discounted terminal value of the public debt tilts to zero, that is, if the long-run growth rate of the public debt is less than the long-run interest rate (Wilcox, 1989; Buiter, 2001).

economy. Subsequently, this prompted a series of sustainability tests, particularly for the U.S. economy. Kremers (1989) examined the mean zero stationarity of discounted public debt series for the U.S. economy during the period 1920-1985. Finding that the data followed a stationarity process until 1981, but there after is a non-stationarity process, concluded that intertemporal budget balance did hold until 1981, but there after it didn't, implying unsustainability of debt for the later period. Besides applying unit root test under the IBC approach, other studies applied test of co-integration in order to find out co-integrating relationship between public expenditure and revenue receipts, and between primary surpluses and stock of public debt for assessing sustainability. Trehan and Walsh (1991), in their study, pointed out that if primary surplus and the debt series were co-integrated, then the intertemporal budget constraint would be satisfied and this would ensure fiscal policy sustainability or public debt sustainability. Testing this proposition in U.S. context for the period 1960-84, they found that the behaviour of data ensured sustainability of fiscal policy after taking first difference of both the series. Considering the same period for U.S economy, Wilcox (1989), extended the work of Hamilton and Flavin by allowing for a stochastic interest rate and found that discounted public debt didn't follow a mean zero stationarity process. Therefore the study concluded that debt was not sustainable for the economy. The difference between both the results could be due to the differences in their methodology adopted. Bohn (1991), for examining the sustainability of public debt tested the stationarity property of debt series to see whether the series followed a mean reverting process or not.

Greiner et. al. (1999) investigated the time series property of debt series for Germany for the period 1955-1994 through the Dickey-Fuller and Flood-Garber unit root test and found that the series did not converge to its mean value. From this, their study concluded that given the present trend in the fiscal variables, the sustainability of fiscal policy for the Germany economy was not possible. Luporini (1999) analyzed the sustainability of the federal government debt in Brazil during 1966-96. Applying the standard unit root test on debt series after subtracting its mean value, he observed mixed evidence. However, dividing the original data into two sub-samples for the period 1966-80 and 1981-1996, he found that the

government fiscal policy was sustainable prior to 1980, but assumed an unsustainable path after 1980.

In another study, Uctum and Wickens (2000), examined the sustainability of fiscal policies for the E.U. countries along with the U.S. economy by applying the unit root test on the fiscal variables for the period 1965-1994. The result indicated that with an infinite horizon, there was some evidence that fiscal stance in Denmark, the Netherlands and Ireland was sustainable, while the fiscal policy in Spain, Italy, Belgium, Portugal and United States was not.

In the context of India, although there are studies which have attempted to assess sustainability of fiscal policy, very few studies have comprehensively looked at the aspect of sustainability of domestic public debt, on the basis of a component-wise analysis, as defined in the data section. The component-wise assessment of sustainability would indicate whether it is market debt or other liabilities, the continuation of which poses a threat to the sustainability and stability of fiscal policy. Gupta (1992) assessed sustainability for nine Asian countries including India, examining under the present value borrowing constraint approach/intertemporal budget constraint approach for the period 1974-84. Under the present value budget constraint approach, he employed Dickey-Fuller's unit root test to the undiscounted value of debt and deficit series (due to lack of data on the discounted values) on the hypotheses that if both the series were stationary, then it would satisfy the present value borrowing constraint, and the public debt would be sustainable, otherwise it would not be sustainable. Finding the null of non-stationaity not rejected for most of the countries, the study concluded that debt and deficits were unsustainable for most of the countries including India.

Buiter and Patel (1997) analysed debt solvency through an accounting framework. Applying the unit root test to the discounted public debt and the deficit series, they found that solvency couldn't be assured in India. But the limitation of the study is that they considered a short series for the application of unit root test of time series analysis. In fact, they had applied ADF test, the results of which cannot be much relied upon since the series consisted of less number of annual observations. But, there are also studies which have examined debt sustainability by

considering the total amount of government debt without looking into its composition.

In another study, Rajaraman and Mukhopadhaya (2000) assessed the sustainability of public debt by adopting a structural time series model (STSM). The model predicted that debt-to-GDP series in India did not follow a sustainable path. The limitation of the study lies in considering an undiscounted debt series. By taking the undiscounted debt series, they didn't evaluate sustainability from an intertemporal budget constraint framework. Besides, applying the STSM model on the projected undiscounted debt, they could not conclude anything about the current stance of fiscal policy. Moorthy et. al. (2000), by employing Domar's stability condition, found that market public debt was stable in India at the prevailing levels of primary deficit and monetised deficit during the period 1970-1998. The study pointed out that the potential for debt instability had arisen due to high-administered rates on non-market borrowings such as small savings and provident funds. Despite the short-run debt instability, bond-financing of deficit, i.e. the switchover to market borrowing had not led to debt trap situation. Rangarajan et. al. (2003) applying the same method found that during 2000- 2003 an excess of interest rate over growth rate led to a rise in debt-to-GDP in India. However, the limitation of their study lies in the stability test, which cannot guarantee sustainability of debt. For example, at a primary deficit of 5 percentage of gdp, the debt may be stable or constant but that particular level of deficit may not ensure sustainability of public debt. Further, the period over which it is constant has to be taken into account. And mere comparison of rate of interest rate with growth rate does not ensure sustainability of public debt, rather it will be sensible to compare the growth rate of debt with the growth rate of the economy. It is the level of debt which matters more than the rate of interest in the economy.

The debt sustainability is analysed under both the approaches. The solvency condition under the PVBC approach is stronger than the stability condition under the accounting approach. The solvency condition points out that debt to be sustainable, the discounted value of debt should approach to zero as time approaches to infinite. In other words, the rate of growth of debt should be less than the rate of interest charged on government debt. If this condition holds, the present vale of borrowing

constraint would be satisfied. This can be examined by applying a standard econometric approach. Before empirically examining the issue, let's now define the components of debt and other related data required in order to assess sustainability of domestic debt under both the approaches.

5.4 Data Description

The data set required for testing the sustainability of domestic public debt is considered over the period from 1960-2000. By dividing the data on aggregate domestic debt into different components, the study tries to assess which component of domestic debt is more vulnerable towards sustainability of current fiscal policy. The data on domestic debt broadly comprises two components: (a) loans raised from the market and, small savings and provident funds raised from the public account {the latter being the principal constituent of other liabilities (PAL)} together constituting the public debt of the central government and (b) other components of 'other liabilities' such as reserve funds and other deposits (other than small savings and provident funds) which comprise intergovernmental loans and a minor portion of which is from public. Making a division in the latter component on the basis of loans raised from the public and loans raised from the governmental departments is an arduous task. With a view to getting a clear picture on the components of domestic debt (which one is more vulnerable for the fiscal policy sustainability), the study has made four categories of domestic debt series for the central government out of the above two: (a) market loans and bonds (b) market loans and bonds from consolidated funds plus small savings and provident funds raised from the public account, (c) other components of other liabilities exclusive of small savings and provident funds, (d) total domestic debt which is defined as public debt plus other constituents of other liabilities exclusive of borrowings (ways and means advances and floating loans) from the RBI and (e) total domestic debt exclusive of small savings and borrowings in the form of ways and means advances from the RBI. All the data relating to debt components has been collected from "Long-term fiscal trends in India 1950-51 to 2000-2001: a conspectus", National Institute of Public Finance and Policy (Jan, 2002); and GDP at market prices is collected from National Accounts Statistics of India 1950-51 to 2000-01, Economic and Political Weekly (EPW) Research Foundation.

The ways and means advances from the RBI as a liability component to the central government does not pose much problem for the unsustainability of fiscal policy for the reasons cited above. Further, with the withdrawal of *ad-hoc* treasury bills from the year 1997-98, the volume has come down drastically; rather its substitution can make other components of debt unsustainable. This liability is intra-governmental in nature. To the extent that its volume increases it reduces the real primary deficit as it gives rise to accretion of seigniorage revenue to the government. The important point to keep in mind is that the study has defined (in the preceding Chapter 3 & 4) credit from the RBI to the central government as a constituent of domestic debt of the centre. But there is a division of opinion among the economists in India as to consider the monetization of debt as a component of debt or not. According to some economists, since it gives rise to seigniorage revenue, the inclusion of seigniorage revenue would eliminate this part of debt from the total debt components in the government budget constraint. Following this line of argument, economists view that the increase in monetized debt does not constitute a debt, because many a time government does not return the funds to the central bank as it is a government entity and the government just continues to roll over the debt. This means the government incurs fresh borrowings just for paying off old debts. Hence, this component of domestic debt does not involve any burden on the part of the central government, rather constitutes a part of revenue. Its increase escalates price level, thereby reducing the real value of other debt components. Chelliah (1991), for instance, views that although the government does not return the principal amount, pays the interest burden on it. The interest payment paid to the RBI comes back to the government in the form of dividends. The interest liability arising on RBI's lending to the government gets compensated by the decrease in real value of other components of domestic debt. As such this should not constitute a component of domestic debt of the central government. Thus, the study does not include it as a debt component especially while examining sustainability of debt.

Under the present value of borrowing constraint approach, one needs to consider the appropriate rates of interest as one of the components in the discounting factor in deriving the present value of debt-to-GDP ratio. There are various rates of interest which vary according to the length of their maturity period.

Which rate of interest to be chosen is crucial in assessing sustainability, as the variations in rates of interest may be sensitive to empirical results. Although there are various rates of interest, to minimize the bias, the study has chosen weighted average real market rates of interest, and the average real rates of interest on small savings and provident funds as the two real rates of interest for applying the discounting technique on market debt and on small savings and provident funds respectively. The average of both weighted interest rate on market loans and average rate of interest on small savings is taken to be the rate representing the rate of interest on the sum of market borrowings, small savings and provident funds. But for other components of 'other domestic liabilities' (which is defined as other liabilities exclusive of small savings and provident funds), the study considers the effective rates of interest as the appropriate discounting component in the discounting factor in the context of unavailability of appropriate rates of interest on those components of domestic debt[61]. Economists suggest that the respective rates of interest on government bonds and loans should be considered while discounting different components of debt. Although there are difficulties with the effective rates of interest as they do not take into account the influence of maturity structure on the cost of borrowings, but this is perceived to be a better proxy in the context of unavailability of interest rates on such liabilities. Hence, it is justifiable to discount the other liabilities by the effective rates of interest.[62] To discount the aggregate domestic debt, the same effective rate of interest is also considered for discounting the aggregate domestic debt. Rajaraman et al. (2000) while applying Domar's cross over formula, have also considered the weighted average of interest rate by defining it as the sum of interest payments by the government in each year divided by aggregate value of debt outstanding at the beginning of respective years so as to compare with the growth rate of the economy in each year.

The problem of effective rates of interest arises on account of the fact that it is difficult to collect data on how much interest payment the government incurs in different years rather than what the government actually pays. A government may

[61]Here, we make a distinction between the discounting component and discounting factor. Discounting components include real interest rates and real growth rates while the discounting factor is the formula applied to compute the discounted debt series.

[62]The effective rate of interest is defined as the total interest payment by the central government in period t divided by the total aggregate domestic debt of the central government at the end of the period (t-1).

default in repaying the interest liability on its debt as per maturity. However, the study has considered the rates of interest on respective components of debt along with effective rates of interest on other components of other liabilities exclusive of small savings and provident funds as well as on aggregate domestic debt exclusive of RBI credit since it is difficult to get appropriate rates of interest for discounting these components of debt.

The rates of interest which are used for discounting debt components under the present value budget constraint approach, are also considered for the comparison of rates of interest with the growth rate of economy under the accounting approach to sustainability. The data on rates of interest is collected from various issues of RBI Bulletins and Report on Currency and Finance, Reserve Bank of India (RBI) and the "Handbook of Statistics on the Indian Economy (2004)" published by the RBI. The data on domestic public debt is taken from reports of Ministry of Finance. Let's examine the results under different approaches to sustainability.

5.5 Assessment of Sustainability Under the Accounting Approach

The assessment of sustainability of domestic debt under the accounting approach is examined as follows. The statistics computed under this framework involves a comparison between real rates of interest and the real growth rate of GDP which is presented in Table 5.2. Given the fact that taxable interest earnings of the individuals and commercial banks actually flow back to the government, economists, while assessing sustainability under this approach, usually suggest comparing the net-of-tax real rate of interest with the real growth rate of GDP. If all the interest income denoted by (R) is taxed at the rate of t, then, after-tax, the remaining interest income will be R(1-t). The rate of interest calculated thereon is relevant for comparison with the growth rate of the economy in assessing sustainability. Further, given the limited information on the identity of government security holders and the frequent changes in the tax policy, there is no straightforward method to calculate the real interest rate net-of-taxes on government securities. Obtaining data on net-of-tax yield on government securities is a complex task. For India, it is empirically permissible to ignore the tax rate on

interest earnings since the bulk of interest income is untaxed, and there are schemes under which those who hold their savings in the form of small savings, are not liable to pay taxes on their interest earnings, rather are exempted from income tax. Most of the government bonds are held by commercial banks and other non-banking financial institutions, the bulk of whose interest income are exempted from imposition of taxes (Moorthy et. al, 2000). Therefore, the real rate of interest not accounted for taxes is opted to be the rate to be compared with the real growth rate of the economy under the accounting approach. Since the data relating to the rate of interest on other components of 'other liabilities' excluding small savings (SS) and provident funds (PF), is not available, the effective real rate of interest is considered to represent the rates of interest on other components of 'other liabilities' other than small savings and provident funds' and the same effective rate of interest is taken to represent the rates of interest on total domestic debt of the central government exclusive of borrowings from the central bank. The real rate of interest is computed by subtracting the inflation rate (derived from the rate of growth of GDP deflator) from the nominal rate of interest. With this, a comparison between the rates of interest with the growth rate of the economy is presented in Table 5 2.

Comparison between the growth rate of GDP and rates of interest on different components of debt shows that all the components of domestic debt taken separately, as well as the aggregate domestic debt exclusive of ways and means advances of RBI to the central government, are always sustainable as the real growth rate of GDP exceeds the weighted real rate of interest on market loans, the average real rates of interest on small savings and provident funds and the effective real rates of interest. The growth rate of GDP also exceeds the average of all these three rates of interest which can be taken to represent the rate of interest on the aggregate domestic debt exclusive of the advances from the RBI. But the question that arises here is, in spite of fulfillment of the basic condition of debt sustainability i.e real growth rate of GDP exceeding the real rates of interest, why the debt is found still at a higher level? Perhaps it depicts an unsustainable fiscal position of the central government. This is because of the fact that although the difference between the growth rate of GDP and rate of interest tends to put downward pressure on the past debt-to-GDP ratio, the increase in primary deficit and the

resultant increase in fresh borrowings have forced the domestic debt to be at a higher level. The accumulation of debt has taken place by repressing the rate of interest to a lower level. As a result, this has led to a rise in primary deficit-to-GDP ratio and high level of aggregate domestic debt-to-GDP ratio. This implies that the steady state condition as assumed by this approach does not hold in the context of India. So this indicates that it is the growth rate of debt which is more important for the analysis of sustainability than simply the rates of interest on government borrowings. Under a situation where rate of interest continues to be at a lower level than the growth rate of gdp, and when debt-to-GDP ratio is prevailing at a higher level, a mere comparison of growth rate with the rate of interest does make little sense.

However, it is meaningful to compare the growth rate of the economy with the growth rate of domestic debt. In Table 5.2, it can be observed that if one compares the real growth rates of domestic debt with the real growth rate of the economy, the overall or aggregate real growth rate of debt exceeds the real growth rate of the economy in each period from 1975-80 to 1990-00, except for first half of the 1990s. This indicates that public debt has become unsustainable over a long-run as it is growing up at a higher rate without effective control of the underlying fiscal parameter. For the domestic public debt to be sustainable over the long run, the level of debt-to-GDP ratio requires to be controlled from its steadily increasing path. On the other hand, if one takes a look at the component-wise real growth rates of domestic debt, market debt in the later half of 1990s, becomes more unsustainable and thereby makes the aggregate domestic debt exclusive of debt from the RBI unsustainable, while the growth rate of other liabilities registers a markedly declining trend and is less than the growth rate of real GDP of the economy. This is due to less reliance of the central government on the other liability component of domestic debt. The pressure on market debt increases at the cost of reduction in the ways and means advances of the RBI and other liabilities. The 'other liabilities' exclusive of small savings and provident funds (which are found at a high level from the 1975 till 1995) declines in the latter half of the 1990s. But again, even the growth rate of debt ruling below the growth rate of GDP is not a strong condition for sustainability, because corresponding to the low growth rate of aggregate domestic debt in the early 1990s (see Table 5.2), the debt-to-GDP ratio prevails at a

higher level (see Table 5.1). Rather, the ratio of debt-to-GDP itself could indicate unsustainability of debt, while the growth rate shows the debt to be sustainable. Further, when the total domestic debt–to-GDP ratio declines, the growth rate indicator shows that it becomes unsustainable. Hence, this method of evaluating sustainability also suffers from certain drawbacks.

In order to examine this, one needs to look at both the level of debt-to-GDP ratio as well as its growth rate over time. This can be examined under the present value budget constraint approach. This approach to sustainability puts a stronger condition of debt sustainability on the trend path of level of debt-to-GDP ratio as well as the growth rate of debt. This approach explains that debt to be sustainable discounted debt-to-GDP ratio either should tend toward zero or maintain a constant path over time. Otherwise the ratio would explode over time and make the debt level unsustainable. The approach, on the assumption of a given current trend path of fiscal variables, examines the future course of fiscal policy (to be sustainable or unsustainable).

Table 5.2: Assessment of Sustainability Through Accounting Approach

(5 Yearly Averages)

Years	Growth rate of RGDP at MP	Growth rate of real market debt	Growth rate of real market debt & SS+PF	Growth rate of real other liabilities exclusive of SS & PF	Growth rate of real SS & PF	Growth rate of real market debt plus aggregate other liabilities	Real primary deficit /RGDP (%)	Real weighted market rates of interest	Real average rates on SS & PF	Real effective interest rates
1961-65	4.81	-0.04	1.15	0.00	2.72	1.15	2.86	-1.76	-1.63	-2.36
1965-70	2.79	-1.90	-2.91	22.77	-4.62	-0.44	1.25	-2.87	-2.86	-3.30
1970-75	2.05	-1.93	-0.76	8.97	0.77	1.28	1.90	-5.09	-5.62	-6.00
1975-80	3.34	8.82	7.93	-61.81	6.72	8.04	2.69	0.77	1.38	0.39
1980-85	5.27	10.97	9.76	8.91	7.54	9.69	4.01	-0.77	-0.83	-2.60
1985-90	5.81	11.14	10.90	13.96	8.58	11.78	4.66	3.36	2.06	-0.40
1990-95	4.62	3.70	4.01	4.52	4.42	4.17	2.17	1.59	1.19	-1.47
1995-00	6.08	14.92	10.11	2.63	-39.42	8.45	1.14	5.76	5.32	3.22

Note: SS and PF represent small savings and provident funds respectively, and RGDP indicates real GDP. Market debt comprises loans and bonds from the market. All the numerical values in the above table are in real terms.
Source: The statistics in the above table are computed by using the data from 'Long Term Fiscal Trends in India 1950-51-to 2000-2001: A Conspectus', NIPFP (2002) and Handbook of Statistics on the Indian Economy (2003-04), and Various Issues of RBI Bulletins and Reports on Currency & Finance, RBI.

On the basis of accounting approach to debt sustainability, many economists such as Gupta (1992) and Moorthy et al. (2000), generalize that public debt is sustainable as the rate of growth of the economy exceeds the rate of interest on public debt, but as it is observed from the above data, this criterion has got limited

relevance in the Indian context as it assumes that debt grows at the rate of interest rates. Further, it does not recognize the fact that it is the growth rate of debt which keeps the debt level at a higher level than the rate of interest as long as the growth rate of debt exceeds the rate of interest on public debt. The growth rate of public debt, *ceteris paribus,* changes in accordance with fresh creation and repayment of debts. Further, it is not only the growth rate of debt but also the level at which grows is important. The argument against the application of this condition of debt sustainability is that keeping the rate of interest artificially at a lower level, the government goes on accumulating more and more borrowings under the controlled interest rate regime. This also holds true under a market determined financial regime, as the rate of interest does not increase rather falls in certain years. In this context, the level of higher borrowing itself may indicate an unsustainable fiscal position rather than a mere comparison of rate of interest with the growth rate of the economy. Nevertheless, this serves as a basic criterion in the context of the rate of interest being higher than the growth rate of the economy. Furthermore, there are varied rates of interest which vary according to the maturity structure of debt. But due to the complexities involved in getting the data on various rates of interest (based on their maturity structure), it makes the comparison more tedious. For this reason the simpler procedure economists adopt is to look at the market rates of interest with the growth rate of the economy without taking into consideration the maturity structure of public debt. Under this situation, it makes more sense to make a comparison between the growth rate of debt and the growth rate of the economy as the growth rate of debt is supposed to take care of the rate of interest on public debt irrespective of its maturity structure. Further, both the conditions avoid giving a complete indication on debt sustainability. These criteria obscure the present stance of fiscal policy. The comparison between the growth rate of debt with growth rate of the economy as observed does not take into account the level of debt. The rates of interest and the growth rate of debt may be below the growth rate of the economy but it is the level of debt ultimately, which matters most for the sustenance of fiscal policy. Therefore, there is no doubt that the comparison of growth rate of the economy with rate of interest and the growth rate of debt, over time, can serve as a basic conditions of debt sustainability, but an alternative method devised in the literature called the present value budget constraint approach puts a strong condition of debt sustainability by putting constraint on the

trends of present value of public debt. Although it is not an easy task to develop a strong condition of debt sustainability, it is meaningful to assess sustainability by considering a relatively stronger condition of sustainability than the stability condition under the accounting approach. On this basis, solvency or transversality/intertemporal condition under PVBC approach does deserve some merit. As the condition under this approach is clearly laid down in the analytical framework, let us examine the empirical results under this approach.

5.6 Assessment of Sustainability Under the Present Value of Budget Constraint (PVBC) Approach: An Application of Time Series Econometric Method

In order to examine sustainability of domestic debt, standard econometric tool is applied under the present value budget constraint approach (PVBC). As already explained, the present value budget constraint explains that domestic debt of the central government would be sustainable provided the current outstanding level of debt is equal to the present value of primary surpluses in the future. This means if primary surpluses can be generated to an equivalent amount of current value of stock of government debt, the debt and the fiscal policy are said to be sustainable.[63] Alternatively, the condition implies that the primary surpluses would accrue to the government for ensuring sustainability provided the present value of public debt in the future can tend toward zero or remain constant over an infinite period of time. This is called stability condition under the present value budget constraint approach. This is the case when $\lim_{N\to\infty} B_{t+N} = 0$ in the equation (12). The approach enables one to know whether the current policy of the government is in line with a sustainable fiscal policy.

To assess the sustainability of domestic debt of the central government, the study along with examining different components of discounted value of domestic debt, examines the discounted value of aggregate domestic debt of the central government exclusive of RBI' ways and means advances to the central government in relation to the GDP. The series include discounted value of (a) market debt, (b)

[63]Primary balance could act as insurance against future unpredictable shocks. An adequate primary surplus would facilitate attaining a virtuous circle of debt reduction, lower interest rates, higher investment and growth. Growth is crucial for the sustainability of public debt (The World Bank, 2004).

market borrowings plus small savings and provident funds, (c) other liabilities other than small savings and provident funds, and (d) total domestic debt of the central government exclusive of RBI's ways and means advances to the central government, in relation to the level of GDP.

The real rate of interest and growth rates actually experienced in the economy over the years has been considered for discounting the real value of debt-to-real gross domestic product (RGDP) series. This provides computed present value of real domestic debt-to-RGDP ratio. The discounting technique adopted is in line with the one proposed by Wilcox (1989). This is also inherent in the intertemporal budget constraint equation presented above. The discounting technique can explicitly be expressed in the following form.

Let $\alpha_t \equiv (r_t - \eta_t)$ and rewriting equation (7) we get (13):

$$b_t = -s_t + (1 + \alpha_{t-1})b_{t-1} \qquad (13)$$

Define $Q_t = \prod_{j=0}^{N-1}(1+\alpha_j)^{-1}; Q_0 = 1$. Multiplying equation (13) throughout by Q_t gives:

$$Q_t b_t = Q_{t-1} b_{t-1} - Q_t s_t \qquad (14)$$

Let B_t be the discounted value of the domestic public debt and S_t the discounted value of primary surpluses. Then (14) can be expressed as in (15):

$$B_t = B_{t-1} - S_t \qquad (15)$$

The budget constraint now involves the market value of the government debt, which is expressed in terms of its present value. Equation (15) implies that the change in the discounted value of the debt equals the discounted value of the non-interest deficit. Applying the recursive forward substitution into equation (15) and applying the limit as N tends to infinite, it yields the previous equation (12) as in (16).

$$B_t = \lim_{N \to \infty} E_t B_{t+N} + E_t \sum_{j=1}^{N} S_{t+j} \qquad (16)$$

As mentioned above, a sustainable level of debt is defined as a level of real value of government debt as a ratio to RGDP backed by future real primary surpluses to

RGDP ratio of equal present value, $B_t = E_t \sum_{j=1}^{N} S_{t+j}$. Alternatively, according to equation (16), the $\lim_{N\to\infty} B_{t+N}$ must be zero. Buiter and Patel (1997) and Uctum and Wickens (1996) show that the condition $\lim_{N\to\infty} B_{t+N} = 0$ is equivalent to the proposition that B_t follows a stationary path. Testing for the unconditional-mean stationarity of the discounted debt series does not exclude the case where the government is accumulating primary surpluses causing the debt to fall. Therefore, the study, in order to gauge sustainabilityof debt in India, adopts the standard econometric techniques of unit root test to detect stationarity of the series.

In order to test the stationarity of debt series, at first, three conventional unit root tests viz. Dickey-Fuller (DF), the Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) have been applied. Though Dickey-fuller test is applied first, the main advantage of using Augmented Dickey–Fuller test later over the Dickey-Fuller test is that the inclusion of higher order lagged variables in the estimation avoids the problem of serial correlation of the disturbance term in the regression. Dickey and Fuller (1979) suggested that the following equation could be estimated by Ordinary Least Square (OLS) to test the presence of a unit root in a series. Let the series be indicated by the term B_t. Thus, the estimable equation under the DF test can be written in the following form assuming that the second term in the right hand side is zero.

$$\Delta B_t = \gamma_0 B_{t-1} + \sum_{j=1}^{p} \gamma_j \Delta B_{t-j} + \xi_t$$

The Dickey-Fuller (DF) test for unit root consists of testing whether coefficient on B_{t-1} is zero. Under the null $H_0 : \gamma_0 = (\rho - 1) = 0$, the series B_t contains a unit root and therefore is non-stationary. Under the alternative $H_1 : \gamma_0 < 0$, the series is stationary. The Augmented Dickey-Fuller (ADF) test can be performed on the same equation only by adding the lagged differenced terms of the same series i.e. by relaxing the assumption that the second lagged term in the right hand side of the equation is zero. The number of lagged differenced terms of a series is added until the autocorrelation problem gets corrected in the estimation. The lag is determined by AIC criterion. Along with employing Augmented Dickey-Fuller unit root test, Phillips-Perron (PP)'s unit root test is also conducted on the same ADF equation.

The PP test corrects the autocorrelation and heteroscedasticity by correcting the t-statistic of the covariance of error terms in the estimated regression and t-statistics of B_{t-1} term (see Eviews 4.0 package). As a confirmatory test, Kwiatkowski, Phillips, Schmidt and Shin (1992) unit root test which is popularly known as KPSS test is also carried out. The null of KPSS test is stationarity as opposed to the non-stationarity of all the standard testing procedures mentioned.[64]

5.7 Empirical Result:

The estimation is carried out using Dickey-Fuller (DF), Augmented Dickey-Fuller (ADF) and Phillps-Perron (PP) tests allowing for two variations: one without trend and the other with trend. Using the P-value provided by Dickey-Fuller's (1979) significance table, the study evaluates the null hypothesis of unit root. If the null hypothesis is rejected, domestic public debt is sustainable otherwise it is unsustainable.

The unit root tests such as DF (1979), ADF and PP (1988) tests carried out on the discounted value of real market debt to RGDP (RMB), discounted value of real market debt plus small savings and provident funds-to-RGDP ratio (RMBSPF)[65], discounted value of real market borrowings and provident funds-to-RGDP ratio (MRBPF)[66], discounted value of real total domestic debt exclusive of small savings and ways and means advance of RBI-to-RGDP ratio (denoted as RMBOLEXSS), discounted value of real other liabilities other than SS and PF-to-RGDP ratio (denoted as RMBOLEXSPF) and discounted value of real total domestic debt-to-

---

[64]The KPSS unit root test is based on the assumption that a time series y_t is the sum of a deterministic trend t, a random walk r_t and a stationary error e_t: $y_t = x_t + r_t + e_t$. The random walk is $r_t = r_{t-1} + u_t$ where u_t are iid $(0,\sigma^2_u)$. In this framework, for the null hypothesis that y_t is trend stationary to be true, the variance of the random walk component, σ^2_u, should be equal to zero. Testing of the null hypothesis that y_t is stationary around a level, is carried out by omitting the time trend. The test statistic is defined as:

$\eta = T^2 \sum_{t=1}^{T} S^2_t / s^2(l)$, where T is the sample size, S_t is the sum of the residuals when the series is regressed on an intercept and a time trend, and $s^2(l)$ is a consistent non-parametric estimate of the long-run variance of the error term. Critical values for the KPSS test, n, without a trend (η_μ) or with a trend (η_τ) are found in Kwiatkowski et al. (1992). We calculate the KPSS test statistics using a number of 3 lags, l, in the estimation of the long-run variance of residuals, on the basis of the Kwiatkowski et al. (1992, page 174) criterion of choosing l at the value at which the test statistic settles down.

[65]The small savings (SS) and provident funds (PF) are clubbed with market debt as there is a drastic reduction in reliance on small savings and public provident funds of the central government in 1999-00. Otherwise, it wouldn't make sense to apply unit root test on small savings and provident funds.

[66]This excludes small savings because the state governments account for a major portion of this fund from the centre and are statutorily required to return this amount to the central government with the interest charges thereon.

RGDP ratio (denoted as RMBOL which is exclusive of ways and means advances of RBI to the central government) are reported in Table 5.3.

The tests clearly indicate that there is presence of unit roots in all the series. The result shows that the statistics of coefficients of all the discounted real value of debt-to-RGDP series are positive. This implies that autoregressive coefficient $\delta=(\rho-1)$ is positive with all debt series. A positive δ implies that ρ is greater than one. This implies that all the debt series including aggregate domestic debt are explosive. They are not converging to their mean value. The usual testing of null hypothesis under the critical value is not applicable. The positive sign of statistics provides sufficient proof that the debt series are non-stationary and therefore all the components of domestic debt including the aggregate domestic debt exclusive of debt from RBI have become unsustainable. [67]

Table 5.3: Unit Root Test Results on Various Components of Discounted Value of Real Domestic Debt of the Central Government to RGDP Series

Real Debt-to-RGDP Variables	Without Trend		
	DF	ADF	PP
RMB	3.80	2.79(1)	3.67(1)
RMBSPF	4.91	3.25(1)	4.66(1)
RMBPF	3.66	2.68(1)	3.53(1)
RMBOL	5.75	3.42(1)	5.40(1)
RMBOLEXSS	4.58	3.49(1)	4.57(1)
ROLEXSSPF	2.74	1.53(1)	2.38(1)

Note: *The figures in the table are the computed ADF statistics. The comparison between computed statistics and tabulated critical values are not relevant here. The positive statistics provides ample evidence of explosive behaviour of all the discounted real debt-to-RGDP ratio series. The figures in parentheses under ADF column represent the number of lagged differenced term included with the DF regression while under PP column it represents the truncation lag. The lag for the ADF test is determined on the basis of Akaike Information Criterion (AIC). The exclusion of constant and trend term is determined on the basis of t-statistics according to their conventional significance level.*

In order to confirm the above results, the Kwiatkowski, Phillips, Schmidt and Shin (KPSS) unit root test is further employed. The results presented in Table 5.4 show that with a truncation lag of 3, the test rejects the null hypothesis of stationarity in all of the cases as the calculated statistics exceeds the critical

[67] The aggregate domestic debt exclusive of the borrowings from RBI, discounted with respect to the average of all three interest rates weighted average rate of interest on market debt, average rates of interest on small savings and provident funds, and effective rates of interest on other components of other liabilities also yielded the presence of unit root in the series.

values.[68] This strengthens the previous results obtained by using DF, ADF and PP tests without the inclusion of trend in the estimating regression equation. This confirms that none of the components of domestic debt are stationary when tests are carried out with or without the inclusion of trend in KPSS test.

Table 5.4: KPSS Unit Root Test for Different Components of Discounted Real Domestic Debt/RGDP Series

Real Debt-to-RGDP Variables	Lags	ETA (mu)	ETA (Tau)
RMB	3	1.035	0.256
RMBSPF	3	1.031	0.256
RMBPF	3	1.037	0.251
RMBOL	3	1.012	0.270
RMBOLEXSS	3	1.019	0.271
ROLEXSSPF	3	0.975	0.253

Note: The critical values at 5% level of significance are .463 for ETA (mu) and .146 for ETA (tau).

The overall result from the above unit root tests suggests that none of the components in the aggregate domestic debt excluding government borrowings from the Reserve Bank of India (RBI), and the aggregate domestic debt exclusive of the borrowings from RBI is stationary implying the unsustainability of domestic public debt and hence unsustainability of fiscal policy of the central government in India.

5.8 An Evaluation of Targets of FRBM Bill: An Arithmetic Calibration of Domestic Debt Stability

This section calibrates a stability condition of debt in line with Domar's formula in order to verify the consistency of fiscal targets with the economic growth rate of India. The application of the stability condition suggests that the following (see Annexure 5.1) would hold in India. Assuming that there is no money-financing of deficits as monetised deficit (m) is abolished, the following possibilities shown in Table 5.5 may hold for the central government in India. Assuming a nominal growth rate of the economy (η) at 16 per cent, in the event of the domestic debt-to-GDP (b) stabilising at 45 per cent, the fiscal deficit would shoot up to the extent of 7.2 per cent of GDP. With the same 16 per cent nominal growth rate, debt-to-GDP ratio can get stabilized at 50 per cent, while the deficit-to-GDP ratio (d) would tend to 8

[68]For lower values of truncation lag, the test has good power even for small samples.

per cent. But this target would be unsustainable for India as evidenced from the above empirical test.

The debt-to-GDP ratio would get stabilized at 45 per cent even with a deficit limit of 2 per cent of GDP as per the target set in FRBM bill, but the nominal growth rate would tend to prevail at 4.44 per cent (see Table 5.5). Similarly, with a fiscal deficit of 3 per cent of GDP, debt-to-GDP in order to get stabilized at 50 per cent, the nominal growth rate would tend to attain 6 per cent. This implies that given a higher level of debt-to-GDP ratio, the target for lowering the fiscal deficit-to-GDP ratio could be achieved at the cost of the growth rate of the economy.

The growth rate of 16 per cent could also be consistent with a deficit-to-GDP ratio of 2 per cent and debt-to-GDP ratio of 12.5 per cent. The same rate of growth of 16 per cent could also be achieved when the debt-to-GDP ratio would stabilize at 50 per cent with a deficit to GDP ratio of 3 per cent. This implies 16 per cent rate of growth in the economy could be achieved by reducing aggregate government debt as well as deficits, both as a percentage to GDP.

Table 5:5 Stability of Domestic Debt Consistent with Different Growth Rates and Fiscal Indicators of the Economy

b=B/Y	$\eta=\Delta Y/Y$	d=D/Y
45	16	7.2
50	16	8
45	4.44	2
50	6	3
45	10	4.5
50	10	5
45	18	8.1
50	18	9
12.5	16	2
18.75	16	3
11.11	18	2
16.67	18	3

If deficit-to-GDP ratio can be contained at 3 per cent, then with a growth rate of 18 per cent, the debt-to-GDP ratio would get down to as low as 16.67 per cent. With the same rate of growth of 18 per cent, debt-to-GDP would come down to 11.11 per cent if the deficit-to-GDP ratio is brought down to 2 per cent of GDP. This reflects various possible targets of fiscal policy which are compatible with different GDP growth rates. In accordance with the expansion and contraction of GDP growth rates, the flexibility and pressure of fiscal restraints are realized in the economy. Given a higher growth rate of the economy, debt can be stabilized at a lower level in proportion to GDP. Thus, the performance of the economy greatly determines the feasible targets of the fiscal policy. Given the above scenario, it seems that the FRBMB is inconsistent in setting its targets.

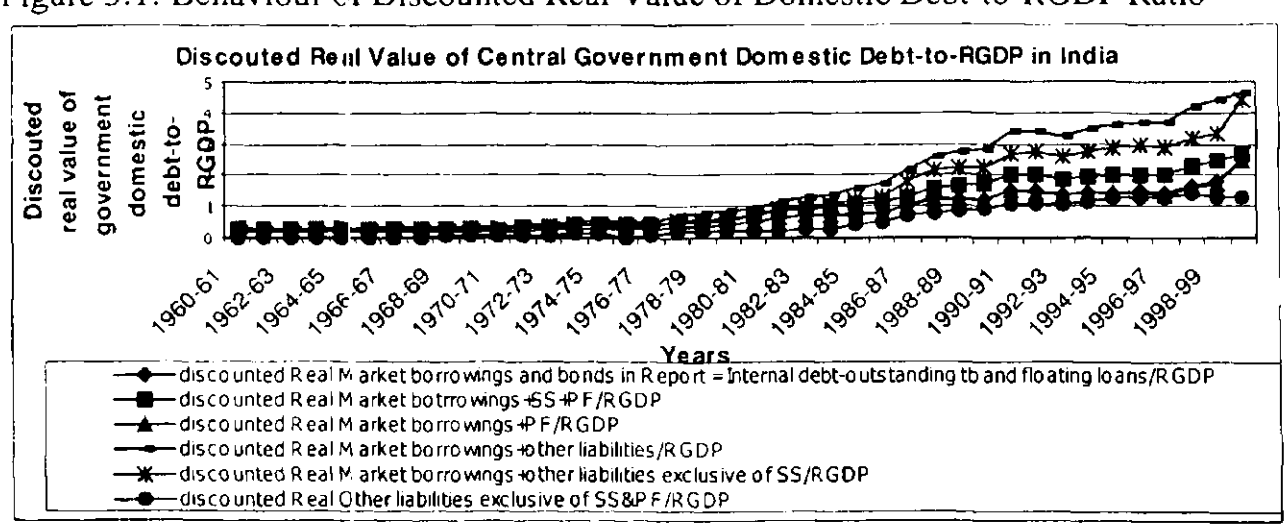
5.9 Summary and Conclusion

To sum up, examination of sustainability of domestic debt through the accounting approach suggests that all the components of domestic debt as well as the aggregate domestic debt of the central government exclusive of borrowings from RBI are sustainable. In contrast to results under accounting approach, an econometric application under present value budget constraint (PVBC) approach presents opposite results. The standard unit root tests for evaluating sustainability under the PVBC approach suggest that none of the components of domestic debt including aggregate domestic debt of the central government exclusive of borrowings from RBI is sustainable. The results confirm the findings of Buiter and Patel (1992) and Rajaraman et. al. (2000). Hence, the results reinforce the evidence that aggregate domestic debt is unsustainable.

The results differ under different approaches depending upon whether it is accounting approach or PVBC approach. This may put one in a little dilemma as to assess the sustainability of domestic debt of the central government and the sustainability of fiscal policy in India. Since the present value budget constraint approach takes into account the level of debt as well as the growth rates of domestic debt into account in assessing sustainability, this seems to be a more convincing and stronger approach than the accounting approach. On the basis of present value borrowing constraint approach to debt sustainability, the study concludes that the aggregate domestic debt is unsustainable in India and the

government has to be very cautious in exercising its fiscal policies in the future. If the government continuously breaches the intertemporal budget constraint, it would face a catastrophic situation in the future. The study suggests that it is the pattern of fiscal deficits that the government has to worry about. The pattern has resulted in increase in the overall government debt-to-GDP ratio and interest payment-to-GDP ratio over the decades. The study does not suggest compromising on the total expenditure of the government or raising tax rates excessively to achieve fiscal policy sustainability, but what the government needs to do is that it has to allocate the resources to productive channels which would give rise to desirable returns for meeting desirable expenditure. Expenditure on productive lines would not only give rise to direct returns but also expand the GDP of the economy. An increased GDP can raise the revenue of the government in the form of more taxes as with a rise in GDP of the economy, the tax base of the economy would expand. This would help the government manage its fiscal policy in a more flexible economic environment. However, the stability calibration shows that the central government does not have to worry about the stability of fiscal policy, provided the growth rate is maintained at a higher level. The aggregate public debt to be sustainable, the government has to drastically reduce the deficits and debt level, which in turn may lead to higher growth rate in the economy. India should not aim at expenditure compression but rather should concentrate on expenditure management to ensure that there is reduction in obligatory expenditure and that there is a rise in productive expenditure. The productive investment of government expenditures can achieve higher growth rate target in the economy.

Figure 5.1: Behaviour of Discounted Real Value of Domestic Debt-to-RGDP Ratio



Annexure-5.1 Arithmetic of Debt Stability

$D = E - R = \Delta B + \Delta M$ and, $D = \Delta B$ \because when $\Delta M = 0$;

$B = B/Y$, $B = b.Y$

$\Delta B = b.\Delta Y + Y.\Delta b$

Dividing Y throughout the above equation, it would yield;

$\Delta B/Y = b.\Delta Y/Y + Y/Y.\Delta b$

$\Delta B/Y = b.\eta + \Delta b$

$\Delta B/Y = D/Y = d$; $\Delta B = D$; $\Delta b = d - b.\eta$

Debt-to-GDP ratio (d) would get stabilized, when $\Delta b = 0$. This is possible when $d = b.\eta$

This implies that when debt-to-GDP ratio (b) gets stabilized at certain level, deficit (D) would tend to the extent of growth rate (η) times the debt-to-GDP ratio of the economy. In order to reduce the level of debt-to-GDP ratio, the growth rate of economy needs to be improved.

Chapter 6

Macro-Economic Impact of Domestic Public Debt on Private Consumption in India

The analysis of private consumption decision is crucial as it influences growth rate of the economy in the long-run and aggregate demand in the short-run (Mankiw, 1997). In any economy, consumption forms one of the principal components of aggregate demand. Consumption influences savings and investment and therefore, the growth rate of an economy. There are various theoretical and empirical contributions that examine the determinants of private consumption demand. In all these, though income appears to be the key determinant of private consumption demand, divergent views have been offered as to how the increase in income affects private consumption. Various theories have been propounded based on absolute, relative, permanent and life-cycle income hypotheses and accordingly, various forms of income viz. current, future, absolute, relative, permanent and temporary, expected and unexpected (or anticipated and unanticipated) are assumed to affect household consumption. Keynes (1936) postulated that individuals, on an average, increase their consumption as their income increases, but not as much as the increase in their income. This implies that as income increases, people tend to spend a decreasing proportion of their income.

Fisher's theory of consumption is based on the idea that individuals make intertemporal choice while making their consumption-saving decisions. Usually, consumers face a constraint as to how much to spend on present consumption, taking into account their current and future income flows which constitute their **budget constraint**. Consumers can allocate their income stream by borrowing and lending, but the present value of consumption is limited by the present value of income.[69] When the trade off between present consumption and future savings takes place, individuals face **intertemporal budget constraint**. Higher interest

[69]The ability to borrow allows current consumption to exceed the level warranted by current income alone. In essence, when a consumer borrows, he consumes out of his future income t present. The amount a consumer can borrow is limited. Thus the consumer faces an additional constraint in his current period consumption. The additional constraint is called as borrowing constraint or liquidity constraint (Mankiw, 1997).

rate reduces first period consumption while raising second period consumption, depending on income and substitution effect of interest rate on individual's consumption. Similar inference is drawn in Hall's (1978) intertemporal consumption function. Modigliani proposed a model of consumption based on Fisher's assumption. The assumption is that an individual's consumption depends on his/her life-time income and if the individual receives any bequest, he/she passes equal amount of it on to the subsequent generation (Branson, 1994). He emphasized that income varies systematically over people's lives and that savings allow consumers to move income from those times in life when income is high to those times when it is low. This forms the basis of his life-cycle income hypothesis.

Friedman (1957) proposed a permanent income hypothesis to explain consumer behaviour. Unlike life-cycle hypothesis, which emphasizes that income follows a regular pattern over an individual's lifetime, permanent-income hypothesis emphasizes that people experience random and temporary fluctuations in their income flow from year to year. The hypothesis suggests that current income is the sum of permanent and transitory components. Permanent income is that part of income which persists into the future (the average income), and transitory income is the random deviation from that average. Friedman explains that consumption should primarily depend on permanent income, because consumers use savings and borrowings to smoothen their consumption in response to transitory changes in income. In the long-run, one should observe a constant average propensity to consume (Mankiw, 1997). This hypothesis also implicitly assumes that consumption responds to permanent changes in fiscal policy.

In the above theories of consumption, life-cycle and permanent income approaches to consumption are the most important ones as they are closer to the observation of the real world. Despite differences in terms of their approach to the determination of private consumption, they are based on similar assumptions. They assume rational behaviour of the consumer in their consumption decision and postulate that individuals maximize consumption subject to their life-time budget constraint. Income and wealth are two important constituents of individual's life-time budget constraint.

From the above discussion, it can be observed that private consumption depends on income and wealth/assets or net worth.[70] Besides income and wealth exclusive of government debt, the actions of fiscal policy, *inter alia,* in the process, plays a greater role in influencing private consumption-saving decisions. Although the effect of fiscal policy on private consumption does not find explicit mention in the above theories, almost all the studies point out that expansionary fiscal policy induces private consumption while contractionary policy adversely affects it. It can be seen from readings on macroeconomics that Keynes attached central importance to the role of fiscal policy in the management of aggregate demand, but in the empirical models of private consumption the role of income gets highlighted while the role of fiscal policy is assumed to be implicit. In recent studies, empirical testing has been carried out keeping in view the fact that while taking intertemporal decision on their future income and savings, individuals save a part of their income either in the form of bank deposits or government bonds. When government finances its deficits through borrowings from the private sector, it imposes taxes later. The action of fiscal policy leads to change in private consumption behaviour depending on the perception of private sector on the change in their net wealth position.

The effect of public debt as a fiscal policy instrument on the key macroeconomic activities, for instance, private consumption is manifested in several directions. Public debt can directly affect private sector consumption when it results in the absorption of financial and real resources and thus curtailing resources for private sector. Alternative way of looking at the impact of domestic public debt on private consumption is its indirect impact through the intermediary channels. Public debt affects the intermediary variables such as interest rates and price level and thereby, impacting private consumption, savings, investment and output. Considering the rates of interest as an intermediary variable, a rise in real interest rates associated with higher public sector borrowing requirements, can tend to crowd out private sector consumption. When rate of interest rules at a higher level, people save in the present and postpone their consumption in order to take

[70]The level of consumption depends on household current and expected future income stream, plus their stock of wealth. Wealth affects private consumption via two main channels. First, households can sell assets to finance consumption. Second, households can borrow against their wealth, which would allow them to raise their

advantage of higher interest income in the future and vice-versa as hypothesized in Modigliani's life-cycle consumption model and Hall's (1978) analysis of intertemporal choice in private consumption model.

Many of the developing countries, including India passed through repressed financial regime for a long period of time, almost until the early 1990s. During such a repressed interest rate regime, the prevailing official interest rate may not have reflected the actual price of money. It is this actual price of money or the opportunity cost of postponing consumption that has an effect on private consumption. Public debt affects the price of money (i.e. real interest rate) and thereby affecting private consumption, saving, investment, and output. But in a repressed interest rate regime, interest rate may have a direct impact on the intertemporal decision of consumers rather than being influenced by public debt and thereby impacting private sector consumption demand.

It is to be noted that when public debt appears as a key determinant of private consumption, the impact of private consumption on economic growth partially depends on how much change in aggregate consumption demand is brought about by a change in domestic public debt. Public sector deficits are said to cause excessive expansion of aggregate demand, leading to current account deficits and inflation, as well as absorption of domestic savings and displacement of private sector investment, thereby inhibiting growth (Haque & Montiel, 1989; Dalamagas, 1995; Wijnbergen et. al., 1992). Further, it is to be emphasised that demand factor is important as it influences policy making in developing countries in terms of maintaining stabilization and determining the growth rate of the economy. In order to know the impact of fiscal variables on consumption demand, this chapter focuses on the relationship between private sector consumption demand and government debt along with the role of other key relevant macro variables. The impact of debt-financed central government expenditure on private consumption is examined in terms of the direction of wealth effect of government domestic public debt.[71] The

spending. Their ability to borrow, however depends importantly on the development of financial markets; with deeper markets allow households greater access to funds for borrowing from the credit market (IMF, April, 2002)

[71]Direction of wealth impact of public debt refers to public debt which may have positive or negative influence on private consumption. When it has positive influence, it indicates net wealth impact of debt, and when it has no influence, it indicates neutral impact and when it has negative influence, it indicates the opposite (to net wealth impact) i.e. public debt may be considered as a liability by private sector.

role of prices and interest rates are assumed to be either implicit or secondary in determining private consumption demand in the model estimation.

6.1 Theoretical Relationship Between Domestic Public Debt and Private Consumption

There are several arguments raised in the economic theory relating to the impact of public debt on private consumption. The effect of public debt on the real economic activities is not definite either in economic theory or statistical evidence (Seater, 1993). Perhaps no issue has generated as much controversy among the economists in the past decade as the proposition that an increase in the government debt leads to an equally offsetting increase in private savings, leaving private consumption expenditure unchanged. Regarding the effect of public debt, Keynesian theory is considered as one of the most well-known and popular theories in the macro-economic literature. It views that during a slump, an increase in debt-financed public expenditure stimulates economic activities. It stimulates aggregate demand as it initially generates income for the individuals. It promotes private consumption and savings by increasing disposable income of the households resulting from a debt-financed (even from a money-financed) expansionary government activity. Along the line of classical theory, Keynesian theory argues that debt-financed public expenditure after reaching an optimum level, (with any further increase in public debt) competes with private demand for a given pool of available funds, and drives up interest rates and lowers private investment. Low investment reduces output and aggregate income. The impact of debt-financing, therefore, is a reduction in private consumption. It can have direct impact on private consumption if a greater proportion of consumers face liquidity constraint. In particular, there is a possibility of public debt crowding out private consumption and thereby producing detrimental impact on aggregate demand and hampering the long-term growth potential of the economy through its effect on the working of multiplier process. However, for a developing country where resources are underutilized, debt-financed public expenditure is likely to have positive impact on private consumption, as it would lead to increase in private investment and expansion of output and income. The sensitivity of private consumption depends on how public debt is spent - whether a large proportion is spent on consumption or investment goods. Increased

government consumption crowds out private consumption while government investment may not impact private consumption (Kormendi, 1983).

Besides the above explanation, there are two competing theoretical positions relating to the net wealth impact of public debt. According to Keynesian analysis, public debt may raise the net wealth position of the individuals. As wealth positively affects private consumption, the increase in debt-financed public expenditure may raise the level of private consumption demand. This is based on the assumption that possession of large government bonds by the individuals makes them feel richer.[72]

In contrast to the Keynesian line of reasoning, Modigliani (1961) critically argues that in a full-employment model, there is no reason why the government expenditure should adversely affect the private consumption demand. An increase in government debt implies an increase in household's perceived wealth; hence, an increase in desired consumption relative to savings. However, this line of reasoning depends on the assumption that an increase in debt leads to an increase in household's perceived wealth. In the context of an under employment equilibrium economy, it also holds true that the effect of public debt on aggregate demand, output and employment hinges on the assumed increase in household perceived wealth. According to Diamond (1965) the presence of internal public debt implies taxes on the individuals. Taxes directly reduce available lifetime consumption of individual taxpayers. However, Diamond does not provide a clear cut answer as to the net impact of debt-financed public expenditure on private consumption and other economic activities.

Subsequently, recognizing the relevance of David Ricardo's treatment of deficit and taxes, Patinkin (1965) and Bailey (1962) argue that the future tax liabilities needed for financing government debt and interest payments would imply an offset for the direct positive wealth impact of debt. Bailey (1962) argues that it is possible that households regard deficit financing as equivalent to the increase in taxes. Issue of bonds by the government for financing its expenditures at the

[72]Usually, it is viewed that government bonds, liquid money, equity, housing stocks held by the private sector are considered as important constituents of private sector total wealth (Faulkner-MacDonagh & Mühleisen (2004).

current period involves a liability on future interest payment and ultimate repayment of principal, and thus implying imposition of taxes. If this is foreseen by the individuals, the behaviour of the community would be exactly the same as the balanced budget. Bailey (1962) contends that there is a possibility of households internalising the future taxes in their budget constraint, which mainly arises on account of issuance of current public debt. Thereby, it renders the government financial decision irrelevant to private consumption and output. He compares public consumption spending with private consumption spending. When households regard public consumption spending as a perfect substitute for their private consumption spending, a rise in government consumption spending induces an *ex-ante* decrease in private consumption, such that the net effect of public spending is nil. Thus, fiscal policy is seen as having no effect on aggregate demand.

Further, there are arguments to defend the position that the offset of future tax liabilities will be only partial. One argument is based on finite lives. It presumes that the relevant horizon for future taxes will be shorter than for the interest payments. Thus, a stream of equal values for interest payments and taxes will have a net positive present value (Thompson, 1967). Mundell (1971) emphasises that if the discount rate for tax liabilities are higher than that for the interest payments, then even with a longer horizon for tax liabilities, a stream of equal values for interest payments and taxes will have net positive present values. This implies that bonds are considered net wealth when individuals discount the associated future tax liabilities at an interest rate higher than the rate on government bonds.

In contrast to the Keynesian position that there is a wealth impact of public debt-financing, Barro (1974), the New Classical economist, argues from the perspective of neutral impact of debt-financing[73] originally propounded by Ricardo (1951). Barro (1974) revives this as Ricardian Equivalence proposition. He puts this proposition on a similar footing as argued by Baily (1962). As explained in Chapter 2, the proposition suggests that under the assumptions of the presence of an infinite horizon of the individuals, presence of perfect capital market and prevalence

---

[73]Neutralist effect of debt financing as implied by the Ricardian equivalence proposition tells that bond-financed public expenditure does not result in any net economic effect. If it produces any effect in the current period it will get compensated for in the later period, so the net effect will be nil.

of lump-sum taxes, the debt-financed government expenditure has none of the economic effects. Public debt implies future taxes with a present value equal to the value of public debt. The rational agents recognizing this equivalence proceed as if the debt did not exist. As economic effects mostly depend on the changes in behaviour of economic agents and that New Classicals assume that agents behave in a similar rational manner throughout their lifetime irrespective of alternative ways of financing the government deficits, there is no change in economic activities.[74]

Taking into account the net wealth effect of government debt, Barro (1974) explains that the analysis of effects of public debt on aggregate economic activities hinges on the assumption whether people perceive government bonds as net wealth or not. Government bonds are perceived as net wealth only if their value exceeds the capitalized value of the implied stream of future tax liabilities. In an overlapping generation model, finite lives are connected to future generations by a chain of operative intergenerational transfers. The essence of Barro's argument is that inclusion of a bequest motive effectively converts a finite horizon into an infinite horizon. In considering an overlapping generation model, (so long as there is an operative intergenerational transfer), there would be no net-wealth effect. Hence government debt has no effect on aggregate demand or interest rates. In the infinite horizon optimization model, capital accumulation and individuals' consumption decision are totally unaffected by the differences in the timing of taxes and debt.

However, the contention of Barro regarding the neutral impact of public debt has not remained unchallenged. Seater (1993) and others have later criticized the assumptions of Ricardian equivalence proposition. They challenge the neutrality effect of public debt on the ground that some individuals do not have a bequest motive and that there is also non-existence of perfect capital market in most of the economies. Bequest motive depends on a number of factors such as whether

---

[74]The substitution of taxes for borrowing to finance a given path of government expenditure should not decrease consumption (increase savings) since agents will expect reduced taxation in the future because of the reduced amount of debt (and debt service). In other words, substituting borrowing for taxes should not increase consumption (decrease savings). Moreover, the equivalent (one to one) change in both the supply of and demand for bonds should leave relative prices of other assets unchanged. Therefore, the interest rate should not increase leading to the effect of crowding out of private consumption and investment.

parents have children or don't have children and possession of asymmetric or symmetric information regarding budgetary policies of the government by the individuals. Some individuals are myopic to account for the future taxes which arise from current debt-financed expenditure. Carmichael (1982) stresses that the divergence in individual's discount rates is the source of net-wealth effect of government bonds. Because of high discount rates for some individuals, the taxes which are required to settle the government debt would not be fully capitalized. Hence, issuing of government bonds involves a net-wealth effect. To the extent that public debt issue entails a loan from low-discount-rate individual to high-discount-rate individual, a positive net-wealth impact results if the government is more efficient than the private market in utilizing this loan. Further, it is argued that debt would have impact on the economy depending upon the presence of a number of liquidity-constrained individuals in the society. Liquidity-constrained individuals do not make investment on government bonds, rather they need money for their own consumption and investment. Barro later on has confessed that the validity of Ricardian Equivalence theorem on debt depends on the assumptions of the intensity of intergenerational altruism, the possibility of strategic behaviour by the individuals in their family relations, the nature and extent of liquidity constraints, and the effects of various kinds of uncertainty pervading the household's maximization decision. It also depends on distributive impact of resources. Careful examination of these factors suggests that exact Ricardian equivalence is implausible.

However, in a similar vein, Barro (1976) and McCallum (1984) also suggest that persistent bond-financed deficits are inflationary, if the rate of growth of bonds exceeds the rate of growth of output. For instance, Barro (1976) argues that, at any point of time, the value of outstanding stock of public debt is bounded by the government's present value of future taxing capacity. If the rate of growth of bonds exceeds the rate of growth of output, the Ricardian equivalence argument breaks down. With a few exceptions (Bental and Eckstein, 1988) persistent bond-financed deficits must eventually be 'monetised' and, therefore, will be inflationary[75]. Given this upper limit, governments face a trade-off between present and future monetization. Hence, the neutrality result of public debt is subject to various

[75] An unsustainable path of budget deficits/debt described by Sargent and Wallace (1981) and others may not be reflected in the current period inflationary expectations (see Seccareccia & Sood, 2000).

conditions of the economy. However, this theorem has been a benchmark for the empirical testing of hypothesis that debt-financed fiscal policy *per se* does not influence the economic activities while it is the government expenditure that influences economic activities. This theorem can precisely be put in the following way.

6.1.1 An Analytical Exposition of Ricardian Equivalence Theorem (RET)

Following Blanchard and Fischer (1989), and Mohanty (1995), Barro's RET can be demonstrated through a simple mathematical representation by considering a two period budget constraint for both private sector and public sector. Let private sector's consolidated budget constraint in the present value term be represented in the following form.

$$C_0 + \alpha^{P}{}_1 C_1 = Y_0 - T_0 + \alpha^{P}{}_1 (Y_1 - T_1) - (1 + r^{P}{}_{-1}) B^{P}{}_{-1} \qquad (1)$$

Where C, Y, T and B^P refer to consumption, income, tax liability and borrowings of the private sector, respectively; r^P is private sector interest rate, and subscripts 0, 1 and -1 refer to the initial period, the second period and the previous period to the initial period. The left hand side of equation (1) shows present value of aggregate private consumption consisting of consumption in the current period (C_0) and the discounted value of second period consumption; where the discount factor is $\alpha^P{}_1 = (1/1+r^P{}_0)$. The three terms in the right hand side of equation (1) show disposable income in the current/initial period and discounted value of disposable income in the second period, and repayment of debt together with interest liability contracted in the previous period. Private sector budget constraint in (1) imposes the solvency constraint in that total consumption equals disposable income minus discharge of debt obligation.

Corresponding to private sector budget constraint, government's consolidated budget constraint for two periods can be represented in a similar fashion. The government may borrow from private sector instead of financing its expenditure completely through taxes. Government debt must pay the rate of return that equals to the rate of return accrued from capital, if the individuals are to hold government bonds in their portfolio. The government faces the following dynamic budget constraint.

$$G_0 + \alpha^g{}_1 G_1 = T_0 + \alpha^p{}_1 T_1 - (1 + r^g{}_{-1}) B^g{}_{-1}$$

$$T_0 + \alpha^p{}_1 T_1 = G_0 + \alpha^g{}_1 G_1 + (1 + r^g{}_{-1}) B^g{}_{-1} \qquad (2)$$

where the government discount factor is $\alpha^g{}_1 = (1/1+r^g{}_0)$; t, g and b represent taxes, government expenditure and government borrowings respectively. The flow constraint only indicates that the government has to borrow when its outlays exceed its tax receipts, or for repaying debt or lends to private sector when tax receipts exceed outlays. The present value of taxes must be equal to the present value of government spending plus the value of the initial government debt b_0, given the no-ponzi game (NPG) condition for the government. Equivalently, the government must choose a path of spending and taxes such that the present value of primary deficit i.e. $g_t - t_t$, equals the negative value of initial debt. This implies that if the government has a positive outstanding debt, it must anticipate running primary surpluses at some point in the future. This is consistent with the above equation (2) in that the government maintains the initial value of debt, b_0, forever, running a primary surplus just large enough to pay the interest net of amount of debt that can be financed by selling b_0 to each newborn person. The implication of the government intertemporal budget constraint as shown in equation (2) reveals that the present value of government expenditure plus initial liabilities must equal the tax revenue of the government. This assumption of solvency condition for the government is important for private sector financial behaviour because this provides a signal that aggregate government spending in present value term must be paid for now or later by equivalent present value of taxes. Introduction of monetary financing would extend the budget constraint by adding another term on the left hand side of equation (2), representing the present value of revenue from seignorage. Similarly, the budget constraint of private sector can be augmented to account for Barro's intergenerational bequests. In this case budget constraint of the private sector will include a term representing the amount of bequests to be gifted to the future generations in present value terms.

If one were to assume that the government's future expenditure program is fairly known to private sector, then taxes required to finance government expenditure can be fully anticipated by forward looking private sector. In that event, the present value of tax liability in the private budget constraint would be equal to

the present value of public expenditure in the government budget constraint. Now substituting equation (2) for taxes in equation (1), equation (3) results.

$$C_0 + \alpha^{P}{}_1 C_1 = (Y_0 + \alpha^{P}{}_1) - (G_0 + \alpha^{P}{}_1 G_1) \qquad (3)$$

Since by assumption $B^{g}{}_{-1} = -B^{P}{}_{-1}$ and $r^{P}{}_0 = r^{g}{}_0$, the debt terms would be dropped from equation (3). Hence, equation (3) is the intertemporal budget constraint of a perfectly rational agent who is able to fully internalize government budget constraint. This representative individual maximizes his/her life time utility subject to the budget constraint shown in equation (3). This specification underlies the Ricardian Equivalence theorem that government debt has no impact on private wealth and that what matters for the private sector consumption is the present value of total government expenditure rather than current taxation or government deficit. As long as the present value of government expenditure remains unchanged, the timing of taxes does not affect private sector economic behaviour. The individual's wealth position can undergo a change only if the two right hand terms of equation (3) are revised. This implies that any change in the expectation and income can generate a wealth effect with implications for the national consumption and savings. Neither taxes nor government debt appears in the budget constraint of the family. Only the government spending is present. This has a strong theoretical underpinning. It says that for a given path of government spending, the method of finance, through lump-sum taxation or deficit financing, has no effect on the allocation of resources. The intuition for such a result is obtained by looking at the intertemporal budget constraint of the government. A decrease in taxes, and a resultant larger deficit today, according to the government budget constraint, must lead to an increase in taxes later. According to the family budget constraint, the current decrease and anticipated future increase in taxes exactly offset each other in present value, leaving the budget constraint unaffected. Families thus do not modify their paths of consumption. They willingly save the increase in current income, exactly offsetting the dis-savings of the government.

A crucial aspect of equation (3) is the assumption that the discount rates for private and government are the same. If $\alpha_1^{g} > \alpha_1^{P}$, then discounting of future taxes is incomplete and deficit generates a net wealth effect. This result will follow if government's planning horizon is different from that of the individual, and if the

capital market is imperfect, in which case, the private sector borrowing rate would differ from that of the government. Therefore, for Ricardian proposition to hold $\alpha_1^g = \alpha_1^p$ and all other assumptions underlying RET must hold true.[76] Given these broader theoretical settings of Keynesians and New-Classicals on the impact of debt-financed government expenditure, a framework is brought out later in order to empirically examine the impact of domestic public debt on private consumption in India. This is done on the basis of a relevant theoretical analysis taking into account structural features of the economy.

6.2 Trends in Private Consumption in Relation to the Key Macro Variables in India

A look at the behaviour of private final consumption expenditure (PFCE)[77] in the domestic market reflects that private final consumption expenditure is rising in absolute terms but in relative terms, as a percentage of Gross Domestic Product (GDP) exhibits a dramatic decline over the years (see Table 6.1). The private final consumption expenditure as a per cent of GDP which is as high as 94.17 in 1960-61, declines to 83 per cent in 1980-81, and reaches one of its lowest levels of 65.57 per cent in 1999-00. On the contrary, government's final consumption expenditure touches its highest level of 12 per cent in 1980s and almost stabilises at that level in 1990's, barring few years where it had experienced a decline in its path. The behaviour of both private and government final consumption expenditures raises several questions. One of them relates to whether the decline in average propensity to consume in private sector (measured as private consumption spending-to-GDP ratio) is due to the increase in income or due to an increase in government consumption expenditure entering into the utility function of private individual's consumption. If private sector benefits from government's consumption expenditure, one may postulate a positive externality of government consumption

[76] Although Feldstein had carried out the empirical test under the Ricardian Equivalence hypothesis, he completely disagrees with the equivalence theorem (1982). He sees the theorem does not contain any weight as it is based upon invalid argumen s.

[77] Private final consumption expenditure (PFCE) is defined as to cover current expenditures on goods and services by households including non-profit institutions serving households. It covers both non durable goods and services and all durable goods except land and buildings. The PFCE in the domestic market covers current expenditures of resident households and direct purchases by non-resident individuals and households (e.g. tourists and visitors) and extra-territorial bodies (i.e. diplomatic staff and such other categories) in the domestic market. It does not include resident households direct purchases abroad, which is covered in PFCE of resident households. This definition of PFCE is in accordance with the definition given by the National Accounts Statistics of India (2001).

on private consumption. This positive externality may have had an implication for reducing private consumption. Contrarily, if the increase in government consumption does not benefit private sector but crowds out private consumption, this would suggest a negative externality of government consumption towards private consumption and thereby diminishing the growth rate of private consumption.

Table 6.1: Private Consumption and Other Related Macroeconomic Indicators

Years	Private final consumption expenditure /GDP(%)	Private financial savings /GDP(%)	Central govt. total expenditure /GDP(%)	Government final consumption expenditure /GDP(%)	Stock of market debt & SS+PF /GDP(%)	Stock of market debt & PF /GDP(%)	Export & Import /GDP(%)	Dependent population to total population
1960-61	94.17	4.29	10.08	7.03	25.47	19.79	0.11	0.20
1965-66	88.77	5.34	13.30	9.29	20.38	14.82	0.09	0.20
1970-71	85.69	4.47	10.34	9.39	16.57	11.83	0.08	0.21
1975-76	83.46	6.01	13.19	9.93	15.14	10.41	0.13	0.21
1980-81	82.79	7.62	14.87	10.08	18.85	13.30	0.15	0.39
1985-86	75.50	8.62	18.14	11.42	24.47	16.75	0.13	0.39
1990-91	68.08	11.40	17.74	11.61	35.37	26.56	0.16	0.45
1991-92	68.33	12.62	16.52	11.37	33.87	25.33	0.16	0.45
1992-93	66.94	11.40	16.37	11.22	31.01	22.97	0.19	0.45
1993-94	66.89	14.50	16.49	11.37	31.68	23.85	0.20	0.45
1994-95	65.58	15.40	15.27	10.73	30.81	22.74	0.21	0.45
1995-96	64.46	13.78	14.66	10.84	30.37	22.65	0.24	0.45
1996-97	66.05	14.78	14.13	10.65	29.17	21.57	0.24	0.45
1997-98	64.03	14.04	13.64	11.31	33.75	24.34	0.23	0.45
1998-99	64.90	14.62	14.27	12.04	35.59	25.57	0.21	0.45
1999-00	65.57	14.48	15.17	11.17	38.67	37.27	0.23	0.45

Note: All the figures in the table are in nominal terms and computed from various sources as mentioned in the data discussion.

Further, it can be observed from Table 6.1 that although the government final consumption increases in 1980s and remains stable at that level in 1990s, the extent of its increase can't compensate for the relative decline in the rate of private final consumption expenditure. As a result, correspondingly there is a rise in financial savings of private sector with a few exceptional fluctuations. The private financial savings as a per cent of GDP which is 4.29 in 1960-61, rises to 7.62 per cent in 1980-81 and further to 14.48 per cent in 1990-00. From this, the question arises that whether the increase in private savings get absorbed by the public sector

or goes for filling up private sector investment demand in the economy. There is a definite increase in private investment in the 1990s as against the previous decade, but the rise in private investment is not as fast as the rise in financial savings of private sector during the same period as compared to the decade of 1980s. The above relationship also can be examined from the trends of private final consumption expenditure along with the trends of government final consumption expenditure and private financial savings. The private final consumption expenditure shown in Figure 6.1 and Figure 6.2 in nominal and real terms respectively shows a declining trend while government final consumption expenditure in nominal and real terms respectively shows a constant trend towards the 1990's as compared to the 1980s. In relation to these trends, both per capita real private final consumption and per capita real government final consumption expenditures shown in Figure 6.3 show upward trends.

Figure 6.1: Behaviour of Current Private Final Consumption and Government Final Consumption Expenditure

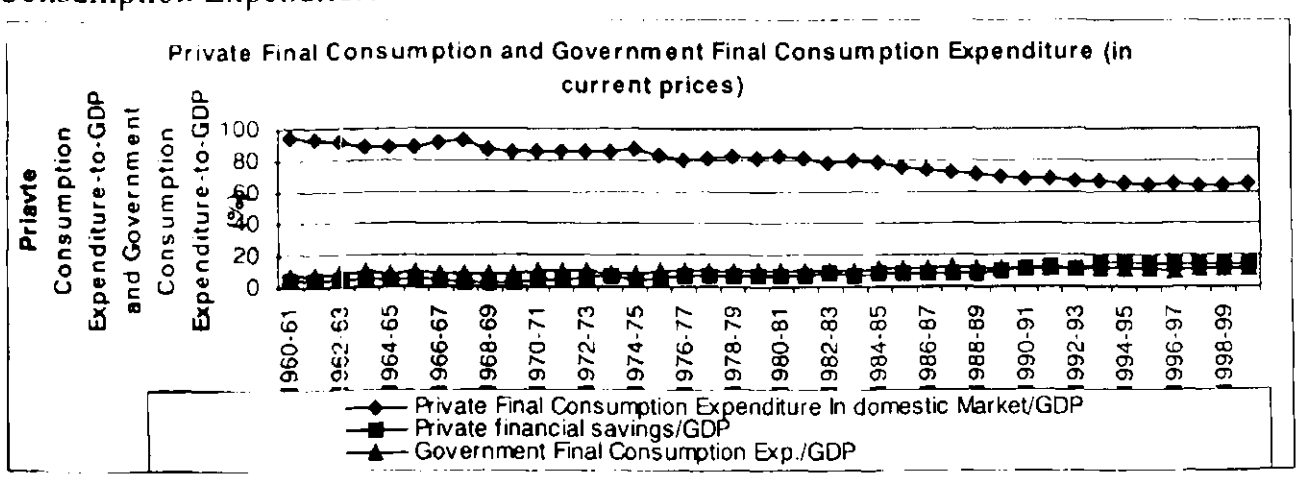
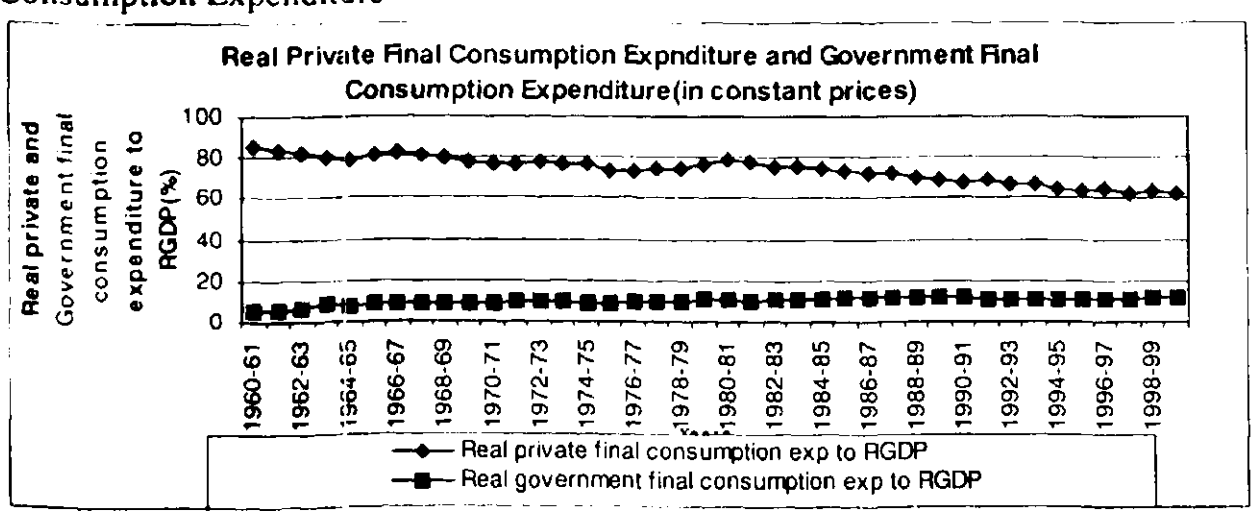


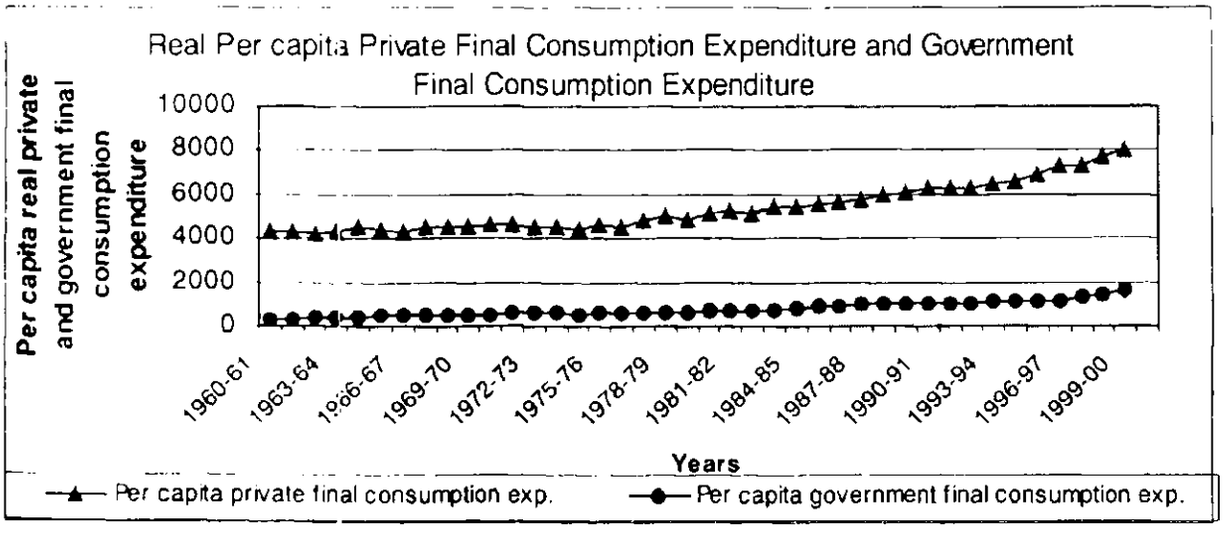
Figure 6.2: Behaviour of Real Private Final Consumption and Government Final Consumption Expenditure



An important point to be noted here is that along with an increase in the population in the economy, there is an increase in per capita private final consumption expenditure but there is a continuous fall in the ratio of private sector final consumption spending-to-GDP ratio. In contrast, there is neither increase in government final consumption expenditure nor increase in tax revenue as a percentage of GDP in 1980s and 1990s. Keynesian reasoning may be valid for explaining this phenomenon. On the Keynesian line, it could be argued that as income increases, level of consumption increases but the increase in consumption would be less than the increase in income. This implies that as income increases, the average propensity of consumption (APC) of the individuals in the economy decreases. But, it must be emphasised that while there is an increase in population in India, there is also a drastic reduction in proportion of people living below the poverty line. The proportion of people living below the poverty line, which constituted around 44 per cent in the mid-1990s, has come down nearly to 26 per cent in 2000. This implies that there is a movement of the people from a low bracket income to a high bracket income group. As the proportion of people below the poverty line declines, there might be a definite change in consumption of the people in the richer segment of population in the society. This can affect the overall consumption expenditure-to-GDP ratio in the economy. Otherwise there is a greater implausibility as to explain why there is decline in the ratio of aggregate private final consumption spending-to-GDP ratio. Thus, this may be due to the increase in income as well as the relative change in the size of economically rich population to the change in the size of economically poor population, as the overall marginal propensity to consume of the economy depends on the relative change in the size of two segments of population. Each segment has a different marginal and average propensity to consume. Further, if one considers population as a factor affecting private consumption, the increase in the proportion of aging population in the total population can dramatically affect the level of private sector consumption. On the basis of life-cycle income hypothesis it could be argued that individuals during childhood days consume without contributing towards the aggregate income. This is because individuals in their early period expect that they would be able to earn income in the future and during their mid-age they consume less than their income. This means individuals tend to save in their middle age so as to meet the future expenses at the old age.

Apart from this, it may also happen that in order to achieve equity objectives, government may take steps to reduce the incidence of poverty through launching of various poverty reduction programs. This is possible through public distribution system, employment generation and subsidies to agricultural inputs in order to facilitate agricultural production. Further, the increase in income may reduce the marginal increase in consumption of necessary commodities, but this may lead to a rise in conspicuous consumption or consumption of other durable products. There is a possibility that if at all there is any reduction in consumption of the richer segment of population, the overall reduction in consumption due to relative change in the size of two segments of population might be negligible or even there might be a net increase in private consumption. This may be the reason why per capita private final consumption expenditure shows an upward trend implying that with the increase in population, there is also a rise in private final consumption expenditure. Then the question arises, besides income, what are other factors that determine private consumption demand in the economy? Whether government's financing policy has something to do with the slower rate of increase in private consumption in India? If government debt influences private consumption, *ceteris paribus*, to what extent does it influence? As noted earlier, government absorption can also affect private consumption when a greater proportion of population in the economy is liquidity constrained.

Figure 6.3: Behaviour of Per Capita Real Private Final Consumption and Per Capita Government Final Consumption Expenditure



Excess demand destabilises the economy and excess supply leads to recession and unemployment. Besides income and modes of financing the government

expenditure, wealth net of government debt (as debt-financed public expenditure is an indicator of wealth of private sector) is also an important factor in determining private consumption. The question is whether people perceive present government debt as a factor giving rise to future taxes, (keeping all other sources of wealth constant). If this happens then their net wealth, and the rate of consumption gets reduced. The study here focuses on the relationship between private sector consumption and government debt along with other key determinants of private consumption in India.

6.3 A Framework for Examining the Impact of Domestic Public Debt on Domestic Private Consumption in India

The following section identifies the determinants of private consumption under different approaches to private consumption as discussed in the literature. On the basis of identification of determinants for explaining private consumption, the study specifies a model for private consumption in the Indian context.

6.3.1 Determinants of Private Consumption Demand: Standard Approach vs. Consolidated Approach

The standard approach is based on Keynesian treatment of fiscal policy instrument in influencing private sector consumption behaviour, while the consolidated approach is based on New Classical treatment of impact of fiscal policy. Kormendi (1983) is the first to design a test nesting both the approaches to private consumption under the Ricardain Equivalence hypothesis. He observes a strong direct evidence in favour of Ricardian equivalence hypothesis in U.S. context. His regression equation relates private consumption to net national product, private wealth exclusive of government debt, total tax revenue, transfer payments, corporate retained earnings adjusted for capital consumption allowances and inventory valuation, government interest payments to persons and businesses, and government debt.

Retaining the same specification of private consumption, the model was later re-estimated by Feldstein and Elmendorf (1990) by adopting alternative definitions of variables with different data base. The findings, with the inclusion of World War II years, evidence that government spending and public debt have negative effects

on private consumption proving contrary to the prediction of standard theory of wealth effect of public debt, while tax does not have significant impact on private consumption. Extending the sample period, the study further finds that the estimates are invariant with respect to the key parameters in the model.

In the same study, in order to reduce the collinearity of fiscal policy variable with income variable (i.e. net national product), Feldstein and Elmendorf express private consumption equation in ratio form by dividing all the variables in private consumption equation with net national product. In doing so, (when private consumption model was re-estimated), the results evidence against Ricardian equivalence hypothesis. When the private consumption model is further estimated by instrumental variable approach and autoregressive approach in level form of the variables, the study does not find support for Ricardian equivalence hypothesis. However, the drawback with Feldstein and Elmendorf study is that they overlook the multicolinearity problem which can arise due to the presence of related fiscal variables in the estimation. Transfer payments, and interest earnings of private individuals on the loans extended to the government are accounted as part of the total income of individuals. Further, transfer payments, interest earnings and government expenditure are closely related. The simultaneous inclusion of these variables into the model is likely to yield biased estimates. Not only they appear to be closely related but also the inclusion of same variable (which is already factored in the broader category of variable) is likely to pose the problem of over parametrisation in the model for any time series application with a short sample size. In order to avoid such problem in the estimation, the study incorporates the major important fiscal variables and drops the variables which are already included in their broader category of variables. Then, the study proceeds to examine the impact of domestic public debt on private consumption with the inclusion of other important determinants of private consumption into the model.

Feldstein and Elmendorf (1990) have objected to Kormendi's (1983) specification of private consumption model on the ground that it does not contain both the tax revenue and government debt simultaneously as explanatory variables in all the estimated consumption equations in order to test the simultaneous effect of both on private consumption. Hence, they point out that Kormendi's study does

not provide an explicit test of neutrality theorem. But the present study argues that there is no reason why the consumption equation necessarily has to include tax revenue, where the incorporation of public debt variable implicitly assumes that private agents take decisions on their consumption spending rationally by taking into account present as well as future taxes, in the sense that individuals are assumed to be forward looking. They observe the level of public debt and then decide their level of consumption spending bearing in mind the implication of current government debt for the future in terms of its corresponding tax liabilities.[78] On this basis, one can include either government debt or tax revenue in the model. Since the main interest of the study is to examine the impact of government debt, it drops tax revenue and retains government debt variable in the model. Further, government debt variable indicates the level of debt after current taxes, in the sense, that the level of government debt represents post-tax government debt. The future taxes are accounted in the consumption behaviour of individuals on the assumption that individuals they look at the level of government debt and on that basis, foresee the level of future taxes on which their consumption decision follows.

Income - According to both the standard and consolidated approaches, among other determinants of private consumption, income net of depreciation is a major determinant of private consumption demand. According to Keynes, current disposable income is the major determinant of private consumption, while consolidated approach to private consumption modeling proposes that *ceteris paribus,* it is the aggregate income which plays key role in determining private consumption demand. There are also other approaches to private consumption which differ from Keynesian and New Classical predictions. The life-cycle hypothesis predicts that it is the expected lifetime income that determines the private consumption in the current period based on the assumption that individuals are assumed to maximize the present value of lifetime utility, subject to their lifetime budget constraint. The budget constraint is equal to current net worth plus the present value of expected labour income over the remaining working life of the agent. As income fluctuates systematically over the course of individual's life, consumption-saving decision is determined by individual's stage in life-cycle (Modigliani, 1986).

[78] The inclusion of current tax variable may not surmount the problem of implicit in test for Ricaridan equivalence theorem.

Age Structure of Population – Private consumption decision determined by the individual's stage in life-cycle implies that the composition of the population has a role to play in influencing private consumption. Young people may have low current income but high lifetime wealth, and may, therefore, borrow to finance current consumption. Young or working age people with higher income are likely to save more for the future than consuming in the current period.[79] An increase in population growth rate increases the number of economically active individuals relative to the retired ones, but may be accompanied by an increase in the share of the young in the total population. Because both the young and the retired (dependant) population consume more than they earn, the effect of both is likely to have positive influence on aggregate private consumption. This is especially experienced in developing economies. Thus, the composition of population in terms of proportion of working-age group to non-working-age group influences private consumption expenditure. One may say that among the working-age group, there are unemployed people who are likely to consume more than they earn, and further among the non-working-age group, there are also people who earn more than they consume. Recognising these people in the aggregate population is very difficult and the effect of this on consumption depends on the relative strength of number of people in both the groups.

Wealth – Apart from income of the individuals, as seen above, wealth is considered as another significant factor which determines private consumption demand. More the private sector wealth or assets, higher would be their consumption. This implies that wealth has got positive influence on the private sector consumption. Individual investment on government securities forms a part of private sector wealth. Other than holding of government securities, individuals possess assets in the form of land, buildings, other non-governmental securities and capital stocks, which are considered as part of wealth. It is very difficult to capture all the components of non-liquid assets and human wealth in calculation of private sector total wealth for the empirical testing of consumption function. Studies consider currency with private sector as part of liquid wealth to which private consumption is more

---

[79]The life-cycle income hypothesis is based on the presumption that young people tend to save during their active working period so as to live off it later after retirement.

sensitive. Total liquid wealth of private sector can be represented by the amount of currency with the people plus private sector's investment in government bonds (Kofuji, 1986).[80]

Government Expenditure – Although Keynes envisages that government expenditure plays an important role in influencing private sector consumption as it affects the level of income, but its role is confined to the short-run. In the long-run, public expenditure does not play a significant role. Keynes perceives that it is the mode of financing that affects private sector behaviour. In contrast, in the Ricardian framework, the hypothesis is reversed. In the Ricardian framework, government expenditure replaces private consumption expenditure while the mode of financing does not matter.[81] When debt is raised, it gives rise to taxes in the later period, as a result, the impact of debt and taxes gets neutralized.[82]

Domestic Public Debt- In accordance with the standard theory of consumption, if debt-financing has a positive impact on private consumption, it is due to the wealth impact of government debt. However, to the extent that government absorbs financial resources from the economy through debt-financing, it reduces consumption spending of liquidity constrained individuals. Based on the rational expectation hypothesis, New Classicals view that public debt should not have any impact on private consumption. If public debt impacts private consumption, there is no full discounting of present value of future taxes, and that debt-financing has net wealth impact in the economy. Economists, in the empirical testing, usually consider other forms of wealth along with public debt as a separate wealth variable in order to examine net worth impact of public debt.

---

[80]Faulkner-MacDonagh and Mühleisen (2004) observe that the empirical relationship between liquid forms of wealth and consumption in United States is considerably stronger than for equity wealth. Therefore, while the wealth declines that can be concentrated in equities, the rise in the other forms of wealth such as bonds and cash can mute the effects of stock market decline in consumer spending.

[81]Public expenditure on goods and services is likely to crowd out private consumption expenditure under the RET.

[82]Feldstein & Elmendorf view that the absence of a negative effect of government outlays on consumer spending is contrary to RET. While this may be true under a stronger version of Ricardian theory, but the effect of government expenditure on private consumption expenditure hinges which purpose the government incurs its expenditure (Kormendi & Meguire, 1990).

Interest Rate on Bank Deposits – Interest rate is one of the crucial factors which influences intertemporal choice of private sector consumption-saving decision. A higher interest rate ruling increases the present price of consumption relative to the future price (substitution effect) of consumption, and thus provides an incentive to increase savings. However, if the household is a net lender, the interest rate rise also raises lifetime income (income effect), and thus leads to their higher consumption. Thus, the favourable response of private consumption to the deposit rate depends on the strength of income effect over the substitution effect. But it is generally believed that substitution effect is stronger than the income effect in developing economies.

Further, the effect of interest rate on private consumption depends on whether it is a repressed interest rate regime or a liberalized interest rate regime. The effect will vary according to the regime. Moreover, following financial liberalization, consumption would increase as young consumers move from being credit constrained under a financially repressed regime to smooth consumption.

Openness of the Economy - In the context of open economies, there is a wide choice of goods and services before the consumer. More imports would raise private consumption while more exports may reduce private consumption, as with an increase in exports, choice would become less for the consumers in the domestic market. Building on the idea of export led growth, the hypothesis postulates that more exports also lead to more growth and hence more savings after a certain stage. It is also true that the effect of openness of the economy depends on what type of goods a country imports. Import of more consumption goods increases consumption while import of raw materials or semi-manufactured products would augment production and hence promote growth and savings.

Transfer payments, interest earnings, and retained earnings influence private consumption which are incorporated in most of the empirical tests under the Ricardian equivalence proposition. But while examining the influence of fiscal variables on private sector consumption, the study assumes individual variables such as transfer payments, interest earnings, and retained earnings to be insignificant in influencing private consumption in the presence of major variables

such as net national income and government expenditure as the former variables are being accounted in the latter variables.[83] Further incorporation of these variables in the model would result in other statistical problems in the estimation, given the short size of the sample.

6.3.2 Specification of Private Consumption Model

This section specifies an estimable private consumption model for empirical testing of Ricardian equivalence hypothesis. This is a modified version of Kormendi (1983), and Modigliani and Sterling (1986) private consumption model. Kormendi model is an augmented private consumption model nesting both the standard and the consolidated approaches and later replicated in Feldstein and Elmendorf's (1990) study. But Modigliani and Sterling model is different from the augmented approach of Kormendi. While Kormendi model is based on permanent income approach having implication for Ricardian equivalence, Modigliani and Sterling model is based on life-cycle income approach having implication for Ricardian equivalence. Both the models are reproduced below in order to observe the differences between them.

Existing Private Consumption Model

(a) **Kormendi** (1983) Specification of Private Consumption Model

$$\Delta PC_t = a_0 + a_{11}\Delta Y_t + a_{12}\Delta Y_{t-1} + a_2\Delta GS_t + a_3\Delta W_t + a_4\Delta TR_t + a_5\Delta TX_t + a_6\Delta RE_t + a_7\Delta GINT_t + a_8\Delta GB_t + U_t \quad (1)$$

(b) **Modigliani and Sterling** (1986) Specification of Private Consumption Model

$$PC_t = a_0 + a_1 W_t + a_2 GB_t + \sum_{1}^{L} a_3(Y_{t-1} - TL_{t-1}) + \sum_{i=1}^{L} a_4 DEF_t + a_5 GS_t + U_t \quad \ldots\ldots(2)$$

Where, PC stands for = Private consumption spending,

W = Net worth of households excluding holding of government bonds,

Y = Net National Product (as a measure of income),

T= Net taxes which refers to total taxes net of transfers and net of interest payments,

GS = Government spending on goods and services,

TR = Gross transfer payments,

RGINT= Real net interest payments on government debt,

[83] Transfer payment is included as part of aggregate income and interest payment is included as part of total government expenditure.

DEF = Government spending on goods and services minus net taxes,
GB = net financial liabilities of the government at book value, and TL = taxes net of transfers, including *ex post* government real net domestic interest payments.

The distinction between the two representative models can be observed in terms of the inclusion of variables. While Kormendi model includes government debt, expenditure and tax revenue in the consumption equation, Modigliani and Sterling model includes deficit and tax/expenditure along with government debt variable. The coefficient restrictions are also different for supporting Ricardian Equivalence Theorem (RET) under both the approaches. But the coefficient restriction of Modiglian and Sterling is less convincing as there is no reason why (a) the coefficient of government debt would be equal to the coefficient of net worth, and (b) the coefficient of tax or government expenditure would be equivalent to income. But Kormendi's nested approach is more convincing as it is based on valid logic. The present study modifies Kormendi model of private consumption for the empirical testing. The modification is done for the reasons outlined above viz. in order to avoid double counting problem among the variables and reducing the problem of over parametrisation for application of time series technique. The private consumption model for the present study is respecified in the following form.

Modified Private Consumption Model

(c) General Form of Private Consumption Model

$$RPFC = \alpha_0 + \alpha_1 RW + \alpha_2 RNNP + \alpha_3 RTGE + \alpha_4 RDD + \alpha_5 RDR + \xi \quad \ldots\ldots\ldots (3)$$

(d) General Form of Private Consumption Model Augmented with Structural Variables

$$RPFC = \alpha_0 + \alpha_1 RW + \alpha_2 RNNP + \alpha_3 RTGE + \alpha_4 RDD + \alpha_5 RDR + \alpha_6 Z_t + \xi \quad \ldots\ldots(4)$$

Where, RPFC stands for = Real private final consumption expenditure,
RW = Real liquidity wealth of the private sector (a part of total wealth of the private sector as measured by real M_1 minus real demand deposits = RM1),
RNNP = Real Net National Product at factor cost,
RTGE = Real total government expenditure (according to the levels of governments, two definitions of government expenditure are followed, one for representing central government total expenditure denoted as RTGE and combined government total expenditure of the center and states denoted as RCTGE),

RDD = Bond-financed domestic real public debt of the government (Varied definitions of government domestic debt are adopted in the study on the basis of change in fiscal policy of center and different levels of governments. Accordingly, government domestic debt has later been denoted as RMBSPF (inclusive of small savings), RMBPF (exclusive of small savings) and RCMBSPF in the empirical testing. The first two relate to the central government domestic debt and third one relates to the combined government domestic debt of the center and states),
RDR = Real deposit rate of the commercial banks and,
Z_t = other relevant structural determinants of private consumption. All the variables in the equation are real and flow variables except liquid wealth of the private sector and government domestic debt, are stocks.

Under the standard approach, government expenditure should have no effect ($\alpha_3=0$) and private consumption is assumed to depend upon permanent personal disposable income. Since tax is not subtracted from income in order to get the disposable income, income is expected to have positive and dominant impact ($\alpha_2>0$) over taxes. Along with other forms of wealth exclusive of debt, the government debt in order to reflect the wealth impact, its coefficient should have positive sign ($\alpha_4>0$).

Under the consolidated approach, income and wealth net of government bonds would have positive impact on private consumption. The government spending adversely affects private consumption as it is likely to substitute private consumption expenditure (implying $\alpha_3<0$). Since the choice between tax and debt finance leaves private sector consumption unaffected, government debt would not have any impact on pr vate consumption representing no net wealth effect involved with debt financing (implying $\alpha_4 = 0$); and the rate of interest is expected to have negative sign under both the approaches to private consumption modelling.

Equation (3) is the most general form of private consumption model which is based upon widely accepted theories for modeling private consumption. Like Kormendi model, the above specification nests both the standard and consolidated approaches. The limitation with this model is that to the extent that it does not explicitly incorporate tax variable in order to examine the impact of disposable

income on private consumption, does not incorporate the basic features of standard model. But tax revenue is implicit in the model as it is included in total income. Since the real economic activities get influenced by the changes in the structural features of the Indian economy, later the equation is augmented with variables such as openness of the economy, composition of population and movement of the economy from agrarian to non-agrarian structure. The variable Z accounts for all these factors. The incorporation of these variables is supposed to reflect the impact of changing structural features of the Indian economy.

The above specification of private consumption demand is subject to certain data constraints inherent in the Indian economy. There is no variable for properly measuring total wealth of the private sector exclusive of government debt. The government debt variable needs a special mention here, since the above equation is a nested one containing variables from both standard and consolidated/new classical approaches. The inclusion of public debt variable in the equation should ensure that all the components included in the domestic debt are bond-financed government debt. But if one were to examine a developing economy, it becomes clear that private individuals directly hold only a small fraction of their wealth on government bonds in the form of post office certificates or other forms of government bonds. Private people indirectly invest a major portion of their wealth on government bonds/securities by making deposits with the commercial banks and other financial institutions. Deposits of private individuals with commercial banks and other financial institutions are equivalent to holding government bonds because these institutions, in turn, are statutorily and partly willingly required to hold a part of these public deposits in the form of government bonds as a measure for ensuring a risk-free portfolio. Thus, one might say that the banks act as agents of private households in holding government securities for them. This portion of government debt is called as market debt. It is both the households and corporates who save in long-term government bonds. It is also a case that households hold corporate equity and corporates hold government bonds as agents of households. The statutory liquidity ratio (SLR) is only a part of market borrowings. Gratuity funds, and corporations, LIC, GIC, and other financial institutions – they all hold government securities and all of these put together constitute market debt.

Apart from market borrowings, government borrows from small savings (SS) and provident funds (PFs). All these components constitute government debt which is similar to bond-financing as these are from private sector and hence they are claims of private sector and constitute a part of wealth of private sector. Other constituents of government's domestic debt have been excluded from the components of domestic debt, as they do not form private sector's savings. For example, raising funds from railway reserve and telecommunication funds by the government would not constitute the claims of the private sector as exactly is the case with small savings and provident funds. Further, all the deposits of private sector in the banks and financial institutions are not completely drawn by the government, private sector also use bank credits when they are in need of funds. Now the question arises whether this part of bank credit can be considered as part of wealth of private sector or not. The answer is simple. To the extent that the private sector draws the resources from the commercial banks and other financial institutions for its use, this does not form part of private sector's investment on government securities on net basis and hence does not constitute wealth as is the case with government debt. Here, the private sector's saving from the surplus making agents is equivalent to the private sector's dis-savings, the deficit running agents. In other words, savings made by the surplus private sector units equal dis-savings in deficits private sector units. There is no net wealth involved. To the extent that the private sector utilizes the borrowed money in constructing buildings or in acquiring new assets, the wealth variable proxied by M_1 minus demand deposits would underestimate the total wealth of the private sector. In case of unavailability and unreliability of concrete data on total wealth (RW), the RW variable represents the liquid wealth of the private sector. The narrow money supply minus demand deposits plus government debt has been assumed to form the total liquid wealth of private sector. The amount of demand deposits is subtracted from M_1 in order to avoid the double counting problem as the same amount of resources which get counted in the government debt, forming a part of wealth of the private sector, should not reappear as part of the liquid wealth of the private sector. This is done for the simple reason that the commercial banks and other financial institutions deploy a sizeable portion of public deposits in buying government bonds. In other words, the government borrows from demand deposits of the private sector. There are studies, which consider private capital stock as a

proxy for the private sector wealth. But there are also problems with this measure of private wealth. Private consumption would not be so much sensitive to a change in capital stock as much as to a change in liquid wealth. Further, the question arises why only the central government debt would form part of wealth and why not the state government's debt which are also raised from private sector. In order to take into account the total wealth of the private sector, one should also include the state government's debt. But the study examines the net wealth impact of private sector on their consumption demand, likewise the centre imposes taxes for its debt, corresponding to the debt of state governments and UTs there are also taxes imposed by the respective governments on private sector. There would not be much problem, if one considers only the net wealth impact arising from the central government's debt. There are studies (Feldstein et al., 1990) which examine the impact of debt once for the federal government and once for all levels of government in order to assess their separate impact. Nevertheless, the study also considers later the impact of combined government domestic debt and expenditure of both the center and states in order to observe their differential impact.

Prior to economic reforms a major portion of net collection of small savings was going to the states from the public account of the central government. From 1999-00, 80 per cent of net collection of small savings and public provident funds were going to the states and from 2001-02, 100 per cent of net collection of small savings are going to the states. While examining the impact of central government domestic public debt on private consumption, it is imperative therefore to examine the impact of domestic public debt of the centre exclusive of small savings (RMBPF), assuming that this portion of liability is borne by the states. In order to do this the study later has netted out the small savings portion from the definition of domestic public debt of the central government (RMBSPF). This is with a view to examining the net wealth impact of government domestic debt of the center on private sector consumption. Besides small savings and provident funds channels through which states get their major resource share from the center, the states also on a large scale do borrow from the center in other forms. Even though the states owe a major portion of their debt from the central government, but the study does not net out this portion of borrowed resources for the reason that when the states are under financial stress, the debt burden is borne by the central government; and

further, it has also got implication on private consumption and the economy but while examining combined impact of debt of center and states, this portion is netted out.

6.4 An Econometric Approach to Private Consumption Modeling

The objective of the present section is to use an appropriate method in order to empirically examine theoretical propositions illustrated above. As we know from time-series analysis that the use of first-differenced (stationary) variables in regression models is required to reduce the spurious results that are likely to arise when the variables are specified in their level (non-stationary) form. However, use of variables in their differenced form removes (long-run) information from the data, resulting in a model that can only provide partial (short-run) information on the relationship between the variables. Further, by not accounting for the potential long-run relationship among the variables, models constructed using only differenced data may be misspecified should there exist such long-run influences, resulting in biased parameter estimates. To avoid such problems, one must test to determine whether a long-run relationship (cointegration), exists between the variables in the model. Therefore, in the present context, application of this technique would enable us to examine the long-run equilibrium relationship between private consumption and domestic public debt along with other relevant macro economic variables such as wealth exclusive of government debt, income, public expenditure and bank deposit rate which influence private sector consumption expenditure. The technique would also enable us to trace out the short-run response of private consumption demand to the shocks in domestic public debt and other determinants of private consumption.

The first step in applying such technique is to determine the order of integration of each variable. However, depending on the power of unit root tests, different tests yield different results (Bahmani-Oskooee, 1998). Due to such uncertainty in the examination of time series property of the variables, **Pesaran** and **Shin** (1995) and **Pesaran, Shin** and **Smith** (1996) introduce an alternative method of testing for cointegration. The approach is known as Autoregressive Distributed Lag (**ARDL**) to cointegration. The main advantage of this estimation technique is that it can be applied irrespective of whether the regressors are I(0) or

further, it has also got implication on private consumption and the economy but while examining combined impact of debt of center and states, this portion is netted out.

6.4 An Econometric Approach to Private Consumption Modeling

The objective of the present section is to use an appropriate method in order to empirically examine theoretical propositions illustrated above. As we know from time-series analysis that the use of first-differenced (stationary) variables in regression models is required to reduce the spurious results that are likely to arise when the variables are specified in their level (non-stationary) form. However, use of variables in their differenced form removes (long-run) information from the data, resulting in a model that can only provide partial (short-run) information on the relationship between the variables. Further, by not accounting for the potential long-run relationship among the variables, models constructed using only differenced data may be misspecified should there exist such long-run influences, resulting in biased parameter estimates. To avoid such problems, one must test to determine whether a long-run relationship (cointegration), exists between the variables in the model. Therefore, in the present context, application of this technique would enable us to examine the long-run equilibrium relationship between private consumption and domestic public debt along with other relevant macro economic variables such as wealth exclusive of government debt, income, public expenditure and bank deposit rate which influence private sector consumption expenditure. The technique would also enable us to trace out the short-run response of private consumption demand to the shocks in domestic public debt and other determinants of private consumption.

The first step in applying such technique is to determine the order of integration of each variable. However, depending on the power of unit root tests, different tests yield different results (Bahmani-Oskooee, 1998). Due to such uncertainty in the examination of time series property of the variables, **Pesaran** and **Shin** (1995) and **Pesaran, Shin** and **Smith** (1996) introduce an alternative method of testing for cointegration. The approach is known as Autoregressive Distributed Lag (**ARDL**) to cointegration. The main advantage of this estimation technique is that it can be applied irrespective of whether the regressors are I(0) or

I(1). This approach, unlike other alternative tests of cointegration avoids classifying variables into I(0) or I(1). In other words, it avoids unit root pre-testing of the variables while examining their cointegration relationship. Inder (1993) indicates that there are desirable properties such as precise estimates of long-run parameters, and valid t-statistics can be obtained even in the presence of endogenous explanatory variables, when the parameters are estimated using the ARDL approach. Kremers, Ericsson, and Dolado (1992), and Inder (1993) suggest applying ARDL approach to estimate the long-run coefficients. Pesaran and Shin (1999) prove that ARDL-based estimators are 'super-consistent', and valid inferences on the long-run parameters can be drawn using the standard normal asymptotic theory. Similarly, they also find that appropriate modification of the orders of the ARDL model is sufficient to simultaneously correct the residual serial correlation and the problem of endogenous regressors.

As a first step of estimation, the existence of the long-run relation between the variables under investigation is tested by computing the F-statistics for testing the significance of the lagged levels of the variables in the error correction form of the underlying ARDL model. This is referred as stability test or variable addition test. However, the asymptotic distribution of the *F*-statistic is non-standard irrespective of whether the variables are I(0) or I(1). **Pesaran** et al. (1996) tabulate two sets of appropriate critical values for different number of regressiors (k), and whether the model contains an intercept and/or trend. One set assumes that all variables are I(0) and another set assumes that they are all I(1). This provides a band covering all possible classifications of the variables into I(0) and I(1), or fractionally integrated. If the computed *F*-statistic lies above the upper level of the band, the null of cointegration is rejected, and a conclusive decision can be made without needing to know whether the underlying variables are I(0) or I(1) or fractionally integrated, indicating the presence of cointegration. If the computed F-statistic falls below the lower level of the band, the null cannot be rejected. This implies that there is no cointegration among the variables in the model. If, however, the computed statistics falls within the critical value band, the result of inference is inconclusive and at this stage of estimation process, the researcher may have to carry out the unit root tests on variables entered into the model (**Pesaran** & **Pesaran**, 1997).

For cointegration testing, the study carries out variable addition test in line with the ARDL estimation procedure and conducts the F-test on the significance of all lagged level variables entered in the error correction form of ARDL equation. In the regression estimation, along with first lagged level of the variables, the lags on each first differenced term of respective lag level variables are imposed[84]. This is to trace out at which lag of the differenced term, there exists cointegration among the variables. After confirming a stable long-run relationship among the variables in the model, it is justified to retain the lagged value of all level variables (a linear combination is denoted by error-correction term, ecm_{-1}) in the **ARDL** model. The second step is to estimate the autoregressive distributed lag equation restricted to a lag structure which is optimal on the basis of a standard criteria such as R-bar Square, Akaike Information Criteria (AIC) and Schwarz Bayesian Criteria (SBC). In this step, the ARDL equation is estimated using an appropriate lag selection criterion.[85] Only an appropriate lag selection criterion would enable one to identify the true dynamics of the model. The resulting underlying ARDL equation is also verified with all its statistical diagnostic properties in order to get unbiased and consistent/efficient estimate. The χ^2_{SC} is the Lagrange multiplier statistic for testing the null of no serial correlation; χ^2_{FF} is the Ramsey's RESET test statistic; χ^2_N is the Jarque-Bera statistic for testing the null of Gaussian errors, and χ^2_H is the chi-squared statistic for testing the null of heteroscedasticity; these are carried out to ensure that the model is well specified.

In the third step, the restricted version of the equation is solved for obtaining long-run solution. In the fourth step, the error correction version of ARDL equation, using the differences of variables and the lagged long-run solution, can then be estimated in order to determine the speed of adjustment of private consumption spending to its long-run equilibrium value. The adjustment parameter, as reflected in the coefficient of error correction term indicates the extent of adjustment of the dependent variable to the deviations from its long-run equilibrium value. Alternatively, this indicates that if there is any departure of the dependent variable from its long-run equilibrium value in the previous period, the extent of

[84]The short-run information is provided by the lagged difference of variables, while the long-run information is provided by the lagged level variables in the model.

adjustment is observed in it in the following period in order to be back to its long-run equilibrium value.

6.4.1 Autoregressive Distributed Lag (ARDL) Model Representation

An ARDL model can be represented in the following form.

$$\phi(L, p)y_t = \alpha_0 + \sum_{i=1}^{k} \beta_i (L, q_i)x_{it} + u_t$$

where $\phi(L, p) = 1 - \phi_1 L^1 - \phi_2 L^2 + \ldots\ldots\ldots\ldots - \phi_p L^p$

$\beta_i (L, q_i) = \beta_{i0} L^0 + \beta_{i1} L^1 + \beta_{i2} L^2 + \ldots\ldots\ldots\ldots + \beta_{iq} L^q, \quad i = 1, 2, \ldots, k,$

Where α_0 is a constant; Y_T is the dependent variable; X_T is the explanatory variable and L is the lag operator such that $Lx_t = x_{t-1}$.

$$y_t = \mu + \sum_{i=1}^{k} \beta_i x_{it} + \varepsilon_t$$

In order to estimate the coefficients of long-run relationship, the equation can be written in the following form.

where

$$\hat{\mu} = \frac{\alpha_0}{1 - (\phi_1 + \phi_2 + \ldots\ldots + \phi_p)}$$

$$\hat{\beta}_i = \frac{\beta_{i0} + \beta_{i1} + \beta_{i2} + \ldots\ldots \beta_{iq}}{1 - (\phi_1 + \phi_2 + \ldots\ldots + \phi_p)}, \qquad i = 1, 2, \ldots\ldots, K$$

In order to establish the short-run relationship between the variables, the corresponding error correction equation can be written in the following form.

$$\Delta Y_t = \alpha_0 + \sum_{i=1}^{k} \beta_{i1} \Delta X_{it} - \sum_{i=1}^{\hat{p}-1} \phi_{i1} \Delta y_{t-j} - \sum_{i=1}^{k} \sum_{i=1}^{\hat{q}-1} \beta_{ij} \Delta X_{it-i} - \phi(1, \hat{p})\, ECM_{t-1} + u_t$$

$$ECM_{t-1} = y_t - \sum_{i=1}^{k} \hat{\beta}_i \Delta X_{it}$$

The ECM_{T-1} is the error correction term. The coefficient of $ecm._1$ measures the speed of adjustment towards the long-run equilibrium. This representation of ARDL model can be generalized for any multivariate cases. In our case, in order to examine the long–run and short-run relationship between the variables (with the private consumption spending), the private consumption model represented in (3) and (4) in the above are estimated using **Pesaran** and **Shin's** (1995) ARDL approach to cointegration. For testing the F-statistics of the lagged variables in the ARDL model, the following equations underlying the error correction equation of ARDL model are estimated.

---

[85]Different criteria chosen for selection of lags in the estimation of ARDL is on the basis of passing all the

General Form of Private Consumption Equation

$$\Delta RPFC_t=\alpha_0+\sum_{i=1}^{n}\alpha_1\Delta RPFC_{t-i}+\sum_{i=1}^{n}\alpha_2\Delta RM1_{t-i}+\sum_{i=1}^{n}\alpha_3\Delta RNNP_{t-i}+\sum_{i=1}^{n}\alpha_4\Delta RTGE_{t-i}+\sum_{i=1}^{n}\alpha_5\Delta RMBSPF_{t-i}+$$

$$\sum_{i=1}^{n}\alpha_6\Delta RDR_{t-i}+\phi_1 RPFC_{t-1}+\phi_2 RM1_{t-1}+\phi_3 RNNP_{t-1}+\phi_4 RTGE_{t-1}+\phi_5 RMBSPF_{t-1}+\phi_6 RDR_{t-1}+u_t \quad (5)$$

General Form of Consumption Equation Augmented with Structural Variables

$$\Delta RPFC_t=\alpha_0+\sum_{i=1}^{n}\alpha_1\Delta RPFC_{t-i}+\Delta RM1_{t-i}+\Delta RNNP_{t-i}+\Delta RTGE_{t-i}+\Delta RMBSPF_{t-i}+$$

$$\sum_{i=1}^{n}\alpha_6\Delta RDR_{t-i}+\sum_{i=1}^{n}\alpha_7\Delta EXIMNF_{t-i}+\sum_{i=1}^{n}\alpha_8\Delta AGL_{t-i}+\sum_{i=1}^{n}\alpha_9\Delta DR_{t-i}+\phi_1 RPFC_{t-i}+\phi_2 RM1_{t-i}+$$

$$\phi_3 RNNP_{t-i}+\phi_4 RTGE_{t-i}+\phi_5 RMBSPF_{t-i}+\phi_6 RDR_{t-i}+\phi_7 EXIMNF_{t-i}+\phi_8 AGL_{t-i}+\phi_9 DR_{t-i}+u_t \quad (6)$$

Where Δ denotes first difference, RPFC is the logarithm value of real private final consumption expenditure; RNNP is the logarithm value of real national income (measured in NNP at factor cost at constant prices); RM1 is the logarithm value of real liquid wealth (RM1= RW) of the private sector; RTGE is the logarithm value of real total government expenditure; RMBSPF is the logarithm value of real government domestic public debt of center (RMBPF and RCMBSPF can be substituted); RDR is the real bank deposit rate; EXIMNF is the logarithm value of export plus import to NNP at factor cost ratio (representing openness of the economy); AGL is the logarithm value of agricultural to non-agricultural output ratio and DR is the logarithm value of dependency ratio (working age population to non-working age population).

6.5 Data Description

Data on private final consumption expenditure and national income (measured by NNP at factor cost) all at constant prices are collected from the National Accounts Statistics of India (1950-51 to 2000-01). Domestic public debt and expenditure of the central government as well as for the combined government are collected from the 'Long Term Fiscal Trends in India 1950-1951 to 2000-2001' published by National Institute of Public Finance and Policy (NIPFP, 2002)[86] verified with the data reported by Ministry of Finance. In order to convert the data on public debt and expenditure of the government into real terms, it is deflated using gross domestic

---

statistical properties of a well specified model.

[86]Domestic public debt at its book value (par value) is used in the estimation, as it is tedious to compute actual market value of debt on the basis of maturity structure of government securities/papers.

product at market price implicit deflator. The commercial bank deposit rates (the average of short, medium and long term State Bank of India deposit rates), narrow money supply (M_1 to measure liquid wealth of the private sector), export and imports have been collected from the "Handbook of Statistics on Indian Economy (2004)' and also from various annual reports of Reserve Bank of India (RBI). The real interest rate is computed by subtracting the inflation rate as derived from GDP deflator from the commercial banks deposit rates. The data on the volume of export and import is taken from the RBI sources for measuring the openness of the economy.[87] In order to measure dependency ratio, the proportion of dependent population to the working age population is considered from various documents of Census of India. The age group from 16-64 years constitutes the working age group in our definition and the rest constitutes dependent population. Considering the difficulty in obtaining the year-wise statistics, as census of India reports the population statistics on a decadal basis, the study assumes that the proportion of dependent population in each decade is maintained until the next census. But there is every possibility of errors creeping in the measurement of this variable. Given the definition and limitation of the measurement of the variables, the study estimates the parameters of the private consumption model.

6.6 Empirical Results

The results are reported in level specification using ARDL approach to cointegration, and robustness of the results is verified with per capita specification, and ratio specification (where variables are expressed as a ratio to national income), using the same ARDL approach to cointegration.[88]

In the following, the results of ARDL approach to cointegration are examined. As mentioned earlier, the ARDL procedure does not require prior unit root testing, but this model is applicable when the variables are integrated of order one or zero or the mixture of both. Thus when variables are integrated of order 2,

[87] In order to broaden the definition of openness measure, openness measure is later defined to include the volume of exports and imports plus net capital account receipts (as there is lack of data on the volume of total capital receipts and debits). Since empirical estimates on this measure do not pass the properties of a well specified model, the results are not reported.

[88] The entire results produced for private consumption and investment models are estimated by using Microfit 4.1 software package developed by Pesaran and Pesaran (1997).

there is no table of F-statistic critical values to test cointegration. In order to ensure that all the variables are either I(1) or I(0), the study carries out Dickey-Fuller and Augmented Dickey-Fuller (ADF) unit root tests. The unit root test results reported in Table 6.2 and Table 6.3 for variables used in level specification show that the variables are either I(0) or I(1). It is also seen that the variables used in per capita terms (as a ratio to population) and as a ratio to national income either belong to I(1) or I(0).[89]

Table 6.2: Unit Root Test Result (in Level of Variables)

Variables	Without Trend		With Trend	
	DF	ADF	DF	ADF
RPFCD	1.97	2.68(1)	-2.02	-1.40(1)
RM1	1.700	1.295(1)	-2.092	-2.090(1)
RNNP	2.049	3.193(2)	-2.074	-1.078(2)
RMBSPF	2.10	1.17(1)	-3.08	-2.85(1)
RMBPF	2.09	1.47(1)	-2.33	-2.19(1)
RCMBSPF	2.34	1.38(1)	-2.92	-2.70(1)
RTGE	0.26	0.18(1)	-2.61	-2.91(1)
RCTGE	0.64	0.49(1)	-2.75	-3.19(1)
RDR	-3.78	-3.56(1)	-4.42	-4.55(1)
EXIMNF	-0.28	-0.51(1)	-2.22	-2.64(1)
RTR	-.070	-.081(1)	-2.93	-3.52(3)
RCTR	.801	0.480	-2.631	-3.240(1)
DR	-0.91	-0.86(1)	-2.20	-2.22(1)
AGL	-0.31	-0.07(1)	-3.91	-3.51(1)

Note-The critical values for rejection of null hypothesis of unit root at 1%, 5 % and 10% are -3.61, -2.94 and 2.60 for without trend and -4.21, -3.54 and -3.19 for with trend respectively.

Table 6.3: Unit Root Test Result (in Difference of Level Variables)

Variables	Without Trend		With Trend	
	DF	ADF	DF	ADF
DRPFCD	-7.06	-4.58(1)	-8.00	-5.90(1)
DRM1	-4.667	-3.604(1)	-5.226	-5.211(3)
DRNNP	-6.746	-4.837(1)	-7.3770	-5.234(4)
DRMBSPF	-4.07	-3.13(1)	-4.52	-3.57(1)
DRMBPF	-3.42	-2.71(1)	-4.05	-3.46(1)
DRCMBSPF	-4.032	-3.031 (1)	-4.604	-3.578(1)
DRTGE	-5.10	-3.41(1)	-5.08	-3.42(1)
DRCTGE	-4.687	-4.590(1)	-4.7372	-3.928(2)
DEXIMNF	-5.00	-4.22(1)	-4.92	-4.14(1)
DRTR	-5.314	-5.169(1)	-5.243	-5.109(1)
DRCTR	-4.1019	-4.672(3)	-4.074	-5.062(3)
DDR	-5.96	-4.27(1)	-5.87	-4.20(1)
DAGL	-6.75	-5.78(1)	-6.73	-5.89(1)

Note-The critical values for rejection of null hypothesis of unit root at 1%, 5 % and 10% are -3.61, -2.94 and 2.60 for without trend and -4.21, -3.54 and -3.19 for with trend respectively

[89]The unit root test results for the variables used in per capita specification and ratio specification (variables as a ratio to NNP) are not reported as they consume a lot of space.

The study, at first, discusses the results with fiscal policy variable of the central government in level specification. The unit root test result reveals that except deposit rate which is I(0), all other variables in level specification are I(1). In order to investigate the long-run relationship among the variables for the general consumption model (3), variable addition test is carried out using ordinary least square procedure. As a usual procedure of the ARDL approach to cointegration, in the variable addition test along with imposing three lags on each first differenced term of respective level variables[90], the first lagged level of the variables is included in the variable addition test. An F-statistic of 6.64 is obtained as can be seen from Table 6.4. The F-statistic is found to be greater than the upper level of the critical band (i.e. 6.64 > 4.78) at 1% level of significance. This lends support to the existence of cointegration or a stable long-run relationship between the variables in the general consumption model. Now it is justified to retain the lagged value of all the five variables (a linear combination denoted by error-correction term, ecm_{-1}) in the **ARDL** model. Then the general private consumption model in (3) is estimated through the autoregressive distributed lag (ARDL) equation as devised by Pesaran and Shin (1995). The optimal lag structure of the specified private consumption model as determined both by R-bar Square and AIC criterion, is ARDL [2,1,1,2,3,0].

Table 6.4: Stability Test/Variable Addition Test/Cointegration Test (In level Forms)

Variables included with an intercept	Lags	F-statistics	Critical Value Bounds of F-statistics		Significance level
F(RPFCD| RNNP,RM_1, RTGE, RMBSPF, RDR)	3	F(6,11) ~ 6.64	3.51	4.78	1%
F(RPFCD| RNNP,RM_1, RTGE, RMBSPF, RDR, EXIMNF)	3	F(7,7) ~ 4.89	3.26	4.54	1%
F(RPFCD| RNNP,RM_1, RTGE, RMBPF, RDR)	3	F(6,11) ~ 5.76	3.51	4.78	1%
F(RPFCD| RNNP,RM_1, RTGE, RMBPF, RDR, EXIMNF)	3	F(7,7) ~ 4.43	2.47	3.64	5%
F(RPFCD| RNNP, RM_1, RCTGE, RCMBSPF, RDR	3	F(6,11) ~7.15	3.51	4.78	1%
F(RPFCD| RNNP, RM_1, RCTGE, RCMBSPF, RDR, EXIMNF	3	F(7,7) ~3.47	2.14	3.25	10%

Note: *The stability test is confirmed by imposing three lags for the differenced variables and one lag of the same variables in their levels in respective models. It is found that at the lags below than the fixed mentioned lags, there is no cointegration between the variables. Even though the lags significantly consume number of degrees of freedom, the cointegration confirmation is still relied on such results, as the estimation process is constrained to a short-sample size.*

[90]The lags on the differenced terms have been imposed on the basis of Akaike information criterion (AIC).

Table 6.5: Long-Run Estimates in the ARDL Model to Cointegration Approach (In Level Forms)

	CONST	RNNP	RM_1	RTGE /RCTGE	RMBSPF/ RMBPF /RCMBSPF	RDR	EXI MNF	ECM_{-1}
RPFCD with RMBSPF	2.24 (4.67)*	0 421 (1.89)***	0.458 (1.58)	0.267 (2.39)**	-0.141 (-1.67)***	0.003 (0.89)	-	-0.28 (-2.48)*
RPFCD with RMBSPF	2.27 (4.62)*	0 464 (1.89)*	0.367 (2.49)**	0.295 (4.42)*	-0.222 (-2.91)*	0.001 (0.78)	0.028 (0.77)	-0.40 (-3.75)*
RPFCD with RMBPF	2.30 (5.05)*	0 478 (2.63)**	0.321 (1.52)	0.234 (2.88)*	-0.151 (-1.71)***	.001 (0.41)	-	-0.294 (-2.62)*
RPFCD with RMBPF	2.361 (4.90)*	0 462 (3.64)*	0.319 (2.21)**	0.266 (4.53)*	-0.161 (-2.75)*	.0007 (0.35)	0.023 (0.63)	-0.423 (-3.61)*
RPFCD with RCMBSPF	2.819 (6.82)*	0 316 (1.88)***	0.418 (2.25)**	0.329 (3.72)*	-0.202 (-2.16)**	-0.003 (-1.21)	-	-0.393 (-3.07)*
RPFCD with RCMBPF	2.62 (4.17)*	.538 (5.59)*	.160 (1.48)	.291 (4.74)*	-.148 (-2.34)**	-.002 (-.029)	.041 (.874)	-.40 (3.72)*

Note- *The figures in parentheses are t-statistics and asterisk marks *** attached with t-values indicate significant at 10% level, ** indicates significant at 5% level and * indicates significant at 1% level.*

The resulting estimated ARDL[2,1,1,2,3,0] regression equation is presented in Appendix Table 6.1. The results indicate that the estimated ARDL[2,1,1,2,3,0] model passes all the diagnostic tests except the heteroscedasticity test. It can be noted that the ARDL estimates show no sign of serial correlation and passes the normality test. But the heteroscedasticity test result shows that the statistic is significant at a lower level (i.e. at 7 %) which means it is less of a problem in the estimation as the parameters are also unbiased in the presence of heteroscedasticity. This problem can be avoided by changing the lag structure. But this is ignored for the reason that by changing the lag structure, the estimation process may end up incorporating the insignificant variables in the estimation which may result in either overparametrisation or underparametrisation of the model. Then the equation is solved for obtaining the long-run parameters restricted to an optimal lag structure determined by R-Bar square and AIC criterion. The long-run coefficients are estimated and presented in Table 6.5. The long-run estimates show that income and government expenditure positively influence private consumption

spending while government domestic public debt negatively influences private consumption spending. The other variables such as liquid wealth of the private sector and real deposit rate play an insignificant role in influencing private consumption spending.

To understand the above result, one needs to take a look at the estimates of error correction results underlying the ARDL model. The parameters of the error correction equation are produced in Appendix Table 6.2. The estimates reflect that in the short-run, wealth of private sector, similar to the long-run estimates continues to play an insignificant role in explaining private consumption spending, while lagged domestic public debt and current income explain private consumption spending. In contrast to positive influence of income and government expenditure and negative influence of domestic public debt in the long-run, the short-run estimates suggest no effect of government expenditure, and a positive influence of public debt and income on private consumption in the short-run. The result also reveals that the lagged error-correction term (ecm_{-1}) carries an expected negative sign and the coefficient (0.29) is significant at a higher level (at 1%). This implies that in the event of a shock to the explanatory variables, the speed of adjustment in private consumption demand would be of 29 per cent. This means that 29 percentage of deviation from the long-run equilibrium solution in the previous year is corrected in the following period. This indicates that private consumption demand adjusts at a milder speed to the shocks of explanatory variables in order to be back to its long-run equilibrium value. Let's take a turn to the estimates of augmented form of private consumption model as represented in equation (4).

When equation (3) is augmented with openness of the economy measure as well as agricultural output to non-agricultural output, dependency ratio and a dummy variable in order to take account of the impact of policy, intensity/degree of liberalization measures and other structural features of the economy represented in equation (4); as the estimation is constrained by the limited sample size of the study, the inclusion of all the structural variables does not show the existence of cointegration. Even if cointegration does exist because of dropping of either of the two variables from these four structural variables, the estimates do not pass all the statistical properties of an efficient estimate. The inclusion of these structural

variables on the basis of various permutations and combinations is experimented. With this, the results suggest that either there does not exist cointegration, or even if cointegration does exist, the estimates produce bizarre results. Replacing the dummy variable, representing more openness of the economy from the year 1991-92, with the financial liberalization dummy from 1992-93, also does not show any sign of improvement in the parameter estimates either in terms of satisfying the statistical properties of the model or significance of the dummy.

When the estimation is carried out by incorporating one of these five variables (including financial liberalisation dummy) by a step-by-step procedure, it can be observed that when EXIMNF, as a measure of openness of the economy, is included in the model, the stability test, as reported in Table 6.4, confirms that there exists a cointegration relationship among the variables as the computed F-statistics (i.e. 4.89) exceeds the tabulated upper critical bound of F-statistics. Now one can proceed to estimate the long-run and short-run parameters of this augmented private consumption model using the ARDL estimation equation. It can be noted from Appendix Table 6.3 that the ARDL(3,1,1,3,3,0,1) passes all the statistical properties for obtaining efficient estimates. The long-run estimates in Table 6.5 shows that with the inclusion of EXIMNF in the model, the liquid wealth variable emerges to play a significant role having a positive influence on private consumption spending along with the continuance of fiscal and income variables in explaining private consumption. It is interesting to note that although the inclusion of EXIMNF improves the significance of the fiscal variables, it does not, by itself, along with interest rate on bank deposits play a significant role in influencing private consumption in the long-run. However, the short-run estimates produced in Appendix Table 6.4 suggest that in the short-run, except wealth and interest rate, EXIMNF, along with all other variables, exert influence on private consumption spending. Income and domestic debt continue to have positive influence. Government expenditure in the more recent past has had a positive and dominant influence on private consumption spending over its negative effect in distant past. EXIMNF negatively influences private consumption expenditure. The coefficient of error correction term (.40) is highly significant. This has a correct sign and suggests a moderate degree of speed of convergence of private consumption to its long-run equilibrium. The larger the error correction coefficient, the faster is the economy's

return to its equilibrium, once independent variables are shocked. This implies that 40 per cent of adjustment takes place in private consumption spending in the following period from any deviation to its long-run equilibrium in the previous period.

The inclusion of agricultural output to non-agricultural output, dependency ratio and dummy variables in the ARDL model shows that they produce inefficient estimates. The inclusion of these variables, on a step-by-step procedure, along with aggravating statistical problems, yields inconsistent estimates. In the latter stage, these variables are dropped from the estimation. One reason for such a problem in the estimation may be an improper measurement of dependency ratio, and colinearity between national income and agricultural-to-nonagricultural output in the model.

In the private consumption model represented by (3), when the variable representing domestic public debt of the central government (RMBSPF) is replaced with an alternative public debt variable (i.e. RMBPF) of the central government initially defined public debt RMBSPF (minus small savings collection), it can be examined whether there is any observable change in the impact of public debt (RMBPF) on private consumption spending. This variable is replaced keeping in view that small savings is no more a source of debt for the central government. A major portion of small savings in the earlier period is shared by the state governments with the central government. In recent years, with the change in debt management/fiscal policy, small savings do not come to the coffer of the central government as already examined in the domestic debt management policy (Chapter 4). This reflects that there is a shift in financing policy of the central government. The study also does not consider the monetized portion of domestic debt of the central government which is raised from the Reserve Bank of India (RBI) as a source of financing government expenditure, considering the fact that this portion does not directly form the claims of the private sector; and further this source of financing ceased to exist from 1997-98. With the withdrawal of monetization of debt as an option of financing the central government deficits, there is a pressure on the market debt component of the central government. The replacement of this newly defined public debt variable (RMBPF) may help answer an important question relating to the likely impact of a continuance of current pattern of public debt on future private consumption spending.

With the replacement of newly defined public debt variable (RMBPF) of the central government in consumption model, it can be seen from Table 6.4 that the F-statistic (i.e. 5.76) computed from the variable addition test, lies above the tabulated upper critical band of F-statistic (i.e., 4.78). This implies that there exists a stable long-run relationship among the variables in private consumption model. In the next step, all the diagnostic tests are carried out like in the earlier case. The order of the ARDL model is ARDL(1,0,1,2,2,0) as determined by the R-Bar square and AIC. In verifying the diagnostic tests, it is observed that it passes all the statistical properties for obtaining consistent estimates as noted in Appendix Table 6.5. Now, the ARDL equation can be solved for obtaining the long-run and short-run parameters. The long-run and short-run estimates of the ARDL model are produced in Table 6.5 and Appendix Table 6.6 respectively.

The long-run estimates of ARDL model for the general private consumption model reported in Table 6.5, reinforce the same result as in the equation with the previous definition of government domestic debt variable. This reflects that while in long-run income and government expenditure continue to exert positive influence on private consumption spending, government domestic public debt continues to have an adverse impact on private consumption spending. In the short-run (see Appendix Table 6.6), it is the income and liquid wealth that exert positive influence on private consumption spending, while deposit rate, domestic public debt and government expenditure do not play a significant role in influencing private consumption spending. Thus, there is a change in result for the short-run parameters with the change in definition of domestic public debt.

When the model as in (3) is augmented with EXIMNF as a measure of openness of the economy, the stability test reported in Table 6.4 confirms that there exists cointegration between the variables included in the model, as the computed F-statistic (i.e. 4.43) lies above the tabulated upper critical band of F-statistics. This leads to rejection of the null of cointegration at 5 per cent significance level. Then in the next step, the ARDL equation is estimated. The lag in ARDL(3,1,1,3,3,0,1) equation determined on the basis of R-bar square and AIC, satisfies the required diagnostic properties in order to ensure that estimates are efficient. This is noted in Appendix Table 6.7. Then the ARDL equation is solved for

the long-run and short-run estimates. From the long-run estimates as reported in Table 6.5, it can be observed that along with continuance of income, government expenditure and government debt in explaining private consumption spending, liquid wealth of the private sector emerges as another significant determinant of private consumption spending. The estimates suggest that in the long-run, income, wealth and government expenditure positively influence private consumption, while government domestic public debt negatively influences private consumption spending. The measure of openness of the economy and deposit rate similar to the above estimates, with changed definition of central government fiscal variables, do not have any significant influence on the private consumption spending. This result also coincides with the previous results when the model is estimated with the previous definition of government domestic public debt (RMBSPF) and expenditure variables with the presence of openness measure (EXIMNF) in the augmented general form of consumption model. In contrast, the short-run estimates reported in Appendix Table 6.8, reveals that except liquid wealth and interest rate (which do not have influence on private consumption expenditure), income, government expenditure and government debt, among other variables in the model positively influence private consumption spending. The adverse impact of EXIMNF on private consumption in the current period is almost offset by the positive impact of EXIMNF on private consumption in the immediate past. The error correction coefficient has correct sign. This is highly significant and negative (i.e. -.42). This indicates that private consumption demand adjusts by 42 per cent in the following period to any deviation from its long-run equilibrium in the previous period. This is in response to any shocks in the explanatory variables in the short-run.

Estimates with Combined Government Fiscal Policy Variables

The same general private consumption model (3) is estimated by substituting combined fiscal policy variables such as combined expenditure and combined domestic public debt of both the centre and state governments, once with exclusion of openness measure and once augmented with openness measure. Now one can examine what the emp rical estimates offer in terms of the parameter sign.

The cointegration test for the general consumption model without openness measure reported in Table 6.4 shows that the computed value of F-statistics (i.e.

7.15) well exceeds the tabulated upper critical band of F-statistics rejecting the null of cointegration. Then the ARDL equation is estimated satisfying all the basic diagnostic tests for a well specified model at an optimal lag. The order of the ARDL equation is ARDL(2,1,1,2,2,0) as shown in Appendix Table 6.9. Then the ARDL equation is solved for obtaining the long-run and short-run estimates. Surprisingly, the result produced in Table 6.5 shows that except interest rate, all other coefficients are significant in the long-run. The liquid wealth, income and combined government expenditure have favourable impact, while combined domestic debt has adverse impact on private consumption. In the short-run, it is the income and domestic debt which are positively significant (see Appendix Table 6.10). The coefficient of error correction term carries correct sign and shows moderate degree of adjustment of private consumption to any shocks in the explanatory variables.

In the next step, retaining all the variables in the general private consumption model (3), the model is augmented only with openness measure as in (4). From cointegration test result reported in Table 6.4, it can be seen that the F-statistics (i.e.3.47) on the lagged value of variables of the model is significant at 10 % level. This rejects the null of cointegration. Then the ARDL equation is estimated on the basis of a restricted optimal lag structure as shown in Appendix Table 6.11. The ARDL(2,0,1,1,0,3,2) equation satisfies all the diagnostic properties for obtaining good estimates. With the inclusion of EXIMNF, the long–run estimates in Table 6.5 indicate that the wealth variable most surprisingly becomes insignificant as compared to the significance of the previous estimates when the model is augmented with EXIMNF in presence of the *central* government domestic public debt and expenditure variables. However, the signs of coefficients of fiscal and income parameters are consistent with previous central government fiscal and income variables. In the short-run, except income (which consistently has positive influence) and openness (which has negative influence on private consumption) the result shows that combined domestic public debt and rate of interest have negative influence on private consumption (see Appendix Table 6.12). The coefficient of error correction term is significant and has negative sign. The magnitude is .40. This indicates a moderate degree of adjustment of the dependent variable in the following period to any deviations from its previous period long-run equilibrium.

Robustness of the Estimates with Per Capita Specification of Consumption Model

In order to verify the robustness of the above estimates, the study estimates the augmented form of private consumption model which includes only the openness measure as an additional structural variable in (3) by using the variables in per capita terms. This is done after conversion of all the nominal values into real terms and dividing by population except undoing with real deposit rate (EXIMNF remains unchanged as both the numerator and denominator would have to be divided by the same population, as a result, reverts to the same original value of EXIMNF). All values are also expressed in logarithm terms in the estimating equation except real deposit rate, for examining the direction of influence of the explanatory variables on per capita private consumption. Corresponding to the augmented consumption model (4), the ARDL approach to cointegration results are derived for three cases in accordance with alternative definitions of fiscal policy variables. Two cases relate to two definitions of domestic public debt followed for the changing financing and fiscal policy of the *central* government along with corresponding central government expenditure, and another case relates to *combined* domestic debt and expenditure of the center and state governments.

Following the usual procedure of ARDL approach to cointegration, when the cointegration is investigated with the augmented consumption model, taking into account central government domestic public debt variable inclusive of small savings (RMBSPFPN), and another case excluding small savings (RMBPFPN) from the definition of domestic public debt of the centre, in both the cases, the computed F-statistics well exceeds the tabulated upper critical band of F-statistics as shown in Table 6.6. This suggests that there exists cointegration between the variables in the models with both the definition of domestic debt of the central government. Then, the long-run and short-run parameters are estimated by solving the ARDL equation. This passes all the diagnostic tests at the restricted optimal lag structure selected on the basis of AIC criterion confirming that the models are well specified and there is no misspecification bias. From the long-run estimates reported in Table 6.7, it is observed that except EXIMNF and per capita liquid wealth of private sector (RM1PN), all other variables significantly influence per capita private consumption spending. As far as per capita income, government expenditure and domestic debt are concerned, the signs of the coefficients are consistent with the previous

estimates of level specification. But, there is a variation in the significance of the short-run estimates from the previous estimates of level specification (short-run estimates are not presented for conserving space). When the definition of debt includes small savings, the short-run estimates suggest that per capita income positively influences per capita private consumption, while deposit rate and openness measure adversely influence per capita private consumption. Other variables do not play a significant role. But when it excludes small savings, the short-run estimates suggest that per capita income along with per capita domestic public debt and expenditure positively influence per capita private consumption, while deposit rate and openness measure adversely influence per capita private consumption. Income, openness measure and to certain extent, public expenditure are consistent with previous estimates in exerting their impact corresponding to the definitions of fiscal policy considered and variables incorporated in the model.

Table 6.6: Stability Test/ Variable Addition Test (Per Capita Terms i.e. As a Ratio to Population)

Variables included with an intercept	Lags	F-statistics	Critical Value Bounds of F-statistics	Significance level
F(RPFCDPN| RNNPPN,RM_1PN, RTGEPN, RMBSPFPN, RDR, EXIMNF)	3	F(7,7) ~ 5.98	3.26 4.54	1%
F(RPFCDPN| RNNPPN,RM_1PN, RTGEPN, RMBPFPN, RDR, EXIMNF)	3	F(7,7) ~ 10.95	3.26 4.54	1%
F(RPFCDPN| RNNPPN,RM_1PN, RCTGEPN, RCMBSPFPN, RDR, EXIMNF)	3	F(7,7) ~ 4.65	3.26 4.54	1%

Note: *PN indicates the variable is in per capita term.

Table 6.7: Long-Run Estimates(in Per capita Specification as a Ratio to Population)

Variables	CONST	RNNPPN	RM_1PN	RTGEPN/RCTGEPN	RMBSPFPN/ RMBPFPN/RCMBSPFPN	RDR	EXIMNF	ECM_{-1}
RPFCDPN with RMBSPFPN	.762 (2.12)*	.705 (4.85)*	.275 (1.40)	.279 (3.07)*	-.256 (-2.30)**	-.016 (-3.05)*	.018 (.29)	-.287 (-3.13)*
RPFCDPN with RMBPFPN	.732 (2.17)**	.694 (4.72)*	.237 (1.30)	.247 (3.52)*	-.185 (-2.37)**	-.015 (-3.18)*	.016 (.28)	-.309 (-3.32)*
RPFCDPN with RCMBSPFPN	1.11 (3.58)*	.527 (3.71)*	.247 (1.68)***	.435 (4.67)*	-.238 (-2.85)*	-.012 (-3.03)*	.022 (.472)	-.377 (-3.86)*

Estimates with Combined Fiscal Policy Variables

When combined fiscal policy variables such as public debt (RCMBSPFPN) and government expenditure (RCTGEPN) are considered in place of central government fiscal policy variables, the null of cointegration is rejected as shown in Table 6.6, confirming that there is a long-run comovement relationship among the variables in the model. Then the model is estimated using the ARDL equation on the basis of an optimal lag selection criterion. This passes all the diagnostic tests confirming that functional form is well specified. The corresponding long-run estimates reported in Table 6.7 suggest that in the long-run, along with consistency of the same set of variables in their direction of influence as in the previous two cases, the per capita wealth emerges to have positive influence on per capita private consumption, though found to be significant at a lower level. Corresponding to the long-run estimates, the short-run estimates suggest that in the short-run, per capita income and per capita expenditure of the combined government exert positive influence on per capita private consumption, while deposit rate, lagged per capita domestic public debt and openness measure adversely affect per capita private consumption. The negative influence of per capita combined government domestic debt is well in contrast with the positive influence of the central government domestic debt in the short-run but consistent with its augmented level specification. This may be because of the fact that in the short-run, up to a certain level, debt induces private consumption and any further increase from that level reduces private consumption. The coefficient of error correction term in all cases possess correct sign indicating there is a moderate degree of adjustment of private consumption in the immediate year following its deviation from the long-run equilibrium in the previous year.

Robustness of the Results with Ratio Specification of Private Consumption Model

It is argued that income and government expenditure are likely to be colinear in the consumption model (4). In the next stage, in order to reduce the colinearity of the government expenditure with income, the model is respecified and re-estimated in the ratio form, by scaling up all the real values of variables except the deposit rate and EXIMNF (as EXIMNF is already expressed as a ratio to income) w.r.t. real national income i.e. RNNP at factor cost, leaving all other things unchanged.

The consumption model is estimated for three cases as in the above using the same ARDL approach to cointegration technique. Two cases are considered for the central government depending upon alternative definitions of domestic public debt adopted, and in another case the estimation is carried out incorporating combined domestic debt and expenditure of both the central and state governments.

When the model includes central government domestic debt inclusive of small savings (i.e. RMBSPFRN), and central government total expenditure, the computed F-statistics clearly exceeds the tabulated upper critical bound of F-statistics rejecting the null hypothesis of cointegration, but when the alternative definition of central government debt (i.e. RMBPFRN) is used in the model, the computed F-statistics lies between two tabulated critical bands (see Table 6.8). As the computed F-statistics falls in the indecisive critical region, it is difficult to take any firm decision about the presence or lack of cointegration in the model. Since the unit root test result suggests that some variables are I(1) and some are I(0), as a rule of thumb, it is assumed that there exists cointegration between the variables. Then, the ARDL equation is solved for obtaining the long-run and short-run parameters in private consumption model in relation to both the definitions of central government domestic public debt variables separately.

Corresponding to the ARDL equations with ratio specification, the underlying long-run estimates surprisingly suggest that all the coefficients are significant except the openness measure (see Table 6.9). The liquid wealth of the private sector and expenditure of the central government exert favourable impact, while interest rate and domestic public debt exert adverse impact on private consumption. In this model, with the alternative definition of domestic debt variable of the center, the EXIMNF surprisingly emerges to have negative influence on private sector consumption in the long-run which is not the case earlier. Similarly there is also a variation in the significance of short-run estimates. The short-run estimates, with domestic debt inclusive of small savings, suggest that the liquid wealth and government expenditure have positive influence, while the rate of interest and openness measure have adverse impact on private consumption. With alternative definition of domestic debt of the center, the short-run estimates reveal that along with the consistency of previous significant variables in exerting their influence,

domestic debt of the central government exerts positive impact on private consumption. In contrast to such estimates with central government fiscal variables, when the same model is re-estimated by substituting combined domestic public debt and expenditure of both the center and state governments using ARDL approach, it is observed that there does not exist cointegration implying that there is absence of long-run relationship between the variables in the model. Therefore, estimation is not carried forward in a usual procedure.

Table 6.8: Stability or Cointegration Test (In Ratio Specification i.e. As a Ratio to NNP at FC)

Variables included with an intercept	Lags	F-statistics	Critical Value Bounds of F-statistics	Significance level
F(RPFCDRN| RM_1RN, RTGERN, RMBSPFRN, RDR, EXIMNF)	4	F(6, 4) ~ 6.83	3.51 4.78	1%
F(RPFCDRN|RM_1RN, RTGERN, RMBPFRN, RDR, EXIMNF)	4	F(6, 4) ~ 2.42	2.26 3.36	Inconclusive
F(RPFCDRN| RM_1RN, RCTGERN, RCMBSPFRN, RDR, EXIMNF	4	F(6, 4) ~.77	2.26 3.36	No cointegration

Note: The above combinations of variables are tried with different lags. The F-test does not ensure whether there is an evidence of cointegration or lack of it for the second combination of variables, while the last one clearly indicates that there does not exist cointegration among the variables.

Table 6.9: Long-Run Estimates (in Ratio Specification as a Ratio to NNP at FC)

	CONST	RN NP	RM_1RN	RTGERN	RMBSPFRN/ RMBPFRN	RDR	EXIMNF	ECM_{-1}
RPFCDRN with RMBSPFRN	.656 (2.55)*	-	.326 (3.00)*	.267 (5.14)*	-.249 (-4.76)*	-.009 (-4.51)*	-.043 (-1.43)	-.458 (-4.25)*
RPFCDRN with RMBPFRN	.831 (2.48)*	-	.445 (3.03)*	.284 (4.50)*	-.235 (-4.13)*	-.009 (-3.62)*	-.068 (-2.13)**	-.39 (-3.66)*

***RN indicates the variable as a ratio to real net national product (RNNP).**

In all the above cases, when the narrower openness measure (EXIMNF) is replaced with a broader openness measure (EXIMCNF), (which is defined as to include exports plus imports and net capital receipts)[91], it is seen that there does not exist cointegration. Hence, the estimation of private consumption models is

[91] An appropriate measure of openness would have been to include total exports plus imports plus total volume of capital receipts and capital outflows, but in the context of data unavailability on total volume of capital receipts and outflows, the study has tried net capital receipts along with exports plus imports as a measure of openness.

confined to the narrower definition of openness measure. It is to be noted that when all the above equations are estimated using Johansen and Juselius (1992) cointegrating vector error correction approach, the long-run relationship corroborate the above results.[92] Even when wealth variable is dropped from the estimation in the context of unavailability of a full measure of wealth, the results are found to be consistent for income and fiscal policy variables within the estimates of Johansen and Juselius cointegrating vector error correction model. These results are not produced along with short-run estimates of previous cointegration model as they consume a lot of space.

Major Findings

From the above, the overall result with both the definitions of domestic public debt of the central government as well as the combined domestic debt of the center and state governments in level specification, suggests that the fiscal policy plays an important role in influencing private consumption-saving decision both in the long-run and short-run. In the long-run, national income along with public expenditure have positive impact, while domestic public debt has adverse impact on private consumption spending irrespective of presence of combined government or only central government policy variables in the model. The inclusion of measures of degree of openness of the economy variable in the model has implications for liquid wealth of private sector in terms of exerting influence on private consumption spending. It is seen that the inclusion of EXIMNF with the presence of central government fiscal policy variables in the model, leads the liquid wealth to have positive and significant impact on private consumption spending along with improving the significance of fiscal policy variables of the central government in explaining private consumption spending as against the presence of combined government policy variables. In the short-run, except liquid wealth and deposit rate, all other variables exert their influence on private consumption spending depending on the strength of their lagged effect over the immediate effect in the augmented consumption model, irrespective of presence of centre or combined fiscal variables.

In verifying the robustness of the estimates, the augmented private consumption model, both in per capita specification and ratio specification with

[92]Since the variables in the private consumption model are integrated at different order, while estimating the model through Johansen Juselius (1992) cointegration and error correction procedure, the steps outlined in

central government fiscal policy variables, provides consistent result as regards to the influence of income, government expenditure and domestic public debt on private consumption in the long-run, while with the combined fiscal policy variables the ratio specification provides little surprising result (as with combined fiscal policy variables, there is no long-run relationship in ratio specification). Further, in ratio specification, all the variables significantly influence private consumption spending keeping openness measure aside. The openness measure influences private consumption depending upon which definition of domestic public debt of the centre is incorporated in the model estimation. When domestic debt of the central government excludes small savings, it is only then that openness measure adversely affects private consumption spending, otherwise there is no impact of it in the long-run. While government expenditure and domestic public debt are consistent in their direction of influence on private consumption irrespective of whether the model is estimated in level, or per capita or ratio specification, the deposit rate has adverse impact on private consumption spending in per capita specification as well as ratio specification, suggesting that with a higher deposit rate, people save more than they consume.

In the short-run, most of the cases the central government domestic debt is found to be consistent in having the opposite impact on private consumption as against its adverse impact in the long-run. In contrast, combined government domestic debt most often has the same adverse impact both in the long-run and short-run. The reason for this may be as cited earlier. Income along with government expenditure, irrespective of the levels of government, has positive influence in the short-run and openness measure has adverse impact on private consumption matching some of the long-run estimates.

6.7 Conclusion

From the ARDL estimation results, it is observed that they vary depending on the specification of the model i.e. whether the model is specified in level form, ratio form (ratio to income) or per capita form; and results also vary according to the presence of fiscal policy variables – be it central government domestic debt and expenditure or combined government domestic debt and expenditure. When it

'Working with Microfit 4.0: Interactive Econometric Analysis are followed (see Pesaran and Pesaran, 1997).

involves central government fiscal variables, the level specification shows that in the long-run, it is both the expenditure and domestic public debt of the central government along with national income that exert influence on private consumption spending irrespective of presence or absence of EXIMNF variable in the model. The presence of EXIMNF makes the difference only in terms of making liquid wealth as a determinant of private consumption and enhancing the significance of fiscal policy variables. Since the study is mainly interested in the long-run impact of fiscal policy, results indicate that public expenditure crowds in private consumption expenditure, while domestic public debt, with both the definitions, (the definition of domestic public debt once includes small savings and in another excludes small savings) has adverse impact on private consumption spending. The adverse impact of domestic public debt may be due to its implication for the future taxation. This is contrary to the positive implication of government debt in raising wealth expectation of the private sector as the standard Keynesian theory predicts.

When it relates to the presence of fiscal policy variables of the combined government in the model, the level specification shows the consistency with above findings in terms of the impact of income, government expenditure and public debt. But the presence and absence of EXIMNF in the equation makes a difference in the impact of real liquid wealth of private sector on private consumption. With the exclusion of EXIMNF, there is an impact of real liquid wealth on private consumption, while its inclusion makes the real wealth insignificant. This is in sharp contrast to the results obtained with presence of fiscal variables of the central government in the private consumption model.

In contrast to level specification, the per capita specification and ratio specification conform to the consistency in the direction of influence of central government expenditure, central government domestic public debt, income and even the liquid wealth in influencing private consumption in the long-run, but it differs as far as significance of the EXIMNF and deposit rates are concerned. That apart, there is lack of evidence of cointegration when the combined fiscal variables are present in the estimating equation in ratio specification. Further, the estimated result, when the central government debt variable includes small savings, shows insignificant impact of EXIMNF, while the exclusion of small savings from the

definition of domestic debt of the center, leads to the significance of EXIMNF. The negative influence of EXIMNF both in the long-run and short-run may arise, as increased exports give rise to more growth, and hence more savings. EXIMNF may also imply more import of raw materials which augments production. This raises productivity and growth of the economy and hence contributes towards savings. From this, it can be concluded that even though there are differences in the results, given the consistency in the sign of the fiscal and income parameters, the results neither support the prediction of standard theory nor the Ricardian Equivalence theorem.

But still the question that arises is why the government expenditure crowds in and domestic public debt crowds out the private sector consumption expenditure remains unanswered. The possible reason may be that government spends a major part of resources towards payment of wages and salaries to the individuals. As a result, it leads to a rise in income and thereby resulting in an increase in their consumption spending. But the negative impact of government debt may arise due to the fact that public debt comes from the people directly constituting the savings of people. To the extent that there is resource absorption by the government from surplus private sector units, the deficit private sector units may be cash strapped or constrained to access credit resulting in less consumption demand. Further, if private people were foresighted, the increase in government debt would induce them to increase their savings as they have to pay taxes in future.

Given such a result, it is not surprising to see why RET fails in the Indian context. Public debt has direct saving implication because when people save in government bonds, it directly reduces their consumption, but when it comes back to them in the form of income through the channel of government expenditure, people spend. The invalidity of the theorem may also arise due to the distributional implications of government expenditure and debt. Suppose as a result of government expenditure, more income goes to the people whose marginal propensity to consume is high, it would increase private consumption expenditure, but at the same time, since rich people increase their savings with a view to pay taxes, holding more of government debt would reduce their consumption. Rich people may also have bequest motive besides having less marginal propensity to consume.

Appendix Table 6.1: Autoregressive Distributed Lag Estimates

ARDL(2,1,1,2,3,0) selected based on R-BAR Squared Criterion Dependent variable is RPFCD 37 observations used for estimation from 1964 to 2000		
Regressor	Coefficient	T-Ratio[Prob]
CONST	.6433	2.2944[.032]
RPFCD(-1)	.5861	3.9129[.001]
RPFCD(-2)	.1276	1.2890[.211]
RM1	.0596	1.1143[.277]
RM1(-1)	.0715	1.1126[.278]
RNNP	.5410	6.9891[.000]
RNNP(-1)	-.4203	-3.6611[.001]
RTGE	.0153	.4919[.628]
RTGE(-1)	.0192	.4684[.644]
RTGE(-2)	.0418	1.4303[.167]
RMBSPF	-.0142	.0888[.930]
RMBSPF(-1)	.0048	-.3173[.754]
RMBSPF(-2)	-.0211	-.3967[.695]
RMBSPF(-3)	-.0373	-1.1884[.247]
RDR	.0009	1.0080[.324]
R-Squared .99954	R-Bar-Squared	.9992
F(14, 22) 3402.4[.000]	DW-statistic	2.2497
A:Serial Correlation*CHSQ(1) = 1.4343[.231]*F(1, 21) = .84688[.368]		
B:Functional Form *CHSQ(1) = .50984[.475]*F(1, 21) = .29341[.594]		
C:Normality *CHSQ(2) = .45899[.795]* Not applicable		
D:Heteroscedasticity*CHSQ(1) = 3.4015[.065]*F(1, 35) = 3.5434[.068]		

Note: A:Lagrange multiplier test of residual serial correlation; B: Ramsey's RESET test using the square of the fitted values; C:Based on a test of skewness and kurtosis of residuals; D:Based on the regression of squared residuals on squared fitted values

Appendix Table 6.2: Error Correction Representation for the Selected ARDL Model

ARDL(2,1,1,2,3,0) selected based on R-BAR Squared Criterion Dependent variable is dRPFCD 37 observations used for estimation from 1964 to 2000		
Regressor	Coefficient	T-Ratio[Prob]
DRPFCD1	-.1276	-1.2890[.209]
DRM1	.0596	1.1143[.275]
DRNNP	.5410	6.9891[.000]
dRTGE	.0153	.4919[.627]
dRTGE1	-.0418	-1.4303[.165]
dRMBSPF	-.0142	-.3173[.754]
dRMBSPF1	.0585	1.6587[.109]
dRMBSPF2	.0373	1.1884[.245]
dRDR	.0009	1.0080[.323]
CONST	.6433	2.2944[.030]
ecm(-1)	-.2861	-2.4898[.020]
R-Squared .8715	R-Bar-Squared .78975	F-stat.(10, 26) 14.9226[.000]

Note:R-Squared and R-Bar-Squared measures refer to the dependent variable dRPFCD and in cases where the error correction model is highly restricted, these measures could become negative.

Appendix Table 6.3: Autoregressive Distributed Lag Estimates

ARDL(3,1,1,3,3,0,1) selected based on R-BAR Squared Criterion Dependent variable is RPFCD 37 observations used for estimation from 1964 to 2000		
Regressor	Coefficient	T-Ratio[Prob]
CONST	.9310	3.2185[.005]
RPFCD(-1)	.3239	2.0461[.056]
RPFCD(-2)	.0562	.6762[.507]
RPFCD(-3)	.2106	2.1468[.046]
RM1	.0392	.9430[.358]
RM1(-1)	.1109	2.0286[.058]
RNNP	.3907	4.7640[.000]
RNNP(-1)	-.2005	-1.7880[.091]
RTGE	.0857	2.7891[.012]
RTGE(-1)	-.0471	-1.3267[.201]
RTGE(-2)	.0409	1.4504[.164]
RTGE(-3)	.0414	1.5783[.132]
RMBSPF	-.0319	-.9002[.380]
RMBSPF(-1)	.0041	.0960[.925]
RMBSPF(-2)	.0012	.0302[.976]
RMBSPF(-3)	-.0642	-2.324[.032]
RDR	.0006	-2.3243[.032]
EXIMNF	-.0986	-3.6253[.002]
EXIMNF (-1)	.1103	4.2631[.000]
R-Squared .99978	R-Bar-Squared	.99955
F-stat. F(18, 18) 4454.8[.000]	DW-statistic	2.0391
A:Serial Correlation*CHSQ(1) = .36005[.548]*F(1, 17) = .16705[.688] B:Functional Form *CHSQ(1) = .42465[.515]*F(1, 17) = .19737[.662] C:Normality *CHSQ(2) = .78657[.675]* Not applicable D:Heteroscedasticity*CHSQ(1) = .71936[.396]*F(1, 35) = .69396[.410]		

Appendix Table 6.4: Error Correction Representation for the Selected ARDL Model

ARDL(3,1,1,3,3,0,1) selected based on R-BAR Squared Criterion Dependent variable is dRPFCD 37 observations used for estimation from 1964 to 2000		
Regressor	Coefficient	T-Ratio[Prob]
dRPFCD1	-.2668	-2.6071[.016]
dRPFCD2	-.2106	-2.1468[.043]
dRM1	.0392	.9430[.355]
dRNNP	.3907	4.7640[.000]
dRTGE	.0857	2.7891[.010]
dRTGE1	-.0823	-3.0495[.006]
dRTGE2	-.0415	-1.5783[.128]
dRMBSPF	-.0319	-.9002[.377]
dRMBSPF1	.0630	1.9569[.063]
dRMBSPF2	.0642	2.3243[.029]
dRDR	.0006	.8272[.417]
dEXIMNF	-.0986	-3.6253[.001]
CONST	.9310	3.2185[.004]
ecm(-1)	-.4092	-3.7595[.001]
R-Squared .9375	R-Bar-Squared	.8751
F-stat.(13, 23) 20.7828[.000]	DW-statistic	2.0391

Appendix Table 6.5: Autoregressive Distributed Lag Estimates

ARDL(1,0,1,2,2,0) selected based on R-BAR Squared Criterion Dependent variable is RPFCD 37 observations used for estimation from 1964 to 2000		
Regressor	Coefficient	T-Ratio[Prob]
CONST	.6751	2.5042[.019]
RPFCD(-1)	.7053	6.2823[.000]
RM1	.0946	2.1631[.040]
RNNP	.5948	8.6831[.000]
RNNP(-1)	-.4539	-4.3354[.000]
RTGE	.0348	1.2241[.232]
RTGE(-1)	-.0145	-.36524[.718]
RTGE(-2)	.0486	1.6384[.114]
RMBPF	.0060	.23871[.813]
RMBPF(-1)	-.0121	-.34313[.734]
RMBF(-2)	-.0383	-1.5640[.130]
RDR	-.0002	-.40994[.685]
R-Squared .99946 R-Bar-Squared .99922 F(11, 25) 4197.0[.000] DW-statistic 2.2323 Durbin's h-statistic -.96697[.334]		
A:Serial Correlation*CHSQ(1) = 1.1772[.278]*F(1, 24) = .78865[.383] B:Functional Form *CHSQ(1) = .22000[.639]*F(1, 24) = .14356[.708] C:Normality *CHSQ(2) = 2.9543[.228]* Not applicable D:Heteroscedasticity*CHSQ(1) = 1.3115[.252]*F(1, 35) = 1.2862[.264]		

Appendix Table 6.6: Error Correction Representation for the Selected ARDL Model

ARDL(1,0,1,2,2,0) selected based on R-BAR Squared Criterion Dependent variable is dRPFCD 37 observations used for estimation from 1964 to 2000		
Regressor	Coefficient	T-Ratio[Prob]
dRM1	.0946	2.1631[.039]
dRNNP	.5948	8.6831[.000]
dRTGE	.0348	1.2241[.231]
dRTGE1	-.0486	-1.6384[.113]
dRMBPF	.0060	.2387[.813]
dRMBPF1	.0383	1.5640[.129]
dRDR	-.0002	-.4099[.685]
CONST	.6751	2.5042[.018]
ecm(-1)	-.2946	-2.6247[.014]
R-Squared .84937 R-Bar-Squared .78309 F-stat. (8, 28) 17.6213[.000] DW-statistic 2.2323		

Appendix Table 6.7: Autoregressive Distributed Lag Model Estimates

ARDL(3,1,1,3,3,0,1) selected based on R-BAR Squared Criterion
Dependent variable is RPFCD
37 observations used for estimation from 1964 to 2000

Regressor	Coefficient	T-Ratio[Prob]
CONST	1.0004	3.3769[.003]
RPFCD(-1)	.3523	2.1811[.043]
RPFCD(-2)	.0544	.5981[.557]
RPFCD(-3)	.1694	1.6350[.119]
RM1	.0388	1.6422[.118]
RM1(-1)	.0966	1.6422[.118]
RNNP	.4058	4.6756[.000]
RNNP(-1)	-.2097	-1.8099[.087]
RTGE	.0854	2.6150[.018]
RTGE(-1)	-.0520	-1.3278[.201]
RTGE(-2)	.0435	1.4200[.173]
RTGE(-3)	.0359	1.2598[.224]
RMBPF	-.0032	-.14313[.888]
RMBPF(-1)	-.0203	-.6427[.529]
RMBF(-2)	.0003	.0083[.993]
RMBPF(-3)	-.0452	-1.9346[.069]
RDR	.0003	.3518[.729]
EXIMNF	-.0968	-3.3867[.003]
EXIMNF (-1)	.1069	3.8460[.001]

R-Squared .99974 R-Bar-Squared .99947
F-stat. F(18, 18) 3804.9[.000] DW-statistic 1.9566

A:Serial Correlation*CHSQ(1) = .083574[.773]*F(1, 17) = .038486[.847]
B:Functional Form *CHSQ(1) = .037986[.845]*F(1, 17) = .017471[.896]
C:Normality *CHSQ(2) = .80041[.670]* Not applicable
D:Heteroscedasticity*CHSQ(1) = 1.6872[.194]*F(1, 35) = 1.6723[.204]

Appendix Table 6.8: Error Correction Representation for the Selected ARDL Model

ARDL(3,1,1,3,3,0,1) selected based on R-BAR Squared Criterion
Dependent variable is dRPFCD
37 observations used for estimation from 1964 to 2000

Regressor	Coefficient	T-Ratio[Prob]
dRPFCD1	-.2239	-2.1406[.043]
dRPFCD2	-.1694	-1.6350[.116]
DRM1	.0388	.8564[.401]
dRNNP	.4058	4.6756[.000]
dRTGE	.0854	2.6150[.015]
dRTGE1	-.0795	-2.7810[.011]
dRTGE2	-.0359	-1.2598[.220]
dRMBPF	-.0032	-.1431[.887]
dRMBPF1	.0449	1.7246[.098]
dRMBPF2	.0452	1.9346[.065]
dRDR	.0002	.3518[.728]
dEXIMNF	-.0968	-3.3867[.003]
CONST	1.0004	3.3769[.003]
Ecm(-1)	-.4237	-3.6169[.001]
R-Squared	.92687	R-Bar-Squared .85374
F(13, 23)	17.5495[.000]	DW-statistic 1.9566

Appendix Table 6.9: Autoregressive Distributed Lag Estimates

ARDL(2,1,1,2,2,0) selected based on R-BAR Squared Criterion Dependent variable is RPFCD 37 observations used for estimation from 1964 to 2000		
Regressor	Coefficient	T-Ratio[Prob]
CONST	1.1082	2.9960[.006]
RPFCD(-1)	.4939	3.1364[.005]
RPFCD(-2)	.1130	1.2209[.234]
RM1	.0590	1.1522[.261]
RM1(-1)	.1054	1.6714[.108]
RNNP	.5216	6.7291[.000]
RNNP(-1)	-.3972	-3.4334[.002]
RCTGE	.0281	.5892[.561]
RCTGE(-1)	.0294	.4413[.663]
RCTGE(-2)	.0718	1.4610[.158]
RCMBSPF	-.0244	-.4790[.636]
RCMBSPF(-1)	.0113	.1925[.849]
RCMBSPF(-2)	-.0665	-1.7058[.102]
RDR	.0012	1.3233[.199]
R-Squared .99957 R-Bar-Squared .99932 DW-statistic 2.1408 F-stat.(13, 23) 4075.9[.000]		
A:Serial Correlation*CHSQ(1) = .69733[.404]*F(1, 22) = .42259[.522] B:Functional Form *CHSQ(1) = 1.5209[.217]*F(1, 22) = .94309[.342] C:Normality *CHSQ(2) = 1.2118[.546]* Not applicable D:Heteroscedasticity*CHSQ(1) = 2.7998[.094]*F(1, 35) = 2.8652[.099]		

Appendix Table 6.10: Error Correction Representation for the Selected ARDL Model

ARDL(2,1,1,2,2,0) selected based on R-BAR Squared Criterion			
Dependent variable is dRPFCD			
37 observations used for estimation from 1964 to 2000			
Regressor	Coefficient		T-Ratio[Prob]
dRPFCD1	-.1130		-1.2209[.233]
DRM1	.0590		1.1522[.259]
dRNNP	.5216		6.7291[.000]
dRCTGE	.0281		.5892[.561]
dRCTGE1	-.0718		-1.4610[.156]
dRCMBSPF	-.0244		-.4790[.636]
dRCMBSPF1	.0665		1.7058[.100]
dRDR	.0012		1.3233[.197]
CONST	1.1082		2.9960[.006]
Ecm(-1)	-.3930		-3.0740[.005]
R-Squared	.8792	R-Bar-Squared	.81099
DW-statistic	2.1408	F-stat. (9, 27)	18.6075[.000]

Appendix Table 6.11: Autoregressive Distributed Lag Estimates

ARDL(2,0,1,1,0,3,2) selected based on R-BAR Squared Criterion Dependent variable is RPFCD 37 observations used for estimation from 1964 to 2000		
Regressor	Coefficient	T-Ratio[Prob]
CONST	1.0557	3.7429[.001]
RPFCD(-1)	.3904	2.7031[.013]
RPFCD(-2)	.2068	2.1959[.039]
RM1	.0647	1.5740[.130]
RNNP	.5249	7.8823[.000]
RNNP(-1)	-.3079	-3.4420[.002]
RCTGE	.0168	.3465[.732]
RCTGE(-1)	.1005	2.0430[.054]
RCMBSPF	-.0596	-2.4736[.022]
RDR	.0009	1.1983[.244]
RDR(-1)	-.0005	-.9353[.360]
RDR(-2)	-.0001	-.3478[.731]
RDR(-3)	.0009	1.7299[.098]
EXIMNF	-.0649	1.7299[.098]
EXIMNF(-1)	.0338	1.0120[.323]
EXIMNF(-2)	.0477	1.8449[.079]
R-Squared .99974	R-Bar-Squared	.9995
F-stat. F(18, 18) 5339.5[.000]	DW-statistic	2.08
A:Serial Correlation*CHSQ(1) = .30136[.583]*F(1, 20) = .16424[.690] B:Functional Form *CHSQ(1) = .88781[.346]*F(1, 20) = .49170[.491] C:Normality *CHSQ(2) = .30252[.860]* Not applicable D:Heteroscedasticity*CHSQ(1) = 2.2148[.137]*F(1, 35) = 2.2285[.144]		

Appendix Table 6.12: Error Correction Representation for the Selected ARDL Model

ARDL(2,0,1,1,0,3,2) selected based on R-BAR Squared Criterion			
Dependent variable is dRPFCD			
37 observations used for estimation from 1964 to 2000			
Regressor	Coefficient	T-Ratio[Prob]	
dRPFCD1	-.2068	-2.1959[.038]	
DRM1	.0647	1.5740[.128]	
dRNNP	.5249	7.8823[.000]	
dRCTGE	.0168	.3465[.732]	
dRCMBSPF	-.0596	-2.4736[.021]	
dRDR	.0009	1.1983[.242]	
dRDR1	-.0007	-1.0924[.285]	
dRDR2	-.0009	-1.7299[.096]	
dEXIMNF	-.0649	-2.6239[.015]	
dEXIMNF1	-.0476	-1.8449[.077]	
CONST	1.0557	3.7429[.001]	
ecm(-1)	-.4026	-3.7246[.001]	
R-Squared	.9270	R-Bar-Squared	.87494
DW-statistic	2.0836	F-stat.(11, 25)	24.2591[.000]

Chapter 7

Macro-Economic Impact of Domestic Public Debt on Private Investment in India

Private investment is a major factor affecting the growth rate of the economies (Bleaney, Gemmell and Kneller, 2001). Economists argue that, apart from many factors directly affecting private sector investment, there are various channels through which domestic public debt, as an instrument of fiscal policy, can impact private sector investment.[93] Factors such as extent of capital mobility, form of exchange rate regime, accumulated domestic real money balances and determinants of aggregate supply can exert influence on private sector investment.[94] Practically, it is very difficult to capture all the factors in the empirical modelling of private investment. This is mainly on account of data difficulties afflicting the developing economies.[95] Therefore, there exists a huge problem in building theoretical macro models and the practicability of these models.

The growing public debt is a crucial issue in the macroeconomic policy making of a country as it has wide implications for an economy. In this context, the study attempts to examine the impact of government domestic debt on private sector investment. There is a widespread view among the policy makers that curtailment of real resources (arising from government absorption) associated with a rise in debt-financed public expenditure influencing the intermediary variables like prices and interest rates affects private investment.[96] Not only does the government

---

[93]In this chapter public debt does not refer to the outstanding stock of government borrowings. It refers to government borrowings (flow of debt) as crowding out concept is more relevant to the flow concept of debt than the stock concept.

[94]The institutional and structural features characterising the economies such as absence of well-functioning financial market, relatively greater role of government in capital formation, distortions created by foreign exchange constraint and other market imperfections inhibit modeling of private investment in developing economies (Blejer and Khan, 1984).

[95]It is very difficult to obtain data on profits earned and rents paid by the private sector firms associated with their investment activities.

[96]Usually, the studies refer to debt-financed public expenditure as bond-financed public expenditure, but here the study refers to debt-financed expenditure as market borrowings plus small savings and provident funds which are the claims of the private sector. As the study focuses on the private sector behavior, it examines the impact of debt raised by the government from private sector on private sector investment spending. Although it cannot be denied that other forms of government borrowings have impact on private sector investment, but private sector

debt affect private investment through its effect on prices and interest rates, but also private investment through the transmission effect of government debt on other macro economic variables such as consumption, savings, and output. The transmission effect occurs through the operation of multiplier and accelerator process. Considering the rates of interest as an intermediary variable, the rise in real interest rates associated with higher public sector borrowing requirements (even when borrowing finances public sector investment) tends to crowd out private investment. The effect depends on the responsiveness of private investment to the change in rate of interest. The impact of this replacement of private investment on economic growth depends on the impact of change in public debt on aggregate investment along with other factors that determine private sector investment in the economy. Since the interest rates in many of the developing countries remained repressed for a long period of time, the effect of public debt on published official interest rates would be almost insignificant. There are numerous empirical studies in the literature that examine the crowding out/in phenomenon. These studies mainly examine the effect of fiscal policy on the rate of interest and thereby conclude on the crowding out hypothesis as noticed in the literature. Like many other studies in the international context which partially modelled the behaviour of private sector investment, this study does not attempt to build a complete model wherein government debt affects private sector investment through its indirect effect via interest rates and prices, requiring a simultaneous equation model. Rather, the rate of interest is used for the computation of real user cost of capital which may explain the behaviour of private investment.

It is to be emphasized that under a situation of debt-financed increase in public expenditure, if a major share of expenditure is spent on less productive activities at the cost of private productive activities, it restrains the optimal use of resources. It would lessen the marginal productivity of private investment thereby stifling not only the economic growth process but also can take away the economy from a higher equilibrium growth trajectory to a lower equilibrium growth trajectory, something undesirable for a growing economy like India in particular, and any economy in general. But one can't lose sight of the fact that public debt, when

---

investment behaviour is expected to be more sensitive to the government borrowings especially when borrowings are raised from the private sector.

utilized for productive activities, especially for creation of infrastructure facilities in a growing economy, supplements private investment.[97] Provision of infrastructure facilities such as transportation, communication, power and irrigation, etc. tends to reduce the cost of production or increase the returns on private investment and thus increase the profitability of private investment (Wai and Wong, 1982) which helps in augmenting private sector investment and hastening the growth process of the economy. Another important point to be noted is that even if the debt-financed public expenditure is productive, it may replace private investment in certain specific sectors such as steel and mining. However, this may not replace private sector investment provided it creates demand for private sector output. But judged from another angle, the increase in domestic market borrowings constrains the availability of financial resources for private sector, thereby reducing private sector investment. Thus, the effect of debt-financed public expenditure on private investment depends on the net effect of its complementarity and substitutability relationship with private investment. As stated earlier, this study does not attempt to build a full-scale macro model of private investment, but tries to capture the effect of government debt on private investment by considering other relevant determinants in the model. Before developing a model for testing the impact of public debt on private investment, the study, in the following section, brings out more clearly the theoretical relationship between government domestic debt and private investment.

7.1 Theoretical Relationship Between Domestic Public Debt and Private Investment

There are several arguments raised in the economic theory regarding the impact of domestic government borrowing on private investment. Notwithstanding the popular consensus, contradictions exist in the arguments of economists as to the relationship between government domestic borrowing and private investment. The impact of government borrowing on private investment, *inter alia*, depends on utilization pattern of borrowing and economic conditions prevailing in the economy (such as whether there is full-employment or not and to what extent the economy is open to trade with the external world). Regarding the effects of government borrowing, Keynesian theory is considered as one of the most popular theories in

[97]Wai and Wong (1982) note that even if the government investment is made in secondary or tertiary sector, the establishment of new factories will increase the demand for related products and thus induce a higher level of

macroeconomic literature. On the one hand, it views that during slump or the economy being in an underemployment equilibrium, an increase in debt-financed public expenditure stimulates economic activities. It stimulates real private investment by filling up the infrastructural needs of an economy, where infrastructure is believed to act as a prime driving force of private investment raising aggregate demand and profitability of private investment and thereby leading to higher economic growth. Higher economic growth promotes savings and consumption by increasing the income of households and, therefore, expansionary economic activities emerge. On the other hand, Keynesian theory, on the lines of Classical theory, argues that debt-financed public expenditure, after reaching a certain optimum higher level, drives up interest rates and lowers the output level. In particular, there is a possibility of public debt crowding out private sector investment and thereby producing detrimental effects on long-term growth potential of an economy. But the occurrence of crowding out effect is seen as a rare possibility within the class of Keynesian models applied in the context of developing economies. In such a context, public investment is likely to enhance the productivity of private sector investment (Aschauer, 1989).

According to Diamond (1965), the presence of internal public debt implies taxes on the individuals. Further, taxes, besides directly reducing the disposable income of individuals, reduce savings and thus capital stock. It reduces capital stock by substituting government debt for the physical capital stock. David and Scadding (1974) in a similar way, contest the view that a rise in government investment expenditure may also crowd out equal amount of private investment expenditure as public investment is deficit-financed. In contrast, Baily (1962), contends that there is a possibility of individuals internalising the future taxes an equivalent value of government debt in their budget constraint. This mainly arises on account of issuance of current public debt, thereby, rendering the government financial decision irrelevant to private investment and output.

However, in contrast to the Keynesian arguments on the impact of debt-financed government expenditure, New Classicals differ in their argument based on neutral effect of debt-financing as originally propounded by Ricardo (1951).[98] The

---

private investment.

[98]Neutralist effect of debt-financing as implied by Ricardian equivalence proposition tells that bond-financed public expenditure does not result in any net economic effect. If it produces any effect in the current period it will get compensated/nuetralised in the later period, so the net effect will be nil.

neutrality proposition is further revived and demonstrated by Barro (1974) in his Ricardian equivalence theorem. The proposition suggests that under certain assumptions such as presence of infinite horizon of individuals and perfect capital market, debt-financed government expenditure has none of the economic effects, as opposite to what the traditional theories put forth. This is based on the logic that debt-financing implies future taxes with a present value equal to the value of government debt. The rational agents (recognizing this equivalence) will proceed as though debt does not exist. Since economic effects mostly depend upon changes in the behaviour of economic agents, and that New Classicals assume that agents behave in a similar rational manner throughout their lifetime, irrespective of alternative ways of financing (debt-financing and tax-financing, given the level of government expenditure), no change in economic activities arise. However, this neutrality proposition is later challenged by several authors as noted in the preceding chapter. It is also true that New Classical debt neutrality theorem is hardly proved to hold in the context of private investment.

Given the above propositions relating to the impact of debt-financing government expenditure on private investment, it is interesting to bring out a general specification of private investment function for the Indian economy by considering relevant determinants along with domestic government borrowings as one of the determinants of private investment. Before discussing the determinants of private investment, next section presents the trends of other macro economic variables along with private investment in the Indian economy. This would help us gain some tentative insights into the behavioural relationship of macro variables in the economy.

7.2 Trends in Private Investment and the Behaviour of Related Key Economic Variables in India

The relationship between domestic private investment and fiscal indicators can be examined through their trends along with those of other key macroeconomic indicators. Private sector savings are a major source of financing private sector investment in most of the economies. In India, gross private sector savings taken as a percentage of GDP, have increased significantly over the decades, barring a few variations in its trends some years. Gross private savings to GDP presented in Table

7.1 shows an increase from 8.94 per cent in 1960-61 to 15.45 per cent in 1980-81 and to 22 per cent in 1990-91 and further to 24.47 per cent in 1999-00. Correspondingly, private sector investment measured in gross private capital formation as a ratio to GDP, starting with 7.79 per cent in 1960-61 reaches 10.27 per cent level in 1980-81 and to 14.73 and 16.14 per cent levels in 1990-91 and 1999-00 respectively (see Table 7.1). In relation to the behaviour of gross private investment, it can be observed from Figure 7.1 that although private fixed investment lies below the gross private investment, they are closely associated in terms of their behavioral pattern. The difference between the two arises due to inventory adjustments. With a fall in gross private investment there is a downward trend in private fixed investment and conversely, with an increase in gross private investment there is an upward trend in private fixed investment. Although both gross and fixed private investment witness a sharp rise in 1990s, both experience severe cyclical fluctuations during the same period. In terms of real investment similar trend is also observed in Figure 7.2.

Table 7.1: Private Investment and Other Key Macro Indicators in India

(In percent)

Years	Gross fixed private capital formation /GDP	Public sector gross capital formation /GDP	Gross private capital formation /GDP	Gross private savings /GDP	Net foreign capital inflow /GDP	Fiscal deficit /GDP	Market Borrowings & SS+PF (flow of debt) /GDP	Government final consumption expend. /GDP	Total Export & Import /GDP
1960-61	6.36	6.86	7.79	8.94	2.80	3.51	3.10	7.03	0.11
1965-66	7.49	8.25	8.08	8.63	2.16	3.50	-0.40	9.29	0.09
1970-71	8.49	6.39	9.43	11.62	0.86	3.08	1.09	9.39	0.08
1975-76	9.22	9.37	9.60	13.00	-0.14	3.64	1.69	9.93	0.13
1980-81	10.15	8.42	10.27	15.45	1.46	6.18	3.38	10.08	0.15
1985-86	10.52	10.79	12.88	15.93	2.24	8.05	3.65	11.42	0.13
1990-91	13.94	9.34	14.73	21.99	31.86	7.85	8.56	11.61	0.16
1991-92	12.87	8.82	13.11	20.06	0.52	5.56	3.06	11.37	0.16
1992-93	14.25	8.55	15.24	20.18	1.85	5.37	1.45	11.22	0.19
1993-94	13.44	8.24	13.01	21.90	0.56	7.01	4.67	11.37	0.20
1994-95	13.17	8.71	14.67	23.17	1.17	5.70	3.93	10.73	0.21
1995-96	16.65	7.66	18.87	23.07	1.75	5.07	4.10	10.84	0.24
1996-97	15.90	7.03	12.91	21.49	1.30	4.88	2.79	10.65	0.24
1997-98	15.35	6.61	16.32	22.00	1.46	4.81	7.53	11.31	0.23
1998-99	14.96	6.37	14.78	22.81	1.03	5.14	6.37	12.04	0.21
1999-00	15.11	7.13	16.14	24.07	1.02	5.64	6.23	11.17	0.23

Note: The data is sourced as discussed in the data discussion. All the figures in the above table are in nominal terms.

Figure 7.1: Trends in Private Capital Formation and Public Sector Capital Formation

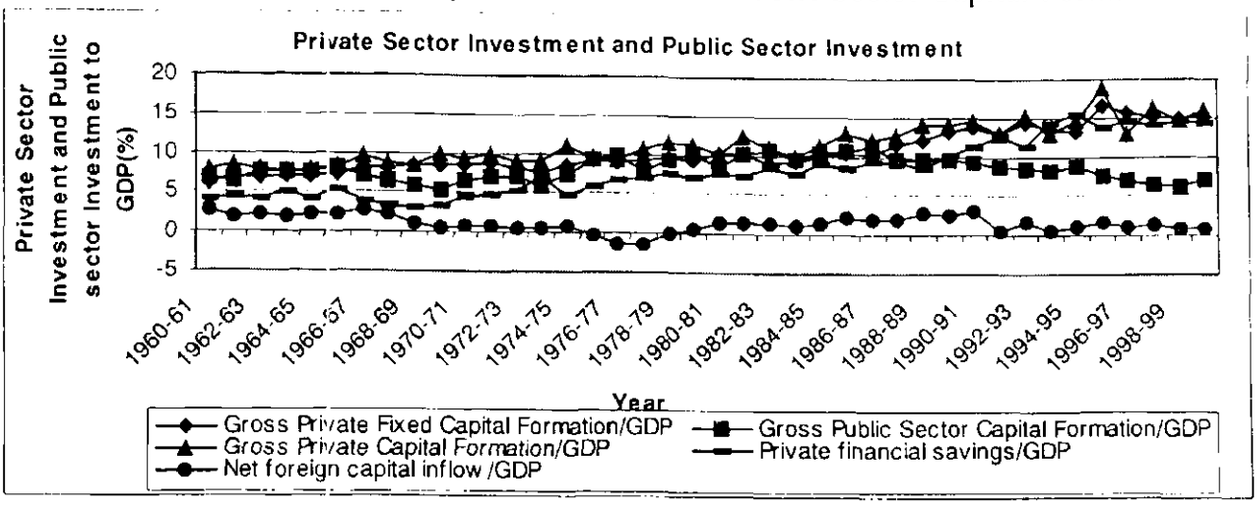
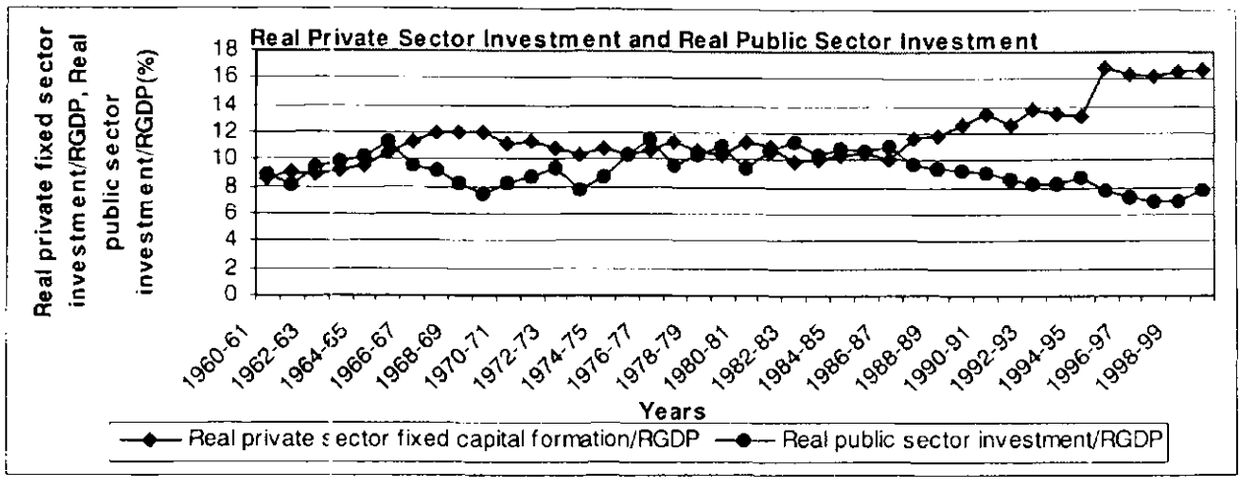


Figure 7.2: Trends in Real Private Capital Formation and Real Public Sector Capital Formation



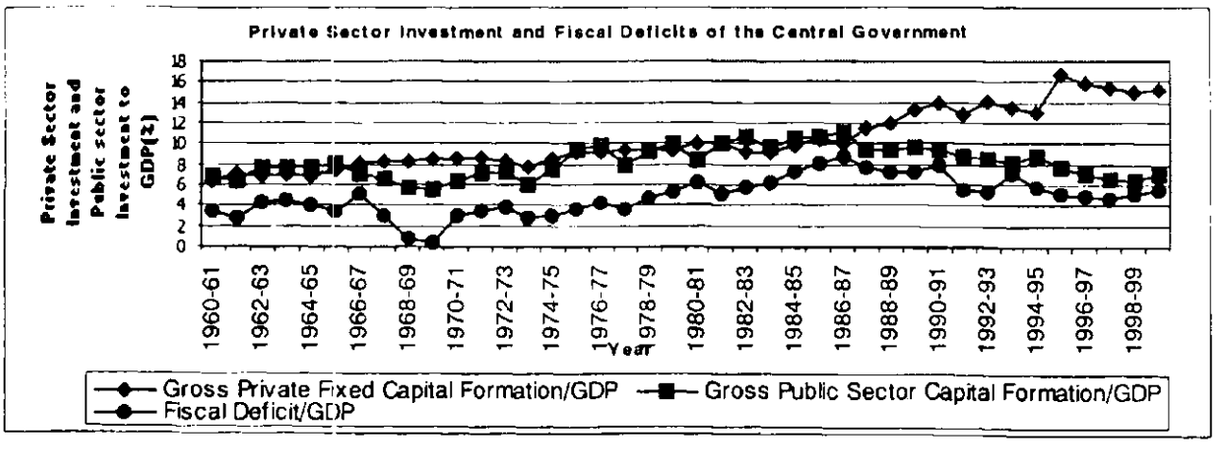
It is to be noted that in India, the foreign capital inflow (net) which is represented by the difference between domestic savings and domestic investment constitutes less than 2 per cent of gross domestic product (GDP) in almost all the years under considerat on barring few years of early 1960s and end years of 1980s. It is argued that given the size of the economy, foreign direct investment is small in terms of international comparison (Athukorala & Sen, 2001). This supports the argument that gross domestic investment in India has been predominantly financed through domestic savings. Although there is an increase in private investment with an increase in private sector savings, the increase in private investment is less as compared to the rise in private savings. Therefore, it is argued that although there is an increase in both private sector savings (financial as well as gross) and investment, a substantial portion of the increase in domestic private sector savings has been absorbed by the public sector for financing the increase in fiscal deficit. This prevents an increase in private investment which otherwise could have taken place. Here, financing the government deficits comes into the picture. It is argued

that because of high level of fiscal deficits, the potential increase in private investment gets crowded out, and the aggregate demand does not expand. On the other side, this has some favorable consequences for the external balance (BOP), as there is no spillover into the balance of payments position of the Indian economy.

The policy makers argue that a slow increase in private investment is not fall out of public sector investment crowding out private investment and that the increase in overall investment rate is mainly driven by an increase in public sector investment. But contrary to this, here, is a case in point. Before mid-1980s, the overall investment rate closely moves up with public sector investment with some cyclical fluctuations in 1970s. From mid-1980's the relative contribution of public sector investment to the gross investment registered a sharp change. Public sector investment as measured by gross domestic capital formation in the public sector as a percentage of GDP, was 6.86 per cent in the 1960-61, and reached a peak level of 11.17 per cent in 1986-87, but drastically came down to 7.13 per cent in 1999-00.

In the face of a relative decline in the contribution of public sector to the gross investment from mid-1980s, there is a rise in private investment rate in the economy. [99] As a result, there is a divergence between the trends of public and private sector investment. Although it is said that the net effect of public investment on the gross investment is positive, the net positive effect may be insignificant considering the size of the economy (as the size of the economy measured by level of GDP of the country has grown dramatically). This is an empirical issue which is addressed subsequently in the empirical testing of investment model.

Figure 7.3: Behaviour of Private Capital Formation and Fiscal Deficits



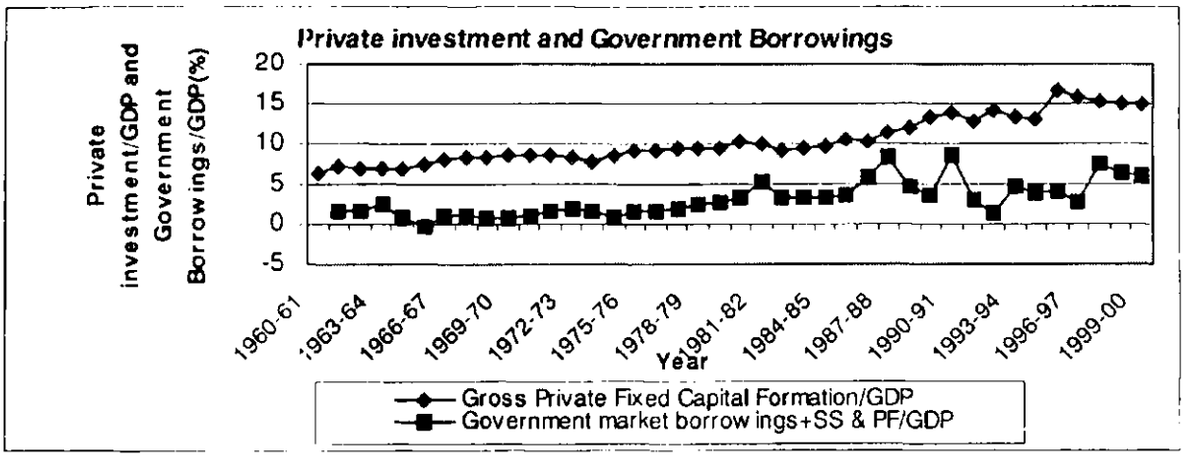
[99] The study by Athukorala and Sen (2001) notes that the increase in gross investment in 1980's and 1990s is mostly a fall out of a rapid rise in private investment in the economy.

It can be seen from Figure 7.3 that the gap between fiscal deficit and private sector investment is widening in the 1990s. This is due to a decline in fiscal deficit and an increase in private sector investment. This reversal in movement can be attributed to less absorption of resources by the government as reflected in decreased fiscal deficits and resources available for the private sector. Although the decline in gross capital formation in the public sector coincides with the decline in the gross fiscal deficit of the central government, the decline in fiscal deficit is relatively low. The fiscal deficit-to-GDP which is found to be 8.83 per cent in 1986-87 declines to 5.64 per cent in 1999-00. The decline in public sector gross capital formation is found to be relatively higher as observed earlier. The sustenance of a higher fiscal deficit, a massive decline in public-sector savings and investment, indicate that relatively more of borrowed resources of the public sector from private sector is either utilized for current public expenditure or invested in competing sectors. Towards the end of 1990s, the decline in fiscal deficit, as a percentage of GDP, is due to the relative decline in total government expenditure (although there is an absolute increase in total public expenditure). The slow increase in total government expenditure is accompanied by a relative reduction in government capital expenditure and an increase in government consumption expenditure. An increase in public sector investment in areas where private sector can benefit in investing its resources, is through the reduction of government consumption expenditure. A proper utilization of resources can complement private capital formation and the growth rate. On the other hand if the public sector in India utilises the available financial and real resources which (leading to squeeze of resource availability for the private sector), it would substitute private investment. If private investment is substituted in India, it is because of a high level of fiscal deficit which gets reflected in the decline in savings of the public sector. The decline in public sector savings is due to stagnation of tax revenues measured as a percentage of GDP along with a continuing expansion in government consumption expenditure and unprofitable investments. In effect, the expansion of public sector consumption crowds out both public and private sector investment. Since much of the investment in infrastructure in India traditionally comes from the public sector (which acts as a prime mover of private investment), the low levels of public sector investment and government capital expenditure in relation to GDP indicate

inadequate investment in critical infrastructure sector, which serves as a key factor in acceleration of growth in the economy.

An achievement of a higher level of economic growth requires maintenance of higher level of infrastructural investment by public sector along with public policies in order to facilitate higher level of private investment. The main impediment in achieving higher gross investment in India is, therefore, the deteriorating fiscal situation of the economy as reflected in higher level of deficits and government debt. If one inspects the behaviour of fiscal indicators of the central government in India, one can see that the government's ability to invest has continuously been declining since late 1980's due to fiscal deterioration. A key threat to sustainable economic growth is the decline in government investment expenditure and increase in fiscal deterioration. With a declining public investment, there exists a grave doubt about the sustenance of current pace of private investment and growth of the economy. The consequence of slow growth reflects in further worsening of fiscal position. However, the trend of private investment and government borrowing from the public as shown in Figure 7.4, does not indicate a clear relationship.

Figure 7.4: Trends in Private Investment and Government Borrowings



Increase in fiscal deficit and government borrowings, apart from having crowding out impact, can also make the general investment climate uncertain. Accumulation of debt implies not only a constraint on the credit availability but also higher (direct) taxes (or else the debt has to be monetized). Debt monetization exacerbates inflationary trends. These fiscal trends are bound to have adverse impact on growth. It is also seen that the rate of growth slows down in the second

half of the 1990s. The economy performs impressively in the immediate post reform years, when it averages 7.5 per cent growth in 1994-95 to 1996-97 but decelerates steadily thereafter averaging around 5.3 per cent in four years from 1997-98 to 2000-01.

It is sometimes argued that the reason for private investment not rising in the 1990s in line with private savings has less to do with crowding out effect and more to do with the incentive to invest. The incentive to invest gets depressed partly due to factors such as poor infrastructure, lack of confidence among Indian investors to cope up with intense pressure from outside investors in an open economy, and partly the failure to push reforms in other important areas critical for achieving rapid growth. The argument deserves a careful consideration. It is entirely true that private investors are found operating under an assured protected market before the liberalized economic environment and found less willing to invest in a free economic environment in the face of stiff competition. The solution obviously does not lie in recreating the earlier conditions as it is known that investment aimed at protecting domestic markets may not provide a solid basis for sustained acceleration in growth. The solution perhaps lies in pushing forward the unfinished reform agenda which can encourage greater efficiency and strengthen the ability of domestic industries to compete more efficiently with outside investors and thus improve the investment climate in general.

Investment aimed at expanding and improving infrastructure is probably the most important factor as it strengthens the ability of investors (both domestic and foreign) to compete in a more open environment. It is important that a higher level of private investment crucial for higher growth, can be achieved only through public investment in basic infrastructure. Another major goal of economic reforms is to reduce the fiscal deficit or government borrowings. What is needed, therefore, is a large reduction in revenue deficit (that is, an increase in public savings) which can facilitate an increase in public investment resulting in a sufficient and desirable reduction in fiscal deficit.

From the point of view of debt sustainability, it is necessary to look at several factors. For example, any given fiscal deficit should cause greater worry if

the size of the public debt in relation to GDP is large, and the growth rate is low; and given fiscal deficit is less damaging provided it is a temporary phenomenon but can be much more dangerous if it is expected to continue at high levels. The debt burden of the central government - from around 33.70 per cent of GDP at the end of 1980-1 to about 50.43 per cent at the end of 1999-00 - found to be higher than in many crisis-hit economies. This figure actually understates the magnitude of the problem as it does not include obligations arising out of government guarantees extended to the public sector entities; it includes neither the central government obligations associated with the need to cover deficits in the Oil Pool account, (which in the past had been taken over by the central government), nor the implicit guarantees extended to the public sector banks (Ahluwalia, 2002).

An important feature of the Indian economy which has made it possible to finance large fiscal deficits without running into the kind of problems experienced elsewhere, is the willingness of the banking system to absorb government debt. Before the reforms in 199os, the banks were required to invest a large portion of their deposits on approved government securities because of high statutory liquidity ratio (SLR). The SLR was significantly reduced in the first half of the 1990s as part of the banking sector reform, but despite this reduction, the proportion of deposits invested in government securities actually increased. The ratio of banking sector investment in government securities to their deposit mobilisation was 24.27 per cent at the end of 1980-01 and increased marginally to 25.97 per cent in 1990-01 but by 2000-01 it had jumped to 35.32 per cent. The readiness of the commercial banks to hold government debt has made it easier for the government to finance its large deficits with much less pressure on interest rates than witnessed in other debt-burdened economies. The following basic private investment model gives an idea about how the private sector investment is primarily a function of key macro variables besides the fiscal policy being a determinant of private sector investment in the developing economies.

7.3 Basic Model of Private Investment

Neoclassical economists have laid the foundation stone for building up of investment model. Jorgenson (1971) and Hall (1977) have made important contributions in this direction. The basic assumption in the neoclassical investment model is that firms 'maximise utility of a consumption stream subject to a production function relating the flow of output to the flows of labour and capital services' (Jorgenson, 1996). The flow of output is a function of the flows of labour and capital services, and the flow of capital services is proportional to the stock of capital goods obtained by summing the stream of past net investments. The consumption is allocated over time so as to maximize utility subject to the present value of the firm.[100] The firm supplies capital services to itself through the acquisition of investment goods. The demand for capital is, therefore, a derived demand and is assumed to be positively dependent on expected level of output and negatively dependent on expected rental cost of capital.

The developing countries have different structural and institutional features. The strict applicability of neo-classical model of investment in the developing countries context is inhibited due to the specific problems faced in these countries with regard to the computation of rental price of capital, definition and estimation of production functions, and further there is difficulty in capturing the existence of imperfections in the financial, capital and labour markets. These factors make it necessary for economists to modify the basic neo-classical model of private investment. One of the important observations that can be made here is that while estimating the investment model, economists place a lot of emphasis on the effects of resource constraints, financial and physical, faced by the private investors in developing countries. This is also noticed in the work of Blejer and Khan (1984).

Although the availability of credit is an important factor in the investment model, constructed to suit the developing countries, it is equally important to assess the effects of government debt on private sector investment, because the

[100]The present value of the firm is the sum of the integral of discounted profits and the market value of assets of the firm. Since market value of assets of the firm is fixed, maximization of the integral of the discounted profits results in the same path for accumulation of capital as maximization of present value of the firm. Alternative criteria in the literature include maximization of the average internal rate of return or an internal rate of return from the investment exceeding the ruling market rate of interest.

government happens to be a major borrower in the developing countries both under the repressed and free market regimes. The increase in government debt can adversely affect private investment by constraining the credit supply in the market. Government debt cannot definitely be the only determinant and ignoring other major determinants of private investment would lead to misspecification bias in the analysis. The study, therefore, draws on Sundararajan and Thakur (1980) and Blejer and Khan's (1984) basic investment models built for developing countries context. The basic models are built along the lines of neoclassical accelerator model. These models are the starting point for explaining and identifying the determinants of private investment in the Indian context. This would help in investigating the relationship between private investment and government borrowings along with other major determinants. In this context, Sundararajan and Thakur's (1980) specification of private investment model derived from cost minimization principle of individual firms, can be represented as follows.

$$IP = B_0 + B_1 (U/W)^* + B_2 a(L)Y + B_3KG + B_4[(S-IG)/PI] + B_5KP_{-1} \quad (1)$$

Where IP is the real fixed investment by the public sector; KP is the private sector capital stock; Y is the private sector real GDP; S is the nominal savings; IG is the public sector investment at current prices; PI is the deflator for private fixed investment goods; U/W is the ratio of user cost of capital goods to nominal wage rate. The term [(S-IG)/PI] denotes real financial resources available to private sector for investment after the absorption of resources by the government.

Similarly, the investment model by Blejer & Khan (1984) as derived from the accelerator assumption, can be put forth in the following form.

$$IP_t = \beta a [1 - (1-\delta)L] Y^e_t + (1-\beta) IP_{t-1} \quad (2)$$

Where private investment is specified as a function of expected output (Y^e_t), the gap between previous expected output and current expected output and previous period's level of private investment (IP_{t-1}). The coefficients 'β' and 'a' represent the adjustment coefficient (the actual capital is assumed to adjust to the difference between the desired stock in period 't' and the actual stock in the previous period), and desired increase in capital stock or investment as a proportion of output required for production respectively. L is the lag operator.

The response of private investment (β) is assumed to vary systematically with economic conditions such as (i) the stage of the cycle, (ii) the availability of financing, and (iii) the level of public sector investment. The phenomenon of crowding out, therefore can be captured through directly changing the desired level of real private investment. When the coefficient of adjustment is expressed as a function of cyclical factors and monetary and fiscal policy variables, the dynamic reduced-form equation for gross private investment can be expressed in the following form which includes cyclical factors, the change in real bank credit, and real public sector investment (as explanatory variables).

$$IP_t = \beta a\,[1-(1-\delta)L]\,Y^e_t + \beta c_1\,GAP_t + \beta c_2\,\Delta DCR_t + \beta c_3\,GIR_t + (1-\beta)\,IP_{t-1} \qquad (3)$$

Where GAP refers to cyclical factors, given by the difference between actual and trend output, ΔDCR is the change in bank credit to the private sector plus real net private capital flows and GIR is the real public sector investment. This serves as a basic investment model.

Considering the fiscal policy variable in affecting private sector investment, the study modifies the above basic investment models. The models are modified keeping in view that investment depends on aggregate expected output rather than the change in output from the desired level to its previous level of actual output.[101] It is also difficult to determine the desired level of output and capital stock in the economy. The sum of past investments would rather constitute the capital stock, with taking into account the role of expectation in investment decision. On the basis of these arguments the study specifies an investment model for India which is presented subsequently.

7.2 A Framework for Examining the Impact of Domestic Public Debt on Private Investment in India

Based on neoclassical investment function, the study identifies the roles of various determinants of private investment as discussed below. This would help in testing different theoretical propositions as put forth by different schools of thought. This

[101] Although it is difficult to determine the expected output and investment, the general procedure is to use their lags for taking account of expected values as the past information helps in predicting about the future.

would guide the policy makers to know what holds in the context of India and what policy designs would be suitable for achieving higher investment and growth.

In a developing country like India, where there exists a large amount of unused capacity as reflected in the unutilized resources, the Keynesian solution lies in framing of a proper mix of fiscal and monetary policy to exploit the existing unutilized resources. At the initial stage, the use of such unutilised resources and the excess capacity largely depends on the government's fiscal actions as there might be a lack of private sector initiative for utilization of existing resources. Government has to take the initiative for inducing the private sector to use such existing unused capacity which would enable the economy to reach a higher equilibrium growth path. At the initial stage, to attract private sector for utilization of excess idle capacity, requires investment on the provision of basic services by the government. The provision of these basic services involves huge initial cost, long gestation period and also presence of large positive externality. Private investors who are primarily profit motivated, would not be encouraged to undertake investments due to the basic characteristics of such investments. Under such circumstances, if the government comes forward to provide these services, the private sector would get induced to initiate investment action which would help in raising the level of aggregate real investment as well as achieving a higher rate of economic growth. If the government is resource constrained, then the question arises as to how the government will initially acquire resources for initiating the action. The Keynesian answer to this question is that the government should finance through borrowing or deficit financing. In the context of such economies, considering Keynesian proposition would be more appropriate for examining the impact of domestic public debt on major economic variables such as real investment and production of output. There are also ways by which government borrowings tend to crowd out private investment. According to Blejer et. al. (1984) and Sundararajan et. al (1980), a principal constraint to investment in developing countries is the quantity, rather than the cost of financial resources. The rate of return on investment is expected to be reasonable or even higher than the real interest rates on loanable funds, as the real rate of interest on the loanable funds is kept low by governments. Financing the budgetary gap at a low cost is one of the important reasons for maintaining a lower rate of interest in the economy. In such

circumstances, the investor cannot be expected to equate the marginal product of capital with its servicing cost.[102] But under a Keynesian framework an increase in public debt may raise interest rates, and as interest rate being an important determinant of private investment, when the interest rate is raised it is likely to affect the interest rate sensitive component of private investment demand or user cost of capital. Consequently, this would result in loss of capital formation. The impact of debt on private investment depends on the strength of various other factors affecting private investment, which is laid out below in order to examine private sector investment in relation to the key fiscal variables with other determinants of private investment.

7.4.1 Determinants of Domestic Private Investment

Aggregate Output - According to Keynesian acceleration principle, private investment demand depends on the level of expected output in the economy. Neoclassical flexible-accelerator model also suggests that private investment growth rate is positively related to real growth rate of output. With a higher level of expected output, there would be higher level of investment in the economy; it is the growth of output that induces the growth of investment. This also implies that acceleration in terms of increase in output is needed as an incentive for private investors to increase their investment spending. A theoretical explanation is also offered in acceleration principle discovered by Aftalion, Bickerdike, Clark, and Hawtrey. Economists support the view that private investment not only depends on the current output net of taxes, but also its lagged values (Koliras & Thorn, 1979). More output expectation also implies more income and hence more demand in the economy. Thus, apart from the fact the rate of profit and rates of interest are believed to be the dominant factors in influencing private investment demand, level of output or income seems to be the most important factor in influencing private investment demand.

Public Sector Investment Expenditure – Effects of aggregate public expenditure on private investment is ambiguous. The effect depends on whether public expenditure involves spending on consumption or investment goods. Public

[102]Emphasising upon Mckinon (1973) and Shaw (1973) hypotheses, Galbis (1979), and Fry (1982) note that an increase in interest rates, by increasing financial savings, raises rather than lowers private investment in an

spending on consumption is more likely to have crowding out impact on private investment than public investment spending. Public investment has also got two types of effects. In a Keynesian model it is the mode of financing rather than the public expenditure which has major role in private capital accumulation. Application of neoclassical model in developing countries has led public investment to be identified as an important factor affecting private sector investment. If public investment is complementary or augments the marginal productivity of private investment, it would lead to increase in private investment. On the contrary, if the public investment is competitive, it would crowd out private investment. It depends on relative potency of effects (Aschauer, 1997). The public sector investment on infrastructural facilities like roads, transportation, schools, water and sewage systems, would support private investment, but public investment in sectors like building cement and steel factories, or opening of new public enterprises, where the private sector has already been operating, tend to have crowding out impact. Therefore, the overall effect of public investment is ambiguous. Notwithstanding the ambiguities of the effects, given the dominant role played by the government in the provision of infrastructure and the key-intermediate and investment-goods producing industries in India, it is generally perceived by the policy makers that 'the stimulant effect of public investment on private investment tends to dominate over the possible adverse effect resulting from competition for investible funds (Athukorala & Sen, 2001)

Availability of Funds for Private Investment - Liquidity is another most important determinant of private investment which has been emphasized by the Neoclassical theory of investment. If the private sector is liquidity constrained, it may adversely affect private investment. Availability of credit or liquidity gets affected on account of changes in the absorption of financial resources by the government. Given the availability of funds in an economy, more the financial absorption by the government, less would be the finance available for private investment. Neo-liberals (McKinnon & Shaw; 1973) also emphasise the fact that more than the cost of capital, the availability of loans plays a primary role in influencing private investment activities in developing economies. Under the repressed regime, governments in developing economies, keep the rate of interest

---

economy.

low and take the advantage of lower cost of capital by seizing more financial resources from private sector. Many studies consider credit availability to the private sector as a determinant of private investment (Sundararajan et. al., 1982; Athukorala et. al. 2002). The present study considers the effect of government borrowings to approximate the opposite effect of credit availability to private sector. Because, more government absorption of funds results in less credit availability to private sector.

User Cost of Capital - Rate of interest in the Keynesian investment function plays an important role. Like the Keynesian model of investment, in the neoclassical model of investment, higher rate of interest tends to crowd out the interest sensitive component of private investment (Sundararajan and Thakur, 1980; Wai and Wong, 1982; and Blejer and Khan, 1984). Rate of interest is also a component of user cost of capital.[103] In a financially repressed economy, rate of interest does not play a major role in determining private investment. Since the last decade, the rate of interest has been liberalized in India, which is likely to have some impact on private investment. However, there is a paradoxical dimension to the role of interest rate in determining private investment. According to the New-liberal economists, higher rate of interest would result in attracting more savings which might lead to more private investment. But from a long-run perspective, increase in savings causes decline in long-run rate of growth without a commensurate stimulative impact on increasing private investment. Thus, the effect of rate of interest on private investment depends on the conditions of an economy. In the present case, interest rate is used in the model for computing the user cost of capital.

Openness of the Economy- Besides domestic factors, the openness of the economy affects private investment decision. Openness of the economy refers to the free movements of goods and services across economies. However, duty structure, exports and imports affect private investment in developing economies. Liberalisation in import of raw materials facilitates private investment by lowering

[103]Real user cost of capital can be defined as the implicit value assigned to the use of capital equipment, which includes both depreciation charge and interest cost. A firm reaches equilibrium when marginal product of capital is equal to the real user cost of capital. As long as the increase in revenue is greater than the increase in cost from an additional unit of capital, the competitive firm will add up capital. But it is very difficult to capture the actual real user cost of capital especia ly for the developing economies in the context of unavailability of data relating to the depreciation cost of capital. Empiricists assume different depreciation rates of capital for different economies.

the cost of production, and production of goods also creates market outside the domestic boundary. More demand for domestic products outside the country with fewer restrictions on exports tends to attract private investment. Fewer barriers may promote setting up of more ancillary industries, having forward linkages for the domestic industries. A lesser degree of control on capital account, can result in free inflow of capital compensating the deficiency in fund requirement of domestic industries. Thereby, it promotes investment.

Uncertainty - Private investment, to a great extent, gets influenced by the degree of uncertainty prevailing in an economy. Uncertainty may arise due to various reasons. Inflationary expectation is one of those which may significantly affect private investment decision. More inflationary expectation means less demand for output and hence discourages and retards private investment.

Taxes – An increase in debt implies increase in taxes in the future. Taxes have got disincentive impact on private sector investment. An increase in direct taxes affects the income and profit of investors and as a result adversely affects private investment.[104] An increase in indirect taxes although leads to a rise in input prices, thereby affecting the cost of production, more often the burden of cost is ultimately passed on to the consumer. So it is the direct taxes which can significantly affect private investment in the economy. Debt besides haaving implications for taxes in the future, results in absorption of resources by the government in the current period which may crowd out private investment. As debt and taxes are closely related, debt has been considered as the determinant of private investment instead of taxes, in accordance with the main interest of the study.

---

[104]As Keynesian theory suggests that private investment is also largely determined by the interest rates and the expected returns on the investment, these variables are relevant to consider their impact on private investment. Since the data on expected returns is not available, the tax revenue (or, debt-to-GDP ratio) has been considered as the inverse factor of it by Borensztein (1991) or a proxy for reduction of returns on private investment. Taxes/debt reduces returns on investment because the government imposes taxes in order to obtain the required resources to service its past debt. Therefore, the taxes can be used as a measure of reductions in net expected profits due to overhang of government debt. But instead of taxes, government borrowing is used, as per the main objective of the study.

7.4.2 Specification of Private Investment Model

The study specifies the modified form of basic private investment model constructed for developing countries context. The following is the form of model which is designed to examine the impact of domestic public debt along with other important variables on private investment in India.

$$RTFPI_t = \alpha_0 + \alpha_1 RNNP_t + \alpha_2 RGPSI_t + \alpha_3 \Delta RDD_t + \alpha_4 UCC_t + \alpha_5 EXIMNF_t + \alpha_6 INFGNP_t + \alpha_7 Z_t + \xi_t \quad (4)$$

Where, RTPFI stand for = Real private fixed investment in the domestic market,

RNNP = Real net national product at factor cost,

RGPSI = Real gross public sector investment expenditure,

UCC= User cost of capital[105],

EXIMNF = Real export plus import-to-RNNP ratio denoting the measure of openness of the economy,

INFGNP= Inflation rate derived from GNP implicit deflator representing uncertainty,

Z = other exogenous factors (different policy regimes) affecting private investment and, ΔRDD = Real borrowings of the government (net change in domestic public debt) which is defined as the loans of the government from domestic private sector including private commercial banks, quasi-public sector banks and other financial institutions such as mutual funds, small savings and provident funds. All the variables are in real terms.

ΔRDD appears as an alternative for credit availability to private sector.[106] Thus, the above private investment equation reveals that private investment depends on the level of current output, user cost of capital, public sector investment and domestic government borrowings. The basic investment model has also been augmented with important structural variables. These are openness of the economy measure, inflation rate as a measure of uncertainty, and dummies representing policy changes in different time periods. In order to take into account the influence of expected output, inflation rate and previous level of private investment, a suitable time series method is adopted for appropriate adjustment of time lags.

---

[105]The user cost of capital is defined as the ratio of price of capital goods to price of all other goods times the real interest rate on capital plus depreciation. The real interest is derived as the rate of interest minus the rate of inflation on capital inputs.

[106]The change in stock of public debt is later denoted by RMBSPF and RMBPF for the central government borrowings and RCMBSPF for the combined government borrowings.

An important point to be noted is that since small savings and provident funds are from private sector, they are also included in market borrowings in order to examine the aggregate impact of these three components of borrowings on private sector investment. Provident fund is included on the ground that if it had been deposited with the bank, would have been available for private sector spending or in holding private sector equities. Domestic government borrowings from private sector do not include borrowings from the central bank of India which is money-financed government deficits. Money-financed deficit has been withdrawn since 1997-98, so it is valid to ignore the money-financed deficits of the government from the Reserve Bank of India (RBI). But the market debt includes some portion of borrowings from the central bank of India which is not money financed, but financed through the reserves possessed by the RBI constituting a claim of the private sector. Since a major portion of net small savings collection goes to the states from the public account of the central government (and from 1999-2000, 100% of net collection of small savings goes to the states), in examining the impact of the central government domestic debt on private investment, it is also imperative to examine the impact of debt of the centre exclusive of small savings assuming that this portion of liability is borne by the states. Besides centre's borrowing, the state governments also borrow from the market. In recent years, the state governments are increasingly relying on borrowings from the market. This may have an impact on private investment and may have wider policy implications for the economy. Therefore, the study examines later the impact of combined government borrowing on private sector investment in India.[107]

7.5 An Econometric Approach to Private Investment Modeling

In a non-stationary environment, an appropriate method to examine the impact of domestic government borrowings on private investment would be to employ error-correction modeling and cointegration techniques. The study uses Autoregressive Distributed Lag (**ARDL**) approach to cointegration devised by Pesaran and **Shin** (1995) and **Pesaran, Shin** and **Smith** (1996). The main advantage of this estimation technique is that it can be applied irrespective of whether the regressors are I(0) or I(1). Inder (1993) indicates that one of the desirable properties of the

[107] Although the study focuses on the impact of central government's borrowings on private investment, but it is imperative to examine the combined impact of public debt on private investment for wider policy implications.

ARDL model is that it precisely estimates the long-run parameters and valid t-statistics, even in the presence of endogenous explanatory variables. Pesaran and Shin (1999) proves that ARDL-based estimators are "super-consistent", and valid inferences on the long-run parameters can be drawn using standard normal asymptotic theory. They also show that appropriate modification of the orders of the ARDL model is sufficient to simultaneously correct for residual serial correlation and the problem of endogenous regressor. The suitability of ARDL model in the present context also arises because of the fact that it takes care of expectation formation by the economic agents. Private investment depends on expected demand and previous year's investment. This model, unlike Johansen and Juselius (1992) cointegration technique, does not consider uniform lags of the variables but different lags on the basis of their true dynamic structure in the model.

The steps involved in the estimation of ARDL approach to cointegration remain the same as described in the methodology section for the preceding chapter. After confirming that there exists a cointegrating relationship among the variables in the model, the ARDL model is estimated. The resulting underlying ARDL equation has to be verified with all its statistical diagnostic properties in order to get consistent and efficient estimates. Then the ARDL equation can be solved for obtaining long-run and short-run parameters. In order to test for the cointegrating relationship among the variables in private investment equation, the variable addition test underlying the error correction equation of the ARDL model is carried out. The variable addition test involves the F-test on the significance of the lagged terms in the following equations.

General Form of Private Investment Model Specification (with RMBSPF)

$$\Delta RTPFI_t = \alpha_0 + DUM + \sum_{i=1}^{n} \alpha_1 \Delta RTPFI_{t-i} + \sum_{i=1}^{n} \alpha_2 \Delta RNNP_{t-i} + \sum_{i=1}^{n} \alpha_3 \Delta RGPSI_{t-i} + \sum_{i=1}^{n} \alpha_4 \Delta RMBSPF_{t-i} +$$

$$\sum_{i=1}^{n} \alpha_5 \Delta UCC_{t-i} + \sum_{i=1}^{n} \alpha_6 \Delta EXIMNF_{t-i} + \sum_{i=1}^{n} \alpha_7 \Delta INFGNP_{t-i} + \varphi_1 RTPFI_{t-1} + \varphi_2 RNNP_{t-1} + \varphi_3 RGPSI_{t-1} +$$

$$\varphi_4 RMBSPF_{t-1} + \varphi_5 UCC_{t-1} + \varphi_6 EXIMNF_{t-1} + \varphi_7 INFGNP_{t-1} + u_t \qquad (5)$$

General Form of Private Investment Model Specification (With RMBPF)

$$\Delta RTPFI_t = \alpha_0 + DUM + \sum_{i=1}^{n} \alpha_1 \Delta RTPFI_{t-i} + \sum_{i=1}^{n} \alpha_2 \Delta RNNP_{t-i} + \sum_{i=1}^{n} \alpha_3 \Delta RGPSI_{t-i} + \sum_{i=1}^{n} \alpha_4 \Delta RMBPF_{t-i} +$$

$$\sum_{i=1}^{n} \alpha_5 \Delta UCC_{t-i} + \sum_{i=1}^{n} \alpha_6 \Delta EXIMNF_{t-i} + \sum_{i=1}^{n} \alpha_7 \Delta INFGNP_{t-i} + \varphi_1 RTPFI_{t-1} + \varphi_2 RNNP_{t-1} + \varphi_3 RGPSI_{t-1} +$$

$$\varphi_4 RMBPF_{t-1} + \varphi_5 UCC_{t-1} + \varphi_6 EXIMNF_{t-1} + \varphi_7 INFGNP_{t-1} + u_t \qquad (6)$$

Where, Δ refers to first difference, RTPFI stands for= Real private fixed investment,
RGPSI = Real gross public investment,
RMBSPF is the change in real domestic public debt of the central government RMBPF and RMBSPF are substituted later. These are in flow terms (not stocks).
UCC = User cost of capital,
EXIMNF = Ratio of export plus import to real net national product (representing openness of the economy measure),
INFGNP = Inflation rate derived from GNP deflator and,
DUM is the dummy variable.
The dummy (1980-81 onwards one, and zero otherwise) is considered once for representing the changing fiscal situation of the country. From the year 1980-81, the proportion of current expenditure has expanded in relation to the capital expenditure of the government. And in another case, a dummy (DUM) is considered in order to represent the shift in industrial policy regime (i.e. 1990-91 onwards dummy is one, and zero otherwise). There is a shift in licensing regime to delicensing regime which may have some significant impact on private sector fixed investment. Once the dummy is used to represent the liberalization policies followed in 1991-92 for opening up the economy to the external world (1991-92 onwards dummy is one, and zero otherwise), and once it is used in order to represent the financial liberalization policies followed in the economy from the period 1992-93 (i.e. 1992-93 onwards dummy takes on value one, and zero otherwise).

Then the ARDL equation is solved for establishing long-run and short-run dynamics among the variables. Here, an important point which needs to be mentioned is that the specification of private investment model (4) in the level form, when estimated using the ARDL approach to cointegration, does not evidence the existence of cointegration among the variables. It also does not pass the no serial correlation, Ramsey RESET test and no heteroscedasticity tests. Hence, the diagnostic statistics suggests that the model is not well specified in the level form. In order to avoid the specification bias, later the model is re-estimated in the ratio form. All the variables are expressed as a ratio to national output measured in net national product at factor cost except EXIMNF which is already taken as a ratio to net national product at factor cost and undoing with user cost of capital. After expressing them in ratio form, the model is estimated in linear form without their

logarithmic values. With this modification, the functional form passes the tests for serial correlation and heteroscedasticity.

7.6 Data Discussion

The data on private fixed capital formation which represents a measure of total private fixed investment (TPFI), and national output represented by Net National Product at factor cost at constant prices (NNP_{fc}) are taken from the 'National Accounts Statistics of India 1950-51 to 2000-01'. The private fixed investment is defined as to include the assets created under construction and machinery and equipment by the private sector in the domestic market. This consists of the acquisition of fixed assets by the resident industries and the producers of private non-profit services to households in the domestic territory of the country. On account of direct unavailability of real private fixed capital formation (RTFPI), the nominal term is converted into real terms by deflating the nominal value of private fixed capital formation with the price index of gross fixed capital formation (GFCF). The data on domestic public debt is taken from the 'Long Term Fiscal Trends in India 1950-51 to 2000-00: A conspectus (2002)'. In order to get flow of government domestic debt, the change in stock of domestic public debt is used in the estimation. The change in the stock of domestic public debt gives us domestic public borrowings in different time periods. The State Bank of India's (SBI) advance rate is considered in calculating the user cost of capital for private investment.[108] The State Bank of India (SBI)'s advance rate is chosen for the reason that SBI, as a commercial bank, has a wide network of operations throughout the country. This is a major commercial bank which carries out major transactions such as lending and deposit mobilisation with the private sector in the economy. This advance rate of SBI is collected from the "Handbook of Statistics on the Indian economy 2004" published by Reserve Bank of India (2004)". In order to convert the nominal

[108] The computation of user cost of capital draws on the methodology of calculating the cost of capital services (rental price of capital) for the total private sector. Following Hebbel and Miller (1992), the user cost of capital (UCC) is equal to (=) PK (r(1-t) + δ - πe) / P. Where, PK = price of capital goods, r = bank lending rate, t = tax rate, δ = depreciation rate, πe = expected rate of change in capital goods price (inflation), and P = the general price level. The price of capital goods (PK) is measured in terms of the implicit price deflators for gross private fixed capital formation (1993 = 1.00). The lending rate charged by the State Bank of India is taken as bank lending rate (r). Since the year-wise data on income tax rate (t) is not directly available, the tax rate is computed by dividing the combined revenue of the governments from the source of direct taxes with the private sector income in the aggregate national income. πe is the expected inflation of capital goods price PK, which is measured as the three year moving average of the rate of capital goods price measured by the implicit deflators for private sector, with a one year lag. The depreciation rate is assumed to be 12 per cent per year. Finally, the general price level, P is captured by the term GNP deflator.

interest rate into real terms, the inflation rate, as derived from the gross fixed capital formation deflator, is subtracted from the nominal advance rate of SBI. In order to convert the gross public sector capital formation into real terms, the nominal gross value has been deflated with respect to the gross capital formation price deflator. For measuring the openness of the economy, the study uses two measures. In one case, it considers export plus import in relation to NNP (EXIMNF) as an indicator; and in another case along with exports plus imports, net of capital inflows and outflows is added as there is a lack of data on gross inflows and outflows. The latter's ratio to NNP (EXIMCNF) is considered as a broad measure of openness. The data for measuring the openness is sourced from the RBI.

7.7 Empirical Result

In order to know the impact of domestic government borrowings, the study has adopted three definitions of domestic government borrowings; two alternative definitions for the central government domestic borrowings (as a ratio to NNP) denoted by RMBSPFRN and RMBPFRN and another for the combined government domestic borrowings denoted by RCMBSPFRN. The division of borrowings into three categories follows the same rationality as noted in the previous Chapter 6 (also mentioned above). Two alternative definitions of openness have been considered. One is defined as to include export plus import to NNP at factor cost (EXIMNF), and the other one is a broader definition which includes exports, imports plus net inflows on capital account of balance of payment to NNP at factor cost (EXIMCNF). A good measure of openness would be overall exports, imports and overall capital receipts (inflows) and capital debits (outflows), but due to data unavailability on the overall receipts and payments arising on the capital account balance, the study considers adding up of only the net capital balances with the volume of exports and imports of the current account.

As mentioned earlier, the ARDL procedure does not require unit root pretesting of variables but the model is applicable when the variables are integrated of order one or zero. Thus when order of the variables exceeds I(1), there is no table of F-statistic critical values to test cointegration. In order to ensure that all the variables are either I(1) or I(0), Dickey-Fuller and Augmented Dickey-Fuller unit

root tests are conducted. The unit root tests results are reported in Table 7.2 and Table 7.3.

Table 7.2: Unit Root Test Results (level of variables without logarithm)

Variables	Without Trend		With Trend	
	DF	ADF	DF	ADF
RTPFIRN	-.227	.197(1)	-1.448	-1.348(3)
RMBSPFRN	-2.979	-.815(2)	-4.918	-2.312(2)
RMBPFRN	-1.821	-.305(2)	-3.503	-3.139(1)
RCMBSPFRN	-2.532	-.555(1)	-4.846	-3.890(1)
RGPSIRN	-2.433	-2.02(1)	-2.405	-2.009(1)
UCC	-3.588	-2.962(1)	-3.825	-3.232(1)
EXIMCNF	-.282	.237(1)	-2.385	-2.556(1)
EXIMNF	-.124	-.327(1)	-1.859	-2.229(1)
INFGNP	-4.481	-3.720(1)	-4.427	-3.718(2)

Note-The critical values for rejection of null hypothesis of unit root at 5 % are –2.94 and –3.98 for without trend and with trend respectively.

Table 7.3: Unit Root Test Results (Difference of variables without logarithm)

Variables	Without Trend		With Trend	
	DF	ADF	DF	ADF
RTPFIRN	-7.175	-2.949(2)	-7.555	-5.678(1)
RMBSPFRN	-8.159	-8.374(1)	-8.0262	-8.249(1)
RMBPFRN	-6.019	-5.187(1)	-5.998	-5.207(1)
RCMBSPFRN	-8.349	-7.987(1)	-8.219	-7.889(1)
RGPSIRN	-6.703	-5.646(1)	-6.612	-5.605(1)
UCC	-7.501	-6.069(1)	-7.3809	-5.977(1)
EXIMCNF	-5.354	-4.947(1)	-5.439	-5.239(1)
EXIMNF	-4.541	-3.508(1)	-4.607	-3.673(1)

Note-The critical values for rejection of null hypothesis of unit root at 5 % are –2.94 and –3.98 for without trend and with trend respectively.

The unit root test result for the ratio of variables reported in Table 7.2 suggests that inflation rate (INFGNP) is clearly integrated of order zero irrespective of inclusion or exclusion of trend in the estimating equation of both DF and ADF tests. The DF test indicates that user cost of capital (UCC) and central government borrowings to NNP at factor cost ratio (RMBSPFRN) are integrated of order zero with trend and without trend term, but ADF yields non-stationarity of both the variables. Both the unit root testing procedures find the combined government borrowings to NNP at factor cost ratio (RCMBSPFRN) to be stationary with the inclusion of trend term while non-stationary without the exclusion of trend term. All

other variables are not integrated of order zero implying non-stationarity of variables with either of the DF or ADF estimating procedures. But when the variables are considered in their differences as noted in Table 7.3, all become stationary or integrated of order I(1).

The estimation of private investment model is carried out with the first definition of central government domestic borrowings to RNNP ratio i.e. RMBSPFRN in the presence of a broader definition of openness measure of the economy. In the first step, as a sequential procedure of ARDL approach to cointegration, in the variable addition test along with estimating the additional parameters on the first lagged level of the variables for private investment specification, four lags are imposed on each first differenced terms of the respective lagged level variables in the model underlying the error correction equation of **ARDL** model. An *F*-statistic of 492.20 is obtained as shown in Table 7.4. This statistic is found to be quite large and exceeds the upper level of the critical band of F-statistics (i.e., 4.781) at 1% level of significance. This lends support to the existence of cointegration. After confirming a stable long-run relationship among the variables from the computed F-statistics, the above private investment model in (4) is estimated through the autoregressive distributed lag (ARDL) equation. An optimal lag structure in the ARDL equation is imposed on the basis of R-Bar Square, AIC and SBC criterion which is appropriate to the situation, correcting for and minimizing the serial autocorrelation and heteroscedasticity problems in the model estimation. The resulting order of the model is ARDL [2,3,0,0,0,1].

The estimated ARDL regression equation is presented in Appendix Table 7.1. The statistics in the table indicates that the estimated equation passes no serial correlation, no heteroscedasticity, Ramsey RESET and non-normality tests. This indicates that it satisfies the basic statistical properties of a well-specified functional form. Table 7.5, presents the long-run coefficients obtained by solving the auto regressive distributive lag version of equation (4) on the basis of selection of an optimal lag structure of ARDL(2,3,0,0,0,1). The long-run estimates produced in Table 7.5 show that while openness measure and dummy variable for 1990-91 are found to have positive and significant influence, the public sector investment has negative and significant influence on private investment. The domestic central

government borrowing and the user cost of capital do not play any significant role in influencing private sector investment in the long-run. The reason for insignificance of user cost of capital is not far to seek. This may be due to less variation in prices and interest rates over a long period of time in the economy. Although in recent years, the economy has witnessed variation in interest rates but the dummy for financial liberalization does not improve the result and dividing the total period into two samples for robustness check of the model would be impossible, given the small sample size of annual time series data, for any time series applications.

To further examine the result in the short-run, the parameters of the error correction model are estimated and reported in Appendix Table 7.2. Contrary to no effect of domestic central government borrowing in the long-run, it has positive influence in the short-run. The gross public sector investment continues to have an adverse impact on private sector investment along with positive influence of openness measure and dummy variable in the short-run. The coefficient of the lagged error-correction term ($ecm._1$) carries expected sign and it is highly significant (at 1%). Its coefficient carries a value of .93 unit. This implies that 93 per cent of deviations of private investment expenditure from its long-run equilibrium in the previous year get adjusted in the following period. This also indicates that if there be any shock in the explanatory variables, the speed of adjustment in the private investment demand will be faster and will immediately restore to its long-run equilibrium condition.

Table 7.4: Stability Test /Variable Addition Test (simple linear form without logarithm)

Variables Included with the intercept term	Lags	F-statistics	Critical Value Bounds of F-statistics		Significance level
F(RTPFIRN | RMBSPFRN, UCC, RGPSIRN, EXIMCNF, INFGNP)	4	F(6, 2) ~ 492.20	3.51	4.78	1%
F(RTPFIRN|RMBSPFRN, UCC, RGPSIRN, EXIMCNF, INFGNP)	4	F(6, 2) ~ 2.28	2.26	3.36	<10%
F(RTPFIRN|RCMBSPFRN, UCC, RGPSIRN,EXIMCNF, INFGNP)	4	F(6, 2) ~10.32	3.51	4.78	1%

Note: The stability test is confirmed by imposing the above lags in the differenced variables and one lag of the same variables in their levels in respective models. It is found that at the lags below the fixed mentioned lags there is no cointegration among the variables. Even though the lags significantly consume the degrees of freedom, the cointegration confirmation is relied on such results. Thus, this is subject to less degrees of freedom as the estimation process is constrained to a short-sample size.

Table 7.5: Long-Run Estimates in the ARDL Model to Cointegration Approach

Variables	CONST	RGPSIRN	RMBSPFRN/ RCMBSPFRN	UCC	EXIMCNF	INFGNP	DUM 1990-91	ECM_{-1}
RTPFIRN with RMBSPFRN	.184 (12.58)*	-.585 (-4.20)*	-.011 (-.11)	-.043 (-.99)	.215 (3.85)*	-.0008 (-1.70)***	.018 (2.39)**	-.935 (-5.06)*
RTPFIRN with RCMBSPFRN	.187 (13.53)*	-.626 (-4.67)*	-.006 (-0.65)	-.044 (-1.07)	.207 (3.81)*	-.005 (-.83)	.017 (2.41)*	-.99 (-5.10)*

*Note- The figures in parentheses are the t-statistics and the asterisk *** indicates coefficients are significant at 10% level, ** indicates significant at 5% level and * indicates significant at 1% level.*

In the private investment model, when openness of the economy dummy representing more transition of the economy towards external integration from 1991-92 onwards, and a financial liberalization dummy (for 1992-93 and onwards), are substituted alternatively with the dummy for 1990-91 and onwards and estimated, it is found that these dummies are insignificant in influencing private sector investment spending. Since 1979-80, there has been change in the pattern of government expenditure as noted earlier, when a dummy variable is introduced for this period in order to capture the change in the pattern of government expenditure, the result shows that the dummy does not play any significant role in the investment model. Rather, one will obtain inefficient estimates as the estimating equation does not pass no serial correlation and no heteroscedasticity tests. These dummies are dropped later from the estimation, and as a result, it is observed that the equation with a dummy for 1990-91 and onwards, yields consistent estimates satisfying the statistical properties of a well-specified functional form; without the introduction of this dummy, the long-run relationship cannot be established.

By replacing the variable representing the domestic borrowings of the central government {n the investment model as presented in (4)} with an alternative definition of domestic borrowing, defined as RMBSPF net of small savings collection (i.e. RMBPF), one can examine whether there is an observable change in the impact of domestic borrowings of the central government on private

investment. The replacement of the alternative definition of domestic debt of the central government follows the same reasoning as mentioned earlier. The previous domestic government borrowing variable is replaced keeping an intent that small savings are no more a source of financing the central government expenditure. A major portion in earlier period being shared by the state governments with the central government and in recent years, with a change in the fiscal policy, small savings do not come to the coffer of the central government as examined in Chapter 4 while analysing domestic debt policy. The monetized borrowing of the central government raised from the Reserve Bank of India (RBI) is not considered, as it is ceased to exist from 1997-98. With the withdrawal of option of using monetization as a source of financing government deficits, there is a pressure on market borrowing component of the central government towards the end of 1990s. Like the previous estimates in the private consumption model, the replacement of this borrowing variable exclusive of small savings (RMBPF) helps answer an important question relating to the impact of current pattern of borrowing (if continued into future) on private investment spending, given the present impact.

The same model, as in (4), is estimated with the replacement of new central government borrowing variable (i.e. RMBPF). As can be seen from Table 7.4, the F-statistic (i.e., 2.28) computed from the underlying error correction form of the ARDL model lies below the tabulated lower critical bound of F-statistics (i.e., 3.57) even at 10% level of significance. This implies that there does not exist a stable long-run relationship between the variables in the specified private investment model. Therefore, the estimation is not carried forward for obtaining long-run parameters with the ARDL approach.

It is also imperative to examine the impact of the fiscal policy of the combined government on private investment which would help policy formulation in a wider context of the economy. Let's examine the impact of combined domestic borrowings of the center and states on private fixed investment. As can be seen from the Table 7.4, the computed F-statistics (i.e.10.32) well exceeds the tabulated upper critical bound of F-statistics; it confirms that there exists a comovement relationship between the variables in the private investment model. In the next step, private investment equation is estimated through the ARDL equation on the basis of an

optimal lag selection criterion. It can be seen that the resulting ARDL[2,3,0,0,0,2] model estimates presented in Appendix Table 7.3 satisfy all the properties of a well specified model at the restricted lag structure except failing to pass the no serial correlation test. The model rejects the null hypothesis of no serial correlation at a lower level of significance (at 10%). This problem can be surmounted by changing the lag structure of the variables, but this is avoided for the reason that it will distort the optimal lag structure as determined on the basis of model selection criteria. Ignoring the optimal lag selection and an arbitrary lag selection procedure, correcting for serial correlation problem may result in the incorporation of insignificant variables into the model which is also not a desirable feature of a model specification. Therefore, keeping the optimal lag structure unchanged, the model is estimated with the risk of serial correlation being at a lower level of significance.

From the selected model, the corresponding long-run and short-run parameters are estimated. The long-run parameters, as presented in Table 7.5, produce similar results as in the previous case of domestic borrowings of the central government. There is consistency in the sign of parameters. The result indicates that combined government domestic borrowings, similar to central government domestic borrowings, do not play a significant role in influencing private sector investment. The user cost of capital, although insignificant in terms of influencing private investment, carries expected sign. The gross public sector investment crowds out private sector investment, while openness measure has a positive influence on private sector investment. The inflation rate, indicating a measure of uncertainty for the business climate, has an adverse impact on private investment.[109]

[109] Private investment model (4) when estimated using the same ARDL approach to cointegration with the same set of variables, but with the replacement of a broader measure of openness of the economy by a narrower openness measure, which is defined exports plus imports, the result shows that there exists cointegration between the variables for the same set of combination of variables, but under a similar situation the cointegrating relationship is absent when the model is estimated with the alternative definition of domestic public borrowing of the central government which excludes small savings component of domestic liabilities (i.e. RMBPFRN) from the earlier definition of domestic debt (i.e. RMBSPFRN). Following the usual procedure of the ARDL model estimation such as determining the optimal lags and satisfying all the diagnostic tests for obtaining consistent estimates, the long-run and the short-run estimates reveal that they are consistent in their sign as with the broader definition of openness measure irrespective of presence of central government debt or combined government debt variable in the model. The long-run estimates reveal that the magnitude of the coefficients of significant parameters is almost similar to the corresponding parameters of the model when estimated with broader measure of openness. The government borrowing, although has no influence in the long-run, has positive influence on private fixed investment in the short-run. The user cost of capital consistently does not have significant impact on private fixed investment, although there is a change in the sign of its coefficient depending upon the alternative definitions of openness measures adopted in the model estimation. In contrast to such results, gross public sector

The short-run estimates as reported in Appendix Table 7.4, suggest that the coefficient of error correction term is significant and has a correct sign indicating that 99 per cent of adjustment in private investment is made in the following year to any deviations from its previous long-run equilibrium. This reflects a quick adjustment of private investment to restore to its equilibrium level. Apart from this, the domestic borrowings of the combined government have positive influence in the short-run as opposed to no effect in the long-run, and public sector investment continues to have adverse impact on private sector investment. The crowding out of private investment, both in the long-run and short-run, may arise because of a possible competition between private sector and public sector in terms of investment. This may also arise due to shortage of credit to private sector and public sector investments in unproductive sectors. The dummy variable for the year 1990-91 is significant irrespective of short-run and long-run, while the other dummies representing more openness of the economy and financial liberalization do not perform well in the model. It is observed that an alternative substitution of later two dummies in the model does not produce efficient estimates and they do not play any significant role in influencing private sector investment. Therefore, they are not estimated.

7.8 Conclusion

The overall result suggests that the domestic public borrowings, whether central or combination of both the centre and states, have no impact on domestic private fixed investment in the long-run, but a favourable impact on private fixed investment in the short-run. This result suggests that as far as government borrowings through debt-financing (bond-financing) are concerned, it has to be very cautious about how it is investing and whether it is effective in enhancing the growth rate of the economy over the long-run. Debt-financing without any favourable influence on the economy is meaningless and counter productive. Since

---

investment and openness measure are consistent in influencing private sector investment both in the long-run and short-run. The gross public sector investment consistently has negative influence, while openness measure has positive influence on private investment. It is also observed that when the variables in the model are expressed in logarithmic terms, there exists cointegration only with narrow measure of openness variable, the sign and significance of key parameters (public sector investment and government borrowings) remaining consistent with above estimates. With broader measure of openness in logarithmic value of variables, there does not exist cointegration in the model.

private investment is central to achieving high growth rate of the market-led economies, government investment should be complementary to private investment. The government has to find out critical areas for investment by which private sector can be induced.

Converse to the complementarity effect of public sector investment in developing economies, the gross public sector investment has crowding out impact on private sector investment both in the long-run and short-run. The crowding out phenomenon can be explained either in terms of the public sector investment in the competing sectors of the economy (where there can be private sector investment) or absorption of resources by the public sector. Excessive absorption of financial and physical resources by public sector implies less resource availability for the private sector. It is possible that a part of government borrowings may get absorbed in public sector enterprises. Apart from that, public sector enterprises borrow more than what the governments allocate to them. Since public sector consists of governments as well as public sector enterprises including various departments, it may absorb more financial (borrowed) and physical resources than the governments. This means total public sector absorption of resources may not be entirely from budgetary allocations of the governments. The operation and scope of public sector is wider than government activities. Thus, public sector covers activities which may be beyond the scope of the government. As a result, while the government borrowings have no impact on private sector investment, public sector investment has adverse impact. In such a situation, the best course for the public sector would be to venture into the areas where private sector has not entered as it has implications for the future growth of income. The openness measure has a positive influence both in the long-run and short-run. The openness measure positively affecting private investment can be attributed to the fact that more openness helps in diffusing newly developed foreign technology which is likely to enhance productivity of private sector investment. This in turn, positively influences private sector investment. The user cost of capital does not play a significant role in influencing private sector investment either in the long-run or short-run. The private investment model also tries to incorporate other changing structural features of the economy over the years. Since the economy has witnessed a significant structural

transformation with more openness of the economy to the external world in the early 1990s, and expecting that this may have brought about an interaction of the external factors with the domestic real sector of the economy, a dummy has been introduced to capture the change. Considering a dummy variable to represent the significant changes in the economic environment from the year 1991-92 in the context of liberalization policy followed in the economy, and another dummy variable representing the financial liberalization policy from the period 1992-93, the ARDL estimates evidence that the coefficients of dummies are insignificant along with insignificance of user cost of capital. Later, these dummies have been dropped from the estimation. But surprisingly, the policy shift dummy for 1990-91 is found to have a positive significant impact on private fixed investment. The significance of dummy for the year 1990-91 may have arisen for the reason that although the economy is found to face a macro economic crisis, there is a relative drastic decline in public sector investment. The reduction in gross public investment in the competing areas may have given scope for private sector investment, as a result, this has led to a rise in private sector investment which the model is not able to distinctly separate out by subdividing the sample period. The other possible reasons are: a move towards modernizing techniques of production, steps taken for delicensing industries and removal of restrictions or controls on private sector investment at the end of the seventh five-year plan period.

However, the major limitation of the study is that the estimates are not based on a complete model of private investment. A complete analysis of the interactions between the fiscal variable and other real macro variables is possible only within the framework of a fully specified macroeconomic model taking into account all structural features of the economy which is beyond the scope of the analysis in the study. Rather, the study tries to examine the relationship between private investment and domestic government borrowing in India in terms of a simple framework.

Appendix Table 7.1: Autoregressive Distributed Lag Estimates

ARDL(2,3,0,0,0,1) selected based on R-BAR Squared Criterion Dependent variable is RTPFIRN 36 observations used for estimation from 1965 to 2000		
Regressor	Coefficient	T-Ratio[Prob]
CONST	.1725	4.3754[.000]
RTPFIRN(-1)	.3320	1.7481[.094]
RTPFIRN(-2)	-.2677	-1.6572[.111]
RMBSPFRN	.1558	2.0250[.055]
RMBSPFRN(-1)	-.0602	-.8122[.425]
RMBSPFRN(-2)	.1944	2.5302[.019]
RMBSPFRN(-3)	-.3007	-3.2625[.003]
RGPSIRN	-.5481	-3.0088[.006]
UCC	-.0403	-1.0033[.326]
EXIMCNF	.2012	3.3243[.003]
INFGNP	-.0001	-.2412[.811]
INFGNP(-1)	-.0007	-1.8135[.083]
DUM1	.0174	2.2386[.035]
R-Squared .94960	R-Bar-Squared	.92330
F-stat. F(12, 23) 36.1088[.000]	DW-statistic	2.2899
A:Serial Correlation*CHSQ(1) = 2.5968[.110]*F(1, 22) = 1.7103[.204]		
B:Functional Form *CHSQ(1) = .75048[.386]*F(1, 22) = .46839[.501]		
C:Normality *CHSQ(2) = 1.6055[.448]*	Not applicable	
D:Heteroscedasticity*CHSQ(1) = .19532[.659]*F(1, 34) = .18548[.669]		

Note: A:Lagrange multiplier test of residual serial correlation: B:Ramsey's RESET test using the square of the fitted values; C:Based on a test of skewness and kurtosis of residuals; D:Based on the regression of squared residuals on squared fitted values

Appendix Table 7.2: Error Correction Representation for the Selected ARDL Model

ARDL(2,3,0,0,0,1) selected based on R-BAR Squared Criterion Dependent variable is dRTPFIRN 36 observations used for estimation from 1965 to 2000		
Regressor	Coefficient	T-Ratio[Prob]
dRTPFIRN1	.2677	1.6572[.110]
dRMBSPFRN	.1558	2.0250[.054]
dRMBSPFRN1	.1063	1.1435[.264]
dRMBSPFRN2	.3007	3.2625[.003]
dRGPSIRN	-.5481	-3.0088[.006]
dUCC	-.0403	-1.0033[.325]
dEXIMCNF	.2012	3.3243[.003]
dINFGNP	-.0009	-.2412[.811]
CONST	.1725	4.3754[.000]
dDUM1	.0174	2.2386[.034]
ecm(-1)	-.9357	-5.0627[.000]
ecm = RTPFIRN + .011469*RMBSPFRN + .58585*RGPSIRN + .043128*UCC -.21505*EXIMCNF + .8490E-3*INFGNP -.18444*CONST -.018608*DUM1		
R-Squared .65546	R-Bar-Squared	.47570
F-stat. F(10, 25) 4.3755[.001]	DW-statistic	2.2899

Note:- R-Squared and R-Bar-Squared measures refer to the dependent variable dRTPFIRN and in cases where the error correction model is highly restricted, these measures could become negative.

Appendix Table 7.3: Autoregressive Distributed Lag Estimates

ARDL(2,3,0,0,0,2) selected based on R-BAR Squared Criterion Dependent variable is RTPFIRN 36 observations used for estimation from 1965 to 2000		
Regressor	Coefficient	T-Ratio[Prob]
CONST	.1867	4.4980[.000]
RTPFIRN(-1)	.3115	1.6006[.124]
RTPFIRN(-2)	-.3079	-1.8155[.083]
RCMBSPFRN	.1691	2.1481[.043]
RCMBSPFRN(-1)	-.0467	-0.6095[.548]
RCMBSPFRN(-2)	.1918	2.4142[.025]
RCMBSPFRN(-3)	-.3203	-3.2578[.004]
RGPSIRN	-.6246	-3.2488[.004]
UCC	-.0439	-1.0706[.296]
EXIMCNF	.2063	3.3321[.003]
INFGNP	-.0008	-0.0996[.922]
INFGNP(-1)	.0004	-2.0847[.049]
INFGNP(-2)	.0004	1.0249[.317]
DUM1	.0177	2.2269[.037]
R-Squared .95021	R-Bar-Squared	0.92078
F-stat. F(13, 22) 32.2947[.000]	DW-statistic	2.4277
A:Serial Correlation*CHSQ (1) = 5.3679[.021]*F(1, 21) = 3.6800[.069]		
B:Functional Form *CHSQ(1) = 1.0974[.295]*F(1, 21) = .66026[.426]		
C:Normality *CHSQ(2) = 1.4616[.482]* Not applicable		
D:Heteroscedasticity*CHSQ(1) = .28309[.595]*F(1, 34) = .26949[.607]		

Appendix Table 7.4: Error Correction Representation for the Selected ARDL Model

ARDL(2,3,0,0,0,2) selected based on R-BAR Squared Criterion Dependent variable is dRTPFIRN 36 observations used for estimation from 1965 to 2000		
Regressor	Coefficient	T-Ratio[Prob]
dRTPFIRN1	.3079	1.8155[.082]
dRCMBSPFRN	.1691	2.1481[.042]
dRCMBSPFRN1	.1284	1.3046[.204]
dRCMBSPFRN2	.3203	3.2578[.003]
dRGPSIRN	-.6246	-3.2488[.003]
dUCC	-.0439	-1.0706[.295]
dEXIMCNF	.2063	3.3321[.003]
dINFGNP	-.0004	-0.0996[.921]
dINFGNP1	-.0004	-1.0249[.316]
CONST	.1867	4.4980[.000]
dDUM1	.0177	2.2269[.036]
ecm(-1)	-.9964	-5.1047[.000]
ecm = RTPFIRN + .0060901*RCMBSPFRN + .62692*RGPSIRN + .044155*UCC -.20711*EXIMCNF + .5004E-3*INFGNP -.18744*CONST - .017833*DUM1		
R-Squared .65964	R-Bar-Squared	.45852
S.E. of Regression .0078588	F-stat. F(11, 24)	3.8762[.003]
DW-statistic 2.4277		

Chapter 8

Concluding Observations and Policy Inputs

8.1 Conclusions

The study tries to review the trends and composition of domestic debt of the central government and traces the underlying causes of rising debt behaviour of the central government in India. It also reviews the domestic debt policy of the central government and interest rate policy relating to domestic debt which may have implications for the fiscal and monetary stability of the country. Subsequently, it empirically addresses the question of sustainability of domestic debt of the central government and examines the impact of central government domestic debt along with combined government domestic debt on private consumption and investment. Based on the reviews and econometric results[110], the following conclusions and inferences have emerged from the study.

- The fiscal development in India presents a worrisome picture of the financial position of the central government. The domestic debt of the central government, showing an upward trend is found to have attained a higher level in the 1990s. Towards the mid-1990s, the debt as a percentage of GDP at market prices, (although showing a marginal falling trend as compared to the early years of 1990s) is observed to be prevailing at a higher level.

- Although the central government has relatively been relying more on domestic sources of debt, where external public debt is no longer an important source of financing central government deficits, the government over the years has heavily resorted to market borrowings and small savings and provident funds except the year 1999-00 (from where there has been a drastic fall in small savings). The fall in small savings is due to the changing fiscal policy of the central government in the context of its changing budgetary accounting practices. This is done

[110]Since much of policy interests lie in evaluating the long-run effects of fiscal policy, therefore, the summary results analysed based on application of cointegration and error correction techniques, emphasis on the long-run

in order to reduce the central government's own deficits as the state governments and union territories apportion a major portion of small savings from the centre.

- The reason for a high level of overall debt of the central government is traced to the increase in government expenditure and less revenue receipts from both the tax and non-tax sources. The gap between government expenditure and revenue receipts is observed to be widened at a higher level of expenditure.

- The study observes that within the expenditure management policy of the central government, it is the inefficiency with regard to the utilization pattern of financial resources which has given rise to such a precarious fiscal situation of the central government. The quality of fiscal adjustment is found to have mainly deteriorated due to a disproportionate rise in revenue expenditure in total expenditure of the central government. Within revenue expenditure, it is observed that interest payment constitutes a sizable proportion of total current expenditure and revenue receipts. Almost 50 per cent of total revenue receipts is absorbed in payment of total interest liabilities leaving the rest for incurring other current and capital expenditures.

- The off-budgetary activities have also led to fiscal problems. The additional financial burden and fiscal risks have arisen due to proliferation of central government guarantees to the state governments and public and private sector units - called contingent liabilities of the central government.

- Realising the shortcomings of the past debt management policies several reform measures are introduced in terms of floatation of large number of debt instruments and ensuring market orientation to the debt management program. As a result, there is now direct participation of

---

effects of government debt and other macroeconomic variables on private sector activities. However, the analysis for short-run effects is presented in the empirical section of preceding chapters.

banks and non-banks in the government security market giving space to the open market operations of the central bank. But the major criticism advanced against the government debt management is that despite all these developments, the banks and non-banks participate only in the government debt market, as a result, there is no significant overall development of the financial and capital markets in India, and it is no different from the program prior to 1990's.

- An empirical examination of sustainability of domestic public debt provides a clear evidence of unsustainability of different components of domestic debt along with unsustainability of aggregate domestic debt exclusive of the debt from the Reserve Bank of India.

- Examining the macroeconomic impact of domestic public debt of the central government as well as combined government, the study finds that in the long-run domestic public debt has an adverse impact on private consumption, while domestic public borrowing has no impact on private investment. The adverse impact of public debt on private consumption is found to be due to credit constraints on private sector. Since banks and other financial institutions are large subscribers to the government bonds, holding of more government bonds by these institutions implies more credit absorption by the government. When the government absorbs the financial resources, the resources from the surplus private sector units do not flow to deficit private sector units. Hence, there will be less credit availability for the liquidity constrained individuals. Thereby, it reduces private sector consumption. Although increase in domestic public debt directly implies an increase in private sector savings, the same does not imply an increase in private investment as it is observed that government borrowings do not get translated into increasing private sector investment. For achieving higher growth rate, as observed in highly developed economies, private consumption demand in tandem with private investment demand has to increase to higher levels. In other words, consumption demand has to be sustained with the increase in private investment demand. But contrarily,

although there is an increase in per capita private consumption expenditure, there is a decline in private consumption expenditure to GDP ratio which has got implications for future growth rate of the economy. The decline in private consumption expenditure to GDP ratio may also imply less consumption of higher bracket income individuals and hence more savings by them in the form of government bonds. Thus, the policy exercise should be carried out aimed at setting the aggregate demand goal at a higher level.

- Although the empirical results suggest that in the long-run government expenditure raises private consumption expenditure, public sector investment expenditure tends to crowd out private investment. The positive impact of government expenditure on private consumption can hold for the reason that government spends a larger proportion of its financial resources on current expenditure. Interest payment, wages and salaries and subsidies constitute a larger proportion of current government expenditure; this generates income for the private sector. As income increases due to increase in government expenditure, it leads to a rise in private consumption expenditure. This fact can be argued from the perspective of distributional effect of public expenditure. Given a higher marginal propensity to consume of the lower bracket income individuals, if more income is transferred to them through the channel of government expenditure, it may result in more private consumption expenditure.

- Since private investment is integral to achieve higher rate of growth, for promoting growth, government investment should promote private investment rather than retarding private investment in the economy. The adverse impact of public sector investment on private investment may be due to the investment competition between private sector and public sector with regard to absorbing physical and financial resources as well as creation of market for the output.

- Although, studies by Sundararajan and Thakur (1980), Patnaik and Joshi (2000), Pradhan, Rath and Sarma (1990) and others in the context of India, which point out that government investment tends to crowd in private investment, the present study has found contradictory results; it is due to differences in the sample period of the studies and the econometric methods applied. For a time series application (since it requires sufficient number of observations but due to sample size constraint), the study finds it difficult to divide the whole sample into two sub-samples on the basis of major policy changes i.e. one sample period is before 1990s and the other is after 1990s when the economy experiences significant structural changes. Nevertheless, the study estimates the result with a 1990-91 dummy but this shows positive influence on private investment. The significant and positive influence of dummy on private investment may be due to modernisation of domestic industries to compete with foreign industries, removal of restrictions in investment and adoption of delincensing industrial policy regime in the country. These may have a positive influence on private sector investment. The influence of macroeconomic crisis faced by the country does not get reflected in the dummy for private investment model. It is difficult to isolate other policy influences as against the positive influence of delincensing policy regime on private investment. In some years, there may be crowding in impact of public sector investment and in some (years) there may be crowding out impact of public sector investment expenditure but the net impact may be crowding out of private investment by public sector investment. The crowding out impact may be explained in terms of absorption of financial and physical resources by public sector. Public sector absorption of resources goes beyond the government absorption because public sector includes government as well as public sector enterprises and other departmental undertakings which can absorb additional financial and real resources after netting out government's acquisition of resources.

- Given the unsustainability sign of fiscal policy, what is required by the government at the present juncture is to concentrate on revenue

optimization and not on revenue maximization along with controlling government expenditure under unproductive heads. The government does not necessarily trim down total expenditure, but needs to cut down imprudent expenditures. More than the issue of unsustainability of domestic debt of the central government (which has recently attracted a lot of policy attention) it is the impact of public debt that has drawn a considerable attention. While the unsustainability of domestic debt has got implications for managing government's finances, the domestic public debt has a bearing on the macro economy. The sustainability of fiscal policy also hinges on whether the government activities are growth promoting or growth retarding. In this context, the stability calibration shows that India should not worry about the fiscal restraint exercise, given the fact that growth rate is maintained at a higher level. Therefore, India should not aim at expenditure compression, rather it should concentrate on expenditure management to ensure that there is a reduction of obligatory expenditure and rise in productive expenditure. A higher growth rate can be achieved provided public expenditure is efficiently and productively utilized.

- On the basis of unsustainability of domestic debt of the central government, the study suggests that government has to be very cautious in exercising its fiscal policies in the future. Otherwise, the government may face a catastrophe in its fiscal management operations due to financial over burden. The government cannot continue to breach the intertemporal budget constraint over the long run. Therefore, the study suggests that it is the pattern of fiscal deficits which the government has to worry about; the fiscal deficit pattern has resulted in a higher level of government debt-to-GDP ratio and interest payment-to-GDP ratio over the decades.

- The study does not suggest compromising on total expenditure of the government or raising the tax rates drastically in the future in order to achieve fiscal policy sustainability, but what the government needs to do is that it has to allocate resources to productive channels which would

give rise to desirable returns in order to meet the desired expenditure. As far as government expenditure through debt-financing is concerned, the government has to be very cautious about how it is investing, and also whether it is effective in enhancing the growth rate of the economy. Debt-financing without any desired positive influence on the economy is meaningless and counter productive. Expenditure on productive lines would not only give rise to direct return but also, by raising GDP of the economy, can raise the revenue of the government in the form of volume of taxes for with an increase in GDP of the economy, the tax base of the economy would be expanded. The debt service burden as a proportion of total expenditure, can come down if the investments made by the government through borrowings, give rise to adequate returns either through the generation of non-tax revenues or through tax revenues. This would help the government efficiently manage its fiscal policy in a more flexible economic environment.

- Improvement in public infrastructure can augment private investment, output and hence would lead to buoyancy in tax revenues. Non-tax revenues should increase through increases in dividends from public enterprise investments. Expenditure reduction being inflexible downwardly, the axe of deficit reduction partly puts pressure on non-tax revenue in the revenue receipt side, and partly on capital expenditure in the expenditure side of the budget in the current fiscal adjustment program. This implies that although non-tax revenue has stagnated at a lower level, in the context of relative decline in tax revenue receipts, further emphasis has to be placed on various ways of raising non-tax revenues for adjustment of fiscal imbalances of the central government in India. In view of continuous and large increases in current expenditure, where a large proportion of revenue receipts is earmarked for interest payments without generating corresponding returns, there exists a serious policy concern towards sustainability of the central government finance in India. Due to rigidities in public expenditure, spending cuts, which are necessary for the fiscal adjustment have not focussed on the programs that should be cut, but focused on programs

that could be cut. Cuts in investment and maintenance spending are expected to affect efficiency. Proper targeting of social expenditures and discipline in the use of resources can improve the quality and sustainability of fiscal adjustment to a significant degree.

- Converse to the expectation of complementrity effect of government investment in a developing economy, the result suggests that government investment results in crowding out impact. As private investment is central to achieve high growth rate of the market-led economies, government investment should be complementary to private investment for achieving higher growth rate. The government has to find out critical areas in which private sector can be induced to raise its investment. The best course for the government would be to venture into areas where the private sector has not made an entry. This would have implications for the future growth of the economy. The policy makers should bear in mind that the government investment spending (although may not generate immediate returns) helps the economy grow over the long-run. The fiscal policy should be formulated bearing the long-term perspective in mind.

- Prudent government debt management is important from several considerations. Government's debt portfolio is the largest financial portfolio in the economy. It can generate substantial risk relating to the government's balance sheet and the country's financial stability. Prudent debt management can make the country less susceptible to contagion and financial risk. Therefore, government debt management policies can have important implications for the effectiveness of other macroeconomic policies. The government can reduce risk associated with its debt portfolio by choosing an appropriate composition of debt, interest rate structure, and maturity profile of debt. If government's debt management strategy is poorly designed, implemented, and communicated, it can induce adverse (investor's) sentiment, raise debt-servicing costs, damage government's credibility, and exacerbate financial market instability. Debt management practice should ensure

investor's participation in the domestic bond market and strengthening the efficiency of domestic financial market. Therefore, prudent practices in debt management include recognition of the benefits of debt management such as a close coordination of debt and monetary management, a limit on debt expansion, careful management of refinancing risk and interest costs and a sound institutional structure, including clear delegation of responsibilities and associated accountabilities among government agencies involved in debt management.

- Interest payment entails a large claim on public resources, and reduces government's capacity to spend on social sectors and developmental activities. Interest payment can be reduced either by retiring debt, particularly higher interest bearing debt or by curbing the growth of new debt (India Economic Survey, 1996-97). Efficient government debt management can reduce government's debt-servicing cost by reducing credit and liquidity premium in the term structure of interest rates for government securities.

- Interest rate and government debt are closely interrelated. For a good financial and monetary environment, there is a necessity of equilibrium interest rate in the economy. For an undistorted equilibrium interest rate and financial market, government debt is one of the instruments in the development of capital market requiring greater policy attention. It is evident from the economic literature that deviation of interest rate either in the upward or downward direction from its market determined equilibrium position is considered as one of the pertinent factors for macroeconomic instability in developing economies like India. The higher interest rate structure not only presages the danger of recession, but also pushes the economy into the debt trap situation (Morley et. al, 1987). In contrast, a lower interest rate structure discourages private savings and hence constrains investment by engaging private sector in speculative activities. Moreover, an appropriate interest rate policy which is sufficiently realistic, stable and flexible can impart more strength to

the monetary authority in curtailing short-term demand for funds or speculative demand for money. To maintain a positive interest rate two methods could be employed i.e. (i) issue of index loans and (ii) manipulation of nominal rates of interest. The interest rate reflects the opportunity cost of holding different kinds of assets determined by what the asset holders would receive under alternative uses of their savings and an equilibrium occurs when the return on various assets converge. A realistic structure of interest rates ensures growth with stability. The realistic rates of interest on government borrowing in India have to take into account the social opportunity cost. Besides ensuring fiscal adequacy for developmental expenditures, government debt policy has to ensure maintaining monetary stability. Government debt management policy should not interfere with the rates of interest policy and overall monetary policy of the country.

- However, a major limitation of the study is that the result is not based on a complete model of private investment. A complete analysis of the interactions between fiscal variables and other real macro economic variables is possible only within the framework of a fully specified general equilibrium macroeconomic model taking into account all the structural features of the economy which falls beyond the scope of the analysis. Rather, the study tries to examine the relationship between private investment and domestic borrowings of the central government in India within a simple framework.

8.2 Direction for Future Research

There is much scope for studying the distributional aspect of public debt which is crucial for the allocation of resources and for maintaining equity and welfare objective in the economy. Moreover, the growth rate of the economy matters most. One can examine the impact of public debt and expenditure on the growth rate, which can have more implications for the economy in guiding the policy makers.

The effect of government expenditure differs in terms of its utilisation. The effect would be different if it is utilised for investment purposes rather than for

consumption. Within the consumption purpose, the effect also depends on whether government incurs consumption expenditure on durables or non-durables. One needs to classify the expenditure according to the purpose of analysis. The effect of expenditure is different from effect of different methods of financing the expenditure. It is argued that it is the growth of public debt which influences economic activities in the long-run rather than the absolute level of public debt. One can undertake an analysis in examining the impact of fiscal policy of all the respective state governments on different economic activities on a similar line through an application of a panel regression model.

8.3 Limitations of the Study

The present analysis applies Dickey-Fuller and Phillip and Perron tests to evaluate sustainability. The limitation of these methods is that they do not account for the breaks in the series for testing the stationarity and non-stationarity of series. The evaluation of sustainability can further be carried out by applying recently advanced unit root tests, which take into account multiple breaks in a series.

Since the automatic monetisation as a method of financing the government expenditure is withdrawn from 1997-98, the study is not concerned with the effects of monetisation. Rather, the study focuses on public domestic debt which is raised from the public in analyzing the macro economic impact. The study, on the basis of Ricardian equivalence proposition, has considered only the bond-financed expenditure. Only recently economists have begun to argue that in the same way monetisation would have neutral impact on the economy through its inflationary impact. When the government finances its expenditures through monetisation, it leads to an increase in money supply. But the real money supply and income would remain unchanged due to an increase in prices. Nevertheless, monetisation is not a permanent arrangement (nor is it a preferred arrangement always). One can undertake a study by separating out the impact of monetisation from the impact of aggregate domestic debt of the government on various economic activities in order to examine what holds good for the economy.

Bibliography

Afonso, A. 2000. "Fiscal Policy Sustainability: Some Unpleasant European Evidence". Paper presented in an Annual Meeting of the European Public Choice Society Conference in Siena.

Ahluwalia M. S. 2002. "India's Vulnerability to External Crises: An Assessment", in M. S. Ahluwalia, Y. V. Reddy and S. S. Tarapore, eds., *Macroeconomics and Monetary Policy: Issues for a Reforming Economy*, Oxford University Press.

Ahmed, H. and S. M. Miller. 1999. "Crowding-out and Crowding-in Effects of the Components of Government Expenditure". University of Connecticut Working Paper 1999-02.

Aschauer, D. A. 1985. "Fiscal Policy and Aggregate Demand". *The American Economic Review* 75: 117-27.

Aschauer, D. A. 1989. "Does Public Capital Crowd Out Private Capital". *Journal of Monetary Economics* 24: 171-88.

Athukorala, P. C. and K. Sen. 2001. *Savings, Investment, and Growth in India.* Oxford University Press.

Auerbach, A. J. and L. J. Kotlikoff. 1998. *Macroeconomics: An Integrated Approach.* The MIT Press, Massachusetts.

Bailey, M. J. 1962. *National Income and the Price Level.* New York: McGraw-Hill.

Barro, R. J. 1974. "Are Government Bonds Net Wealth?". *Journal of Political Economy* 82: 1095-1117.

Barsky, R. B, N. G. Mankiw and S. P. Zeldes. 1986. "Ricardian Consumers with Keynesian Propensities". *The American Economic Review* 76(4): 676-91.

Bcaugrand, P., B. Loko and M. Mlachila. 2000. "The Choice Between External and Domestic Debt in Financing Budget Deficits: The Case of Central and West African Countries". IMF Working paper Wp/02/79.

Bhattacharya, B. B. 1990. "Internal Public Debt of Government of India: Growth and Composition". *Economic Political Weekly:* 780-88.

Bhattacharya, B. B. and S. Guha. 1992."The Behaviour of Public Debt in India: A Macroeconometric Analysis". *Journal of Quantitative Economics* 8(1): 29-50.

Bhole, L. M. 1999. *Financial Institution and Markets.* Tata Mcgraw-Hill Publishing Company Ltd.

Black, R. A. and C. G. Gilmore. 1990. "Crowding out During Britain's Industrial Revolution". *The Journal of Economic History* 50(1): 109-15.

Blanchard, O. J. 1985. "Debt, deficits, and Finite Horizon". *Journal of Polictical Economy* 93: 223-47.

Blanchard, O. J. and S. Fischer. 1989. *Lectures on Macroeconomics.* The MIT press Cambridge, Massachusetts, London, England.

Bleaney, M., N. Gemmell and R. Kneller. 2001. "Testing the Endogeneous Growth Model; Public Expenditure, Taxation, and Growth Over the Long-run". *Canadian Journal of Economics* 34(1): 37-57.

Blejer, M. I. and M. S. Khan. 1984. "Government Policy and Private Investment in Developing Countries", *IMF Staff Papers* 31(2): 379-03.

Blinder, A. S. and R. M. Solow. 1973. "Does Fiscal Policy Matter?", *Journal of Public Economics* 2(4): 319-37.

Bohn. H. 1991. "The Sustainability of Budget Deficits in a Stochastic Economy". *Journal of Money, Credit and Banking* 27: 257-71.

Borensztein, E. 1991. "Will Debt Reductions Increase Investment", *Finance & Development* 28(1): 25-27.

Boskin, M. J., J. S. Flemming and S. Gorini. 1987. *Private Savings and Public Debt.* Basil Blackwell, U. S. A.

Bougrine, H. 2000. "Fiscal Policy and the Current Crisis: Are Budget Deficits a Cause, a Consequence or a Remedy?" in H. Bougrine, ed., *The Economics of Public Spending: Debts, Deficits and Economic Performance.* Edward Elgar Publishing Ltd., U.S.A.

Bowen, W. G., R. G. Davis and D. H. Kopf. 1960. "The Public Debt: A Burden on Future Generations?". *American Economic Review* 50: 701-706.

Branson, W. H. 1994. *Macroeconomic Theory and Policy.* Universal Book Stall, New Delhi.

Brixi, H.P and A. Schick. 2002. *Government at Risk: Contingent Liabilities and Risk.* A Copublication of the World Bank and Oxford University Press.

Buchanan, J. M. 1958. *Public Principles of Public Debt.* Homewood, IL:Richard D. Irwin.

Buiter W. H. 2001. "Notes on A Code for Fiscal Stability". *Oxford Economic Papers* 53: 1-19.

Buiter, W. H. and U. R. Patel. 1992. "Debt, Deficits and Inflation: An Application to the Public Finance of India". *Journal of Public Economics* 47: 172-05.

Buiter, W. H. and U. R. Patel. 1997. "Solvency and Fiscal Correction in India: An Analytical Discussion". in Sudipto Mundle, ed., *Public Finance Policy Issues for India.*

Callen, T. and P. Cashin. 2001. "Assessing India's External Position". in T. Callen, P. Reynolds & C. Towe, eds., *India at the Crossroads: Sustaining Growth and Reducing Poverty, IMF.*

Cardia, E. 1997. "Replicating Ricardian Equivalence Tests with Simulated Series". *The American Economic Review* 87: 65-79.

Carmichael, J. 1982. "On Barro's Theorem of Debt Neutrality: The Irrelevance of Net Wealth". *American Economic Review* 72: 202-13.

Cebula, J.C. 1985. "Crowding Out and Fiscal Policy in the United States: A Note on the Recent Experience". *Public Finance/Finances Publiques* 40(1): 133-36.

Cebula, R. J. 1988. "Federal Government Budget Deficits and Interest Rates: An Emprical Analysis for the United States, 1955-1984". *Public Finance/Finance Publiques* 43(3): 337-48.

Cebula, R. J. and W. J. Belton. 1993. "Government Budget Deficits and Interest Rates in the United States: Evidence for Closed and Open Systems Put into Perspective 1985-1989". *Public Finance/Finance Publiques* 48(2): 188-209.

Cebula, R. J. 1978. "An Empirical Analysis of the "Crowding Out" Effect of Fiscal Policy in the United States and Canada". *Kyklos* 31: 424-36.

Chelliah, R. J. 1991. "The Growth of Indian Public Debt - Dimensions of the Problem and Corrective Measures". IMF Working Paper, WP/91/72.

Chibber, A., M. Dailami, and N. Shafik. 1992. *Reviving Private Investment in Developing Countries: Empirical Studies and Policy Lessons.* North Holland, New York, PP.245.

Cipollini, A. 2001. "Testing for Government Intertemporal Solvency: A Smooth Transition Error Correction Model Approach". *The Manchester School* 69(6): 643-55.

Cohen D. 2002. "Fiscal Sustainability and a Contingency Trust Fund". in *Brixi* H. P. & A. Schick, eds., *Government at Risk: Contingent Liabilities and Fiscal Risk.* A Copublication of the World Bank and Oxford University Press, New York.

Clark, P.K. 1979. "Investment in the 1970s: Theory, Performance, and Prediction". *Brookings Papers on Economic Activity* 1: 73-124.

Corbo, V. and K. Schmidt-Hebbel. 1991. "Public Policies and Savings in Developing Countries". *Journal of Development Economics* 36(1): 89-116.

Cuddington, J. T. 1996. "Analysing the Sustainability of Fiscal Deficits in Developing Countries". Paper presented in the Economic Department, Georgetown University, Washington, D.C.

Dalamagas, B. 1995. "Growth, Public Investment and Deficit Financing". *Australian Economic Papers* 34: 244-331.

Dasgupta, B. 1996. "Debt Sustainability and Net Outward Financial Transfers: Deterrent to Growth in a Debtor Economy". *Economic and Political Weekly* 30: 844-46.

David, P. A. and J. L. Scadding. 1974. "Private Savings: Ultrarationality, Aggregation, and Denison's Law". *Journal of Political Economy* 82: 225-50.

Diamond, P. A. 1965. "National Debt in A Neoclassical Growth Model". *American Economic Review* 55: 1126-50.

Dickey, D. A. and W. A. Fuller. 1979. "Distribution of the Estimation for Autoregressive Time Series with a Unit Root". *Journal of The American Statistical Association* 74: 427-31.

Domar, E. 1944. "The Burden of Debt and National Income". *The American Economic Review* 34: 798-827.

Domar, E. 1957. "The Burden of Debt and National Income". in *Essays in the Theory of Economic Growth*. Oxford University press, New York.

Evans, P. 1985. "Do Large Deficits Produce High Interest Rates?". *The American Economic Review* 75(1): 68-87.

Evans, P. 1987_a. "Do Budget Deficits Raise Nominal Interest Rates? Evidence from Six Countries". *Journal of Monetary Economics* 20: 281-300.

Evans, P. 1987_b. "Interest Rates and Expected Future Budget Deficits in the United States". *Journal of Political Economy* 95(1): 34-58.

Evans, P. 1989. "A Test of Steady–State Government Debt Neutrality". *Economic Inquiry* 37: 39-55.

Faini, R. 1994. "Morocco: Reconciling Stabilisation and Growth". in W. Easterly, C. A. Rodriguez and K. Schmidt-Hebbel, eds., *Public Sector Deficits and Macroeconomic Performance*. Oxford University Press.

Faulkner-MacDonagh and Mühleisen. 2004. "Are U.S. Households Living Beyond Their Means? Consumer Spending, Household Wealth, and Real Estate Prices in the United States". *Finance and Development.*

Feldstein, M. and D. W. Elmendorf. 1990. "Government Debt, Government Spending, and Private Sector Behaviour Revisited: Comment". *The American Economic Review* 80: 589-599.

Feldstein, M. J. 1982. "Government Deficits and Aggregate Demand". *Journal of Monetary Economics* 9: 1-20.

Friedman, M. 1957. A Theory Of Consumption Function. *Princeton University Press.*

Friedman, M. 1968. "The Role of Monetary Policy". *The American Economic Review* 58: 1-17.

Gopalkrishnan, S. 1989. *Economic Development in India.* Anmol Publications, New Delhi.

Gopalakrishnan, S. 1991. "Effect of Domestic Government Debt on Private Consumption and Saving in India". *Journal of Indian School of Political Economy* 3: 443-53.

Government of India. 1996-97. Economic Survey.

Government of India. 2002. Economic Survey.

Government of India. 2000. "Fiscal Responsibility and Budget Management Bill".

Greene, J. and D. Villanueva. 1991. "Private Investment in Developing Countries: An Empirical Analysis". *IMF Staff papers* 38: 33-58.

Greiner, A. and W. Semmler. 1999. "An Inquiry into the Sustainability of German Fiscal Policy: Some Time-Series Tests", *Public Finance Review* 27(2): 220-36.

Gupta, K. L. 1992. "Sustainability of Perpetual Deficits" in *Budget Deficits and Economic Activity in Asia*. Biddles Ltd., Guildford and King's Lynn, Great Britain.

Gupta, K. L. and B. Moazzami. 1991. "Dynamic Specification and the Long-run Effect of Budget Deficits on Interest Rates". *Public Finance/Finance Publiques* 46 (2): 208-21.

Gupta, K. L. and B. Moazzami. 1996. *Interest Rates and Budget deficits: A study of the Advanced Economies*. Routledge Studies in the Modern World Economy, Routledge, London.

Haliassos, M. 1991. "Sustainability of Macroeconomic Policies, Inflation Targeting, and Crowding Out". *Southern Economic Journal* 57(4): 1010-18.

Hall, R. E. 1978. "Stochastic Implications of the Life Cycle-permanent Income Hypothesis: Theory and Evidence". *Journal of Political Economy* 86: 971-87.

Hamilton, J. D. and M. A. Flavin. 1986. "On the Limitations of Government Borrowing: a Framework for Empirical Testing". *American Economic Review* 76: 808-19.

Haque, N. U. and P. J. Montiel. 1989. "Consumption in Developing Countries: Tests for Liquidity Constraints and Finite Horizons". *Review of Economics and Statistics* 71: 408-15.

Haque, N. U., and P. J. Montiel. 1994. "Pakistan: Fiscal Sustainability and Macreconomic Policy" in W. Easterly, C. A. Rodriguez, & K. Schmidt-Hebbel, eds., *Public Sector Deficits and Macroeconomic Performance*. Oxford University Press.

Haque, N. U., K. Lahiri and P. J. Montiel. 1990. "A Macroeconometric Model for Developing Countries". *IMF Staff paperS* 37: 537-57.

Hjertholm, P. 2003. "Theoretical and Empirical Foundations of HIPC Debt Sustainability Targets". *The Journal of Development Studies* 39 (6): 67-100.

Hoelscher, G. 1986. "New Evidence on Deficits and Interest Rates". *Journal of Money, Credit and Banking* 18(1): 1-17.

Hoelscher, G. 1993. "Federal Borrowing and Short Term Interest Rates". *Southern Economic Journal* 50(2): 319-33.

Inder, B. 1993. "Estimating Long Run Relationships in Economics". *Journal of Econometrics* 57: 53-68.

International Moneatry Fund. 2002. *World Economic Outlook.*

International Moneatry Fund. 2003. *World Economic Outlook.*

Islam, R. and D. Wetzel. 1994. "Ghana: Adjustment, Reform, and Growth" in W. Easterly, C. A. Rodriguez and K. Schmidt-Hebbel, eds., *Public Sector Deficits and Macroeconomic Performance*. Oxford University Press.

Janssen, N., N. Charles and T. Ryland. 2002. "Money Debt and Prices in the United Kingdom 1705-1996". *Economica* 69 (275): 461-79.

Johansen, S. and K. Juselius. 1992. "Testing Structural Hypotheses in a multivariate Cointegration Analysis of the PPP and UIP for UK". *Journal of Econometrics* 53: 211-44.

Jorgenson, D. W. 1996. "The Theory of Investment Behaviour", in D.W. Jorgenson ed., *Investment: Capital Theory and Investment Behaviour* (1). *The MIT Press.*

Joshi, S. M. 1995. "*Macroeconomic Policies: Issues and Evidence*", New Delhi: Anmol Publications.

Keynes, J. M. 1923. A Tract of Monetary Reform, in *The Collected Writings of J. M. Keynes* IV. London: Macmillan, 1971.

Keynes, J. M. 1936. *The General Theory of Employment, Interest and Money*, London: Macmillan.

Khan, M. S. and M. S. Kumar. 1997. "Public and Private Investment and the Growth Process in Developing Countries". *Oxford Bulletin of Economics and Statistics* 59: 69-88.

Khundrakpam, J. K. 1998. "Sustainability of Central Government Debt". *RBI Occasional Papers* 19 (1): 61-87.

Kochin, L. 1974. "Are Future Taxes Anticipated by Consumers? Comment". *Journal of Money, Credit and Banking* 6: 385-96.

Kofuji, Y. 1986. "Wealth Effects and Fiscal Policy in the Context of A Flexible Price Level". *Public Finance/Finances Publiques* 41(2): 233-43.

Kopits, G. 2001. "Fiscal Policy Rules for India?". *Economic and Political Weekly* 36 (9): 749-56.

Koliras, P. G. and R. S. Thorn .1979. *Modern Macroeconomics: Major Contributions to Contemporary Thought.* Harper & Row Publishers, New York? London.

Kormendi, R. C. 1983. "Government Debt, Government Spending, and Private Sector Behaviour". *The American Economic Review* 73: 995-1010.

Kormendi, R.C. and P. Meguire. 1986. "Government Debt, Government Spending, and Private Sector Behaviour: Reply". *The American Economic Review* 76(5): 1180-87.

Kormendi, R.C. and P. Meguire. 1990. "Government Debt, Government Spending, and Private Sector Behaviour: Reply and Update". *The American Economic Review* 80(3): 605-17.

Kotlikoff, L. J. 1995. "*Applying Generational Accounting to Developing Countries".* IED Discussion Paper Series (67), Institute for Economic Development.

Kremers, J. M. J. 1989. "U. S. Federal Indebtedness and the Conduct of Fiscal Policy". *Journal of Monetary Economics* 23: 219-38.

Kremers, J. J. M., N. R. Ericsson, and J. J. Dolado. 1992. "The Power of Cointegration Tests". *Oxford Bulletin of Economics and Statistics* 54: 325-348.

Krishnamurty, K., V. Pandit, and P. D. Sharma. 1989. "Parameters of Growth in A Developing Mixed Economy: The Indian Experience". *Journal of Quantitative Economics* 5(2): 295-25.

Kulkarni, K. G. and E. Erick. 1993-94. "Is Crowding Out Hypothesis Evident in LDCs? A case of India". *Prajnan* 22(1): 11-23.

Kulkarni, K. G. and L. Alfirman. 1999. "Crowding Out Hypothesis in Indonesian Economy". *Indian Journal of Economics* 81(316): 49-66.

Kwiatkowski, D., P. C. B. Phillips, P. Schmidt and Y. Shin. 1992. "Testing the Null Hypothesis of Stationarity Against the Alternative of a Unit Root: How Sure are We that Economic Time Series Have a Unit Root?". *Journal of Econometrics* 54: 159-78.

Lahiri, A. and R. Kannan. 2001. "India's Fiscal deficits and Their Sustainability in Perspective". Paper presented at the conference on India: Fiscal Policies to Accelerate Economic Growth, NIPFP

Langdana, K. F. 1990. *Sustaining Budget Deficits: In Open Economies.* Routledge, London & New York.

Leiderman, L. and A. Razin. 1987. "Testing Ricardian Nuetrality with an Intertemporal Stochastic Model". NBER Working Paper 2258.

Luporini, V. 1999. "*Sustainability of the Brazilian Fiscal Policy and Central Bank Independency".* Belo Horizonte*: Universidade Federal de Minas Gerais/Cedeplar.*

Mallick, S. K. 1999. *Modelling Macroeconomic Adjustment with Growth in Developing economies: The case of India.* Sydney: Ashgate.

Mankiw, N. G. 1997. *Macroeconomics.* Worth Publishers, New York.

Masson, P. R. 1985. "The Sustainability of Fiscal Deficits". *IMF Staff Papers* 32 (4): 577-605.

McCallum, B. T. 1984. "Are Bond-Financed Deficits Inflationary? A Ricardian Analysis". *Journal of Political Economy* 92: 123-35.

McKinnon, R. L. 1973. *Money and Capital in Economic Development.* The Brookings Institution, Washington, D.C.

Modigliani, F. 1961. "Long-Run Implications of Alternative Fiscal Policies and the Burden of the National Debt". *The Economic Journal* 71: 730-55.

Modigliani, F. and A. G. Sterling. 1990. "Government Debt, Government Spending, and Private Sector Behaviour: A Further Comment". *The American Economic Review* 80 (3): 600-03.

Modigliani, F. and T. Jappelli. 1987. "Fiscal Policy and Saving in Italy since 1860'. in M. J. Boskin, J. S. Fleming and S. Gorini, eds., *Private saving and Public Debt.* Basil Blackwell, Oxford, Pp.126-70.

Modigliani, F. and T. Jappelli. 1988. "The Determinants of interest Rates in the Italian Economy". *Review of Economic Conditions in Italy.* Pp. 9-34.

Mohanty, M. S. 1995. "Budget Deficits and Private Savings in India: Evidence on Ricardian Equivalence". *Reserve Bank Occasional Papers* 16: 1 -21.

Monadjemi, M. S. 1989. "Fiscal Deficits and Interest Rates: A Multi Country Analysis". *Australian Economic Papers* 28 (52-53): 209-218.

Moorthy, V., B. Singh, and S. C. Dhal. 2000. "Bond Financing and Debt Stability: Theoretical Issues and Empirical Analysis for India". RBI Development Research Group Study No.19.

Moreley, S. and A. Fishlow. 1987. "Deficits, Debt and Destabilisation: The Perversity of High Interest Rates". *Journal of Development Economics* 27 (1&2): 227-44.

Mujumdar, N. A. 2002. *Financial Sector Reforms; India's Economic Development.* (2). Academic Foundation, Delhi.

Mulji, S. 2002. "The Burden of National Debt". *The Business Standard* 5(112).

Mundell, R. 1971. "Money, Debt and the Rate of Interest". in R. Mundell, ed., *Monetary Theory.* Pacific Palisadas, Calif:Goodyear.

Nachane, D. M., A. V. Karnik and N. R. Hatekar. 1997. "The Interest Rate Imbroglio: Monetary and Fiscal Dimensions". *Economic Political Weekly* 32(20 & 21): 1167-74.

Ostrosky, A. 1979. "An Empirical Analysis of "Crowding Out' Effect of Fiscal Policy in The United States and Canada: Comments and Extensions". *Kyklos* 32: 813-16.

Pani, P. K. 1984. "A Macro Model for the Indian Economy with Specific Reference to Output, Demand and Prices, 1969-70 to 1981-82". *RBI Occasional Papers* 5(2).

Parguez, A. 2000. *A Monetary Theory of Public Finance.* Mimeo University of Besancon, France.

Patinkin, D. 1965. *Money, Interest, and Prices.* Harper & Row, New York.

Patnaik, I. and D. K. Joshi. 2000. "Private Investment Behaviour in India: The role of Inflation and Public Spending during the Reforms Period". in V. V. N. Somayajulu, eds., *Econometric Studies of Economic Reforms in India.* Academic Foundation, Delhi.

Pesaran, M. H. and Y. Shin. 1999. "An Autoregressive Distributed Lag Modelling Approach to Cointegration Analysis". in S. Strom, ed., *Econometrics and Economic Theory in the 20th Century.* The Ragnar Frisch Centennial Symposium. 1998. Chapter 11, Cambridge University Press, Cambridge.

Pesaran, M. H., and B. Pesaran. 1997. *Working with Microfit 4.0: Interactive Econometric Analysis.* Oxford University Press, Oxford.

Pesaran, M. H., Y. Shin and R. J. Smith.1996. "Testing for Existence of A long-run Relationship". Department of Applied Economics Working Paper No.9622. University of Cambridge.

Phillips, P. C. B. and P. Perron. 1988. "Testing for a Unit Root in Time Series Regression". *Biometrika* 75: 335-46.

Plosser, C. I. 1987. "Further Evidence on the Relationship between Fiscal Policy and the Term Structure". *Journal of Monetary Economics* 20: 343-67.

Polackova, H. 1999. "Contingent Government Liabilities: A Hidden Risk". *Finance & Development* 36(1): 46-49.

Pradhan, B. K., D. K. Rath and A. Sarma. 1990. "Complementarity between Public and Private Investment in India". *Journal of Development Economics* 33: 101-116.

Rajaraman, I. and A. Mukhopadhaya. 2000. "Sustainability of Public Debt In India", in D. K. Srivastava, ed., *Fiscal Federalism In India: Contemporary Challenges, Issues Before 11th Finance Commission*, Har-Anand Publications Ltd.

Rakesh, M. 2002-03. "Fiscal Correction for Economic Growth" in Uma Kapila, ed., *Indian Economy since Independence.* Academic Foundation, Delhi.

Rakshit, M. .2000. "On Correcting Fiscal Imbalances in the Indian Economy: Some Perspectives". *ICRA Bulletin: Money & Finance.* Pp.19-57.

Rangarajan, C., A. Basu and N. Jadhav. 1989. "Dynamics of Interaction between Government Deficit and Domestic Debt in India". *Reserve Bank of India Occasional Papers* 10: 103-205.

Rangarajan, C. 1998. *Indian Economy: Essays on Money and Finance*, UBC Publishers Distribution Ltd.

Rangarajan, C. 2002. "*The New Economic Policy and the Role of the State*", in Uma Kapila, ed., *Indian Economy Since Independence.* Academic Foundation, New Delhi.

Rangarajan, C. and D. K. Srivastava. 2003. "Dynamics of Debt Accumulation in India: Impact of Primary Deficit, Growth and Interest Rate". *Economic and Political Weekly*, November, Pp.4851-58.

Rao, M. J. M. and R. Nallari. 2001. *Macroeconomic: Stabilisation and Adjustment.* Oxford University Press, New Delhi.

RBI. 2001. *Reserve Bank of India Functions and Working*, November.

Reid, B. G. 1985. "Government Debt, National Income and Causality". *Applied Economics* 17: 321-30.

RBI. 1995-96. *Report on Currency and Finance: Economic Review*, Vol.1: VII-7.

Saltz, I. S. 1993. "Budget Deficits and Real Interest Rates in U.S.A.". *Indian Economic Journal* 41(1): 74-83.

Sargent, T. J. and N. Wallace. 1981. "Some Unpleasant Monetarist Arithmetic". *Federal Reserve Bank of Minneapolis Quarterly Review* 5: 1-17.

Seater, J. J. 1982. "Does Government Debt Matter? A Review". *Journal of Monetary Economics* 16: 121-32.

Seater, J. J. 1985. "Does Government Matter? A Review". *Journal of Monetary Economics*16: 121-31.

Seater, J. J. 1993. "Ricardian Equivalence". *Journal of Economic Literature* 31: 142-90.

Seater, J. J. and R. Mariano. 1985. "New Tests of the Life Cycle and Tax Discounting Hypotheses". *Journal of Monetary Economics* 15: 195-15.

Sen, K. and R. R. Vaidya. 1997. *The Process of Financial Liberalisation in India.* Oxford University Press.

Sergio, P. L. 1993. "Coordinating Public Debt and Monetary Management". *Finance and Development* 30 (1): 30-33.

Seshan, A. 1987. "The Burden of Domestic Public Debt in India". *RBI Occasional Paper* 8: 45-76.

Shaw, E. S. 1973. *Financial Deepening in Economics Development.* Oxford University Press, New York.

Sijben, J. J. 1979. "Theoretical Foundations of Monetary Policy: A Monetarist View". in J. E. Wadsworth and F. L. D. Juvigny, eds., *New Approaches in Monetary Policy. Sijthoff & Noordhoff*, The Netherlanmds.

Singh, C. 1998. Ricardian Equivalence and Consumption in India". *Reserve Bank Occasional Papers* 19: 39-60.

Singh, C. 1998-99. "Monetised Debt, Monetary Aggregates and Price Level in India". *Pranjnan* 27 (4): 359-81.

Sinha, Y. 2000. *Fiscal Responsibility and Budget Management Bill.* Ministry of Finance, Government of India.

Smith, G. W. and S. E. Zin. 1988. "Testing a Government's Present Value Budget Constraint". Queen's University.

Sobhee, S. K. 2000. "Modeling the Sustainability of Public Debt: The Case of Mauritius". *Indian Journal of Economics* 81: 490-05.

Spaventa, L. 1987. "The Growth of Public Debt: Sustainability, Fiscal rules, and Monetary Rules". *IMF Working Papers* 34(2): 375-07.

Sundararajan, V. and S. Thakur. 1980. "Public Investment, Crowding out, and Growth: A Dynamic Model Applied to India and Korea". *IMF Staff Papers* 27: 814-55.

Taiwo, I. O. 1994. "An Empirical Test of the Sustainability of Fiscal Deficit". *The Indian Journal of Economics* 74(295): 495-504.

Tanner, J. E. 1979. "An Empirical Investigation of Tax Discounting". *Journal of Money, Credit, and Banking* 11: 215-18.

Tanzi, V. and M. S. Lutz. 1991. "Interest Rates and Government Debt". *Finance and Development* 28(4): 30-32.

Tarapore S. S. 2002. "Monetary Policy, Internal Debt, and Autonomy of the Central Bank", in S. S. Tarapore, ed., *Issues in Financial Sector Reforms.* UBSPD, New Delhi.

Tarapore, S. S. 2000. "Capping the Public Debt" in S. S. Tarapore, ed., *Issues in Financial Sector Reforms.* UBSPD, New Delhi.

The World Bank. 2004. *Brazil: Equitable, Competitive, Sustainable: Contributions for Debate*, Washington.

Thompson, E. A. 1967. "Debt Instruments in Macroeconomic and Capital Theory". *American Economic Review* 67: 1196-1210.

Tobin, J. 1963. "An Essay on the Principles of Debt Management". in Commision on Money and Credit. *Fiscal and Debt Management Policies.* Prentice Hall, Englewood Cliffs.

Tobin, J. 1965. "Money and Economic Growth". *Econometrica* 33 (4): 671-84.

Trehan, B. and C. E. Walsh. 1991. "Testing Intertemporal Budget Constraints: Theory and Applications to U.S. Federal Budget and Current Account Deficits". *Journal of Money, Credit, and Banking* 23 (2): 207-23.

Trehan, B. and C. Walsh. 1988. "Common Trends, the Government Budget Constraint, and Revenue Smoothhing". *Journal of Economic Dynamics and Control* 12: 425-44.

Turnvosky, S. J. 1975. "Monetary Policy, Fiscal Policy and the Government Budget Constraint". *Australian Economic Papers* 14 (25): 197-15.

Uctum, M. and M. Wickens. 2000. "Debt and Deficit Ceilings, and Sustainability of Fiscal Policies: An Intertemporal Analysis". *Oxford Bulletin of Economics and Statistics* 62(2): 197-21.

Wai, U. T. and C. Wong. 1982. "Determinants of Private Investment in Developing Countries". *Journal of Development Studies* 19: 19-36.

Wheeler, G. 2004. *Sound Practice in Government Debt Management.* The World Bank. Washington, D.C.

Wickens, M. R. and T. S. Breusch. 1988. "Dynamic Specification, the Long run, and the Specification of Transformed Regression Models". *Economic Journals* 98 (390): 189-205.

Wijnbergen, S. V., R. Anand, A. Chibber and R. Rocha. 1992. *External debt, Fiscal Policy, and Sustainable Growth in Turkey.* The Johns Hopkins University Press.

Wilcox, D. W. 1987. "The Sustainability of Government Deficits: Implications of the Present–Value Borrowing Constraint". Board of Governors of the Federal Reserve System Working Paper, No.77.

Wilcox, D. W. 1989. "The Sustainability of Government Deficits: Implications of the Present-Value Borrowing Constraint". *Journal of Money, Credit, and Banking* 21 (3): 291-06.

Yarri, M. E. 1965. "Uncertain Lifetime, Life Insurance, and the Theory of the Consumer". *Review of Economic Studies* 32: 137-50.