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), 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”. 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...
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. 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 access to open market operations. 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

---

1In 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).
2.1.1.1 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”. 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 fillipping 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

---

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 (Buieter, 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 agreement 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. 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

---

14It 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
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 unsustainability 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 Keynesians, 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). \textsuperscript{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

\textsuperscript{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 uncharged. 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.\textsuperscript{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\textsuperscript{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

\textsuperscript{17} It is argued that parents having no children, may not leave any bequests for future (Seater, 1993).

\textsuperscript{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 IIInd 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 IIInd 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 distortional 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. 

**REFERENCE AND ARCHIVAL SECTION**

46
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 Alfirm (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, Hallassos (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

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 Sundararajan 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 Wetzel (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 suggest 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, Rath 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.