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Threshold Level of Debt and Public Debt Sustainability: The Indian Experience

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The objective of the paper is twofold. The first objective is to assess the sustainability of public debt in India. In addition, an attempt has also been made to examine the relationship between public debt and growth in the Indian context. The sustainability analysis, based on empirical assessment of inter-temporal budget constraint and fiscal policy response function at the general government level for the period 1980-81 to 2012-13, indicates that the debt position in India is sustainable in the long run. The empirical results also reveal that there is a statistically significant non-linear relationship between public debt and growth in India, implying a negative impact of public debt on economic growth at higher levels. The threshold level of general government debt-GDP ratio for India works out to be 61 per cent, beyond which an inverse relationship is observed between debt and growth. This threshold level is lower than the actual level of debt at 66.0 per cent of GDP in end March 2013. This calls for a greater focus on a credible fiscal consolidation to safeguard against adverse debt dynamics should the interest rate-growth differential turn less favourable, keeping in view the recent slowdown in growth.

JEL Classification : H63, E62, O40
Keywords : public debt, gross fiscal deficit, growth

Introduction

The non-linear relationship between growth and debt has been a subject of wide interest and debate since the time of publication of the paper by Reinhart and Rogoff on the subject. In their paper "Growth in a time of Debt" (2010), Reinhart and Rogoff (R&R) argue that growth slows down sharply when the government debt to gross domestic product (GDP) ratio exceeds a threshold level of 90 per cent. The median growth falls by one per cent and the average growth falls

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by considerably more for debt-GDP ratios above the threshold of 90 per cent. The non-linear effect of debt on growth is considered to be reminiscent of "debt intolerance" resulting in non-linear response of market interest rates when debt tolerance levels are reached. These results have been supported by a number of other studies (Kumar and Woo, 2012; Cecchetti *et al.,* 2011; Checherita and Rother, 2010 and Baum *et al.,* 2012), although they differ, though not markedly, in terms of the threshold level of debt-GDP ratio. Herdon, Ash and Pollin (2013), however, point out that the conclusions of R&R may not hold because of coding errors, selective exclusion of available data and unconventional weighting of summary statistics in the methodology used by the authors. After correcting for these statistical drawbacks, they come to the conclusion that there is no evidence of a negative relationship between debt and growth beyond the threshold level of 90 per cent.

Based on the most up-to-date work that incorporates the corrections and latest set of data, R&R continue to hold that growth slows down (by about 1 percentage point) when debt hits 90 per cent of GDP. In other words, slower growth is associated with higher debt. However, critiques[1] are of the view that an association is definitely not a cause. The direction of causality could be from growth to debt with slower growth causing high debt. While this debate is still unsettled, this paper seeks to test its validity, and estimate the threshold level of public debt in India. In addition, the paper also provides a comprehensive analysis of the sustainability of public debt in India through the use of different approaches including inter-temporal budget constraint and fiscal policy response function.

The paper is organised as follows. Section II provides a brief description of various channels through which high public debt levels are said to impact growth, inflation and other macroeconomic variables. Section III presents a review of literature relating to determination of threshold level of debt based on both debt-growth relationship and fiscal/debt sustainability aspects. Section IV covers evolution of combined

[1] Paul Krugman (2013); Elmeskov and Sutherland (2012).

debt position of central and state governments in India from 1980-81 to 2012-13. It also analyses the impact of developments in the primary balances along with interest rate and growth dynamics on the evolution of public debt in India. Section V examines debt sustainability in the Indian context in terms of various indicators of public debt sustainability, inter-temporal budget constraint and fiscal policy response function of the government. Section VI analyses the debt-growth relationship in India. Concluding observations are covered in Section VII.

Section II
Interplay of High Public Debt and Macro-Economic Variables

Fiscal expansion financed through debt issuances and the resultant public debt accumulation have important influences over the economy both in the short-run as well as the long run. Debt *per se* may not be bad. It depends on the utilisation of funds raised through borrowings. In case it is used for capital formation, it could contribute to the real income of future generation and add to repayment capacity of the government as well. On the contrary, the use of borrowings to finance only current expenditure poses the risk of debt rising to unsustainable levels.

There are different channels through which elevated and rising levels of public debt could operate and impact growth, *viz.,* reduced investment/capital accumulation following the pressure on long-term interest rates (Baum *et al.,* 2012), reduced (perceived) returns on investment due to uncertainty about future prospects and policies, and risk of introduction of distortionary taxes. Besides these, there are other risk factors, such as, volatility in interest rates, reduced present and future productive government spending, reduced scope for countercyclical policies and vulnerabilities associated with debt build-up that tend to contribute to slowdown in economic activity and growth at higher levels of debt.

High public debt levels, through higher issuances of government debt, crowd out private investment, in the absence of debt neutrality or Ricardian equivalence, particularly when the economy is operating at or near full employment situation. Pattillo *et al.*, (2002) indicate that the effect of debt on growth works through reduction in total factor

productivity growth and physical capital accumulation. Cournede (2010) points out the impact of high debt levels on cost of capital and in turn on the intensity of capital in production. The lower productivity level affects potential output and growth and the effect could be substantial in case investment in research and development reduces in response to higher cost of capital. Kumar and Woo (2012) also point argue that debt accumulation has a larger adverse impact on domestic investment of emerging market economies *vis-a-vis* advanced economies.

The persistence of debt overhang raises the risk of sovereign insolvency, particularly during economic downturns. Higher the debt, higher is the risk of repayment ability or probability of default which, in turn, leads to widening of sovereign spreads, thereby making attainment of debt sustainability all the more difficult to achieve. Moreover, higher sovereign spreads get transmitted to higher private lending spreads, affecting both investment and consumption.

High and rising public debt arising from unsustainable fiscal policies also increases the risk of an eventual monetisation of persistent deficits, with consequent impact on inflation. If the long-run interest rate-growth rate differential turns positive, a higher debt-GDP ratio, for a given primary deficit-GDP ratio, could increase the anticipated inflation tax in the form of higher seigniorage revenue through increased issuance of base money. It could also tempt the government to erode the real value of current and future debt service through unanticipated burst of inflation, with inflation having the largest impact on long-term, fixed-rate, and local-currency denominated debt. Fear of the government inflating away a part or the whole of its domestic currency denominated debt burden in future could lead to a rise in nominal interest rates associated with higher inflationary expectations and higher inflation risk premium (Buiter and Patel, 2010).

In emerging markets, high public debt levels tend to generate significant inflationary pressures. R&R (2010) point out that median inflation more than doubles (from less than seven per cent to 16 per cent), as debt in emerging markets rises from the low range of 0-30 per cent to above 90 per cent. The existence of a strong and stable impact of

debt growth on inflation in developing and some advanced economies establishes the indirect negative impact of debt on growth in these countries.

Section III
Review of Literature

In the theoretical and empirical literature, the threshold level of debt has been defined based on two strands of thought *viz.,* debt-growth dynamics and fiscal/debt sustainability perspective in different countries over a period of time. In terms of debt-growth dynamics, increases in debt-GDP ratio beyond the threshold level are associated with a negative impact on growth, while they give rise to debt servicing, liquidity and solvency concerns from the view point of debt sustainability.

The recent empirical studies have primarily focused on the debt-growth relationship and been motivated by the R&R's (2010) work, raising concerns regarding negative impact of debt on growth when debt-GDP ratio exceeds the threshold level of 90 per cent. Baum *et al. (*2012) and Chang and Chiang (2009) have looked at the impact of debt on short-term growth, while the focus of other studies is on medium-term/long-run economic growth. The short-term growth effect is studied in terms of either direct impact of debt on growth or indirect impact running through fiscal multipliers linked to shocks to government expenditure or taxes while also being influenced by the initial level of debt.

Reinhart and Rogoff (2010) show that growth rates in both developed and developing countries with the public debt to GDP ratio higher than 90 per cent are about 1 percentage point lower than in the less indebted countries. Growth in emerging markets (EMs) slows down by an annual two percentage points when their external debt reaches 60 per cent of GDP and the decline is even sharper for external debt levels in excess of 90 per cent of GDP. Other empirical studies also establish that public debt beyond a certain threshold is negatively correlated with economic growth (Egert, 2012; Elmeskov & Sutherland, 2012; Greenidge *et al.,* 2012; Kumar & Woo, 2012; Cecchetti *et al.,* 2011; Checherita & Rother, 2010; Baum *et al.,* 2012; Cordella *et al.,* 2005). The negative effect of debt on growth is attributed, among others, to

both the crowding out effect and the debt overhang effect. However, the direction of causality has not been unambiguously established. Elmeskov and Sutherland (2012) admit that high debt levels have a negative impact on growth but they argue that correlation is not the same as causation. While high levels of public debt could be detrimental to growth, low economic growth could itself lead to high levels of public debt *i.e.,* reverse causality. Easterly (2001) argues that the causality runs from growth to debt. In the Indian context, while Singh (1999) found that the domestic debt held by the public and economic growth are not causally related, Rangarajan and Srivastava (2005) indicate that growth may be adversely impacted on account of large structural primary deficit and interest payments relative to GDP.

The non-linearity in the impact of debt on growth has been examined in empirical studies based on various model specifications. Reinhart and Rogoff (2010) use correlations between debt and growth while Kumar and Woo (2012) and Egert (2012) study the impact of public debt on growth along with other determinants of growth in a general growth framework. The statistical techniques used in empirical exercises include OLS, quadratic, spline and panel regressions, besides using exogenously/endogenously determined threshold debt levels and calculating debt thresholds based on credit ratings of major rating agencies[2]. The threshold level of debt varies for different regions/ country groups as also across countries.

The determination of public debt thresholds, based on the concept of sustainable public debt level, has primarily been guided by necessary and sufficient conditions of debt sustainability as defined in the theoretical literature. In the pioneering work on debt sustainability, Domar (1944) said that GDP should grow faster than public debt for debt to be sustainable. Subsequently, Buiter *et al.* (1985) suggested that sustainable fiscal policy is the one that is capable of keeping the public sector net worth to output ratio at its current level. Blanchard *et al.* (1990) introdicate two conditions for a sustainable fiscal policy: (i) the ratio of debt to GNP should converge in the long run to its initial level,

[2] Bannister and Barrot 2011.

and (ii) the present discounted value of the ratio of primary budget deficit to GNP should be equal to the negative of the current level of debt to GNP.

The debt sustainability conditions revolve around the government's inter-temporal or the present value budget constraint (PVBC). This has been put differently in various empirical studies. In Lengrenzi and Milas (2011) work, the PVBC requires that the present value of outlays (current and future) equals the present value of revenues (current and future). The transversality condition under the PVBC constrains the debt to grow at a slower rate than the interest rate (Chalk and Hemming, 2000). Buiter and Patel (2010) refer to the standard solvency constraints *viz.,* (i) the present discounted value of the terminal government non-monetary debt be non-positive and (ii) the outstanding value of the government's non-monetary debt cannot exceed the present discounted value of its future primary surpluses. In terms of the first constraint, the growth rate of public debt cannot be greater than the effective interest rate on the public debt. Gerson and Nellor (1997) define fiscal sustainability as a situation of overall fiscal balance rather than a constant debt ratio.

In the Indian context, the sustainability of public debt has been empirically examined based on various approaches including the Domar stability condition and time series methods, such as, stationarity of debt series, unit root and co-integration tests. While the earlier studies of the 1990s (Buiter and Patel, 1992, 1995; Jha, 1999 and Cashin and Olekalns, 2000) drew attention to non-stationarity of debt series and violation of solvency conditions/inter-temporal budget constraint, the subsequent studies based on the co-integration and other techniques have admitted a weakly sustainable condition or sustainable public debt situation (Jha and Sharma, 2004). After addressing the issue of regime shift, Goyal, Khundrakpam and Ray (2004) find that while fiscal stance of the central and state governments at the individual level is unsustainable, it is weakly sustainable for the combined finances of centre and states. Some of these studies indicate that the stationarity - based sustainability tests are satisfied when structural or regime-based breaks in debt-GDP series are accounted for. Tronzano (2012) finds the existence of first-order cointegration between revenue and expenditure flows but could

not confirm the existence of a deeper long-run equilibrium between stock and flow fiscal variables and cautioned that an adverse shock on the real economy may destabilise the debt pattern in India.

Bohn (2008) argues that the failure of stationarity and co-integration could not be interpreted as evidence of unsustainable fiscal policy. The time series tests are backward looking and do not fully exploit the implications of uncertainty in deriving appropriate tests of fiscal sustainability. He suggests that the positive response of primary balance relative to GDP to public debt relative to GDP of a country be considered as an indicator of dynamic sustainability[3]. Using this framework and Fincke and Greiner's model of time-varying coefficients[4] for testing public debt sustainability, Tiwari (2012) did not find any clear-cut evidence on the sustainability of public debt in India during the period 1970-2009.

Section IV
Debt Dynamics in India

IV.1: Evolution of India's Public Debt[5]

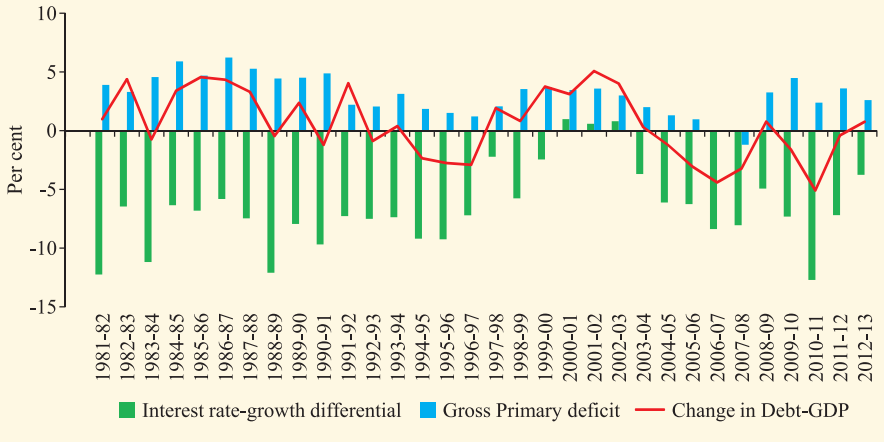
The fiscal position of the central and state governments had remained comfortable in the first three decades since Independence. The revenue account of the central government turned into deficit in the year 1979-80, while the state finances exhibited signs of fiscal stress since the mid-1980s. Given this backdrop, both the centre and states started with moderate debt levels, with the consolidated public debt to GDP ratio at 47.9 per cent in end March 1981. However, the debt position deteriorated steadily thereafter to reach a high of 72.9 per cent in end March 1992. This was also the period characterised by high primary deficits with the primary deficit-GDP ratio at 6.2 per cent

[3] IMF (2003) estimated fiscal policy reaction function; the positive response of the primary balance to debt was considered as indicative of long-run solvency of the fiscal policy stance. It was found that countries with a lower and more volatile revenue base, less ability to adjust expenditures, as well as greater disparity between the real interest and growth rates, are able to sustain lower debt levels.

[4] This captures change in the response of government with respect to public debt over time.

[5] Public debt refers to consolidated debt position of the centre and states in India.

Figure 1: Public Debt Growth in India



in 1986-87 (Figure 1), giving rise to concerns regarding high growth in public debt of India (Seshan, 1987; Report of the Comptroller and Auditor General of India, 1988).

There was some improvement in debt position during the period 1992-93 to 1997-98, which reflected the impact of macro-economic and structural reforms undertaken in the aftermath of the balance of payments crisis in the early 1990s. However, this improvement could not be sustained, as all the key deficit indicators of the central and state governments deteriorated sharply thereafter, due to additional expenditure liabilities linked to the implementation of the Fifth Pay Commission award as also sluggish revenue growth on account of poor performance of public sector undertakings. Reflecting these developments, the debt liabilities accumulated sharply and the public debt-GDP ratio increased to 83.2 per cent in end March 2004.

IV.2: Fiscal Consolidation and Public Debt Growth

Fiscal reforms at the central government level were led by the enactment of the Fiscal Responsibility and Budget Management (FRBM) Act, 2003. Around the same time, most states also operationalised fiscal rules with a focus on a phased improvement in their fiscal deficit and debt-gross state domestic product (debt-GSDP) ratios. The state government initiatives were also supported by the implementation of Debt Swap

Scheme (DSS) from 2002-03 to 2004-05 and Debt Consolidation and Relief Facility (DCRF) from 2005-06 to 2009-10. While the DSS allowed the state governments to pre-pay their high cost loans from the central government, the DCRF provided for debt consolidation and debt/interest relief on outstanding central government loans, subject to the enactment of the FRBM Act and reduction in revenue deficit, as per stipulated rules, during the award period. As a result of these measures, the outstanding debt-GDP ratio of the states at the consolidated level declined from 31.8 per cent in end March 2004 to 26.6 per cent in end March 2008. A similar improvement was evident in debt position of the central government. This trend has continued thereafter (barring 2008-09) with the public debt-GDP ratio of the general government (central and state governments) declining to 66.0 per cent in end March 2013.

IV.3 Features of Public Debt in India

It is important to analyse the composition, ownership, and maturity pattern of public debt that provide an idea about liquidity and pricing risks associated with the level of debt and its profile. In the Indian context, the central government debt accounts for around 70 per cent of the total public debt of the general government. Within public debt, domestic/internal liabilities remain the predominant component, with external debt accounting for less than 3 per cent of the total public debt (Annex Table A.1). Market loans of the central and state governments account for over 50 per cent of the total public debt in India.

As regards ownership pattern of central and state government securities, more than 50 per cent of these securities are held by the scheduled commercial banks, reflective of the mandatory statutory liquidity reserve requirements. Insurance companies hold about 20 per cent of these securities (Annex Table A.2). Notwithstanding an increase in the share of short-term debt in the recent period, it accounts for less than 10 per cent of the total public debt in India (Annex Table A.3). The long maturity profile of India's public debt along with a small share of floating rate debt (less than 5 per cent) tends to limit rollover risks, and insulate the debt portfolio from interest rate volatility (Annex Table A.4).

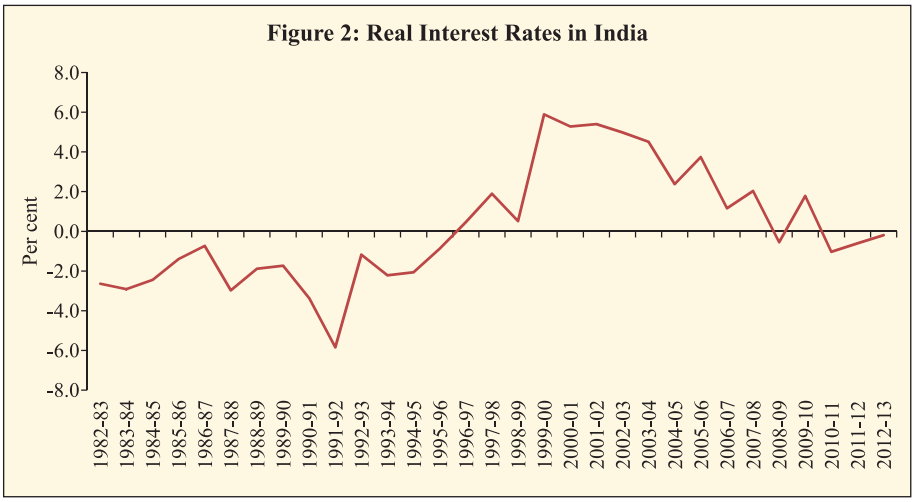
IV.4: Inflation and Interest Rates: Impact on Public Debt

The declining debt levels across countries during the 1970s were attributed to the negative real interest rates following high inflation rates in these countries (Hall and Sargent 2011). In the context of EMs, empirical studies refer to the phenomenon of the government inflating away a part or the whole of its domestic currency denominated debt burden in future, in case financial markets are characterised by financial repression. Financial repression refers to a set of government policies that keep the real interest rates low or negative than would otherwise prevail, for the purpose of reducing the interest burden on government debt. An environment of low or negative real interest rates, characterised as financial repression, can be achieved either through lower nominal interest rates or through higher inflation rate or through a combination of the two (Reinhart and Sbrancia, 2011). The negative real interest rates help to liquidate or erode the real value of government debt. The year, in which the real interest rate turns negative, is considered as a liquidation year. During the liquidation years, the negative real interest rate on government debt generates savings to the government, which is also known as financial repression revenue.

In this section, following the methodology of Reinhart and Sbrancia (2011), an attempt has been made to examine the presence of financial repression in the Indian context and if so, its benefit to the government in terms of lower interest burden. The time period covered for the analysis is 1982-83 to 2012-13. For this purpose, the real interest rate in India has been worked out using the Fisher equation such that:

$$r_t = (1+i_{t-1}) / (1+\pi_t) - 1$$

Where i = nominal interest rate; r = real interest rate; and π = inflation rate. Effective interest rate on general government debt has been used as a proxy for nominal interest rate. Inflation rates have been measured in terms of GDP deflator. The calculations reveal that real interest rates in India were negative during the period 1982-83 to 1995-96 but turned positive thereafter. The real interest rate has again turned negative in the recent period (Figure 2). The years marked by negative real interest rates are considered as liquidation years.



The savings/revenues to the government during these years through liquidation effect are measured in terms of real interest rate times the stock of outstanding debt of the government. The financial repression revenues, thus calculated, are expressed as a share of GDP as well as a share of tax revenues (Table 1).

It may be observed from Table 1 that in India, during the period 1982-83 to 1995-96, the annual liquidation of debt *via* negative real interest rates amounted to 1.5 per cent of GDP and 10.3 per cent of the tax revenues of the government[6]. Annual debt reduction of 1.5 per cent of GDP accumulates to around 21.2 per cent reduction in the debt to GDP ratio during this period[7].

Table 1: Government Revenue from Liquidation Effect

(per year)

Period	Financial Repression Revenues/GDP (%)	Financial Repression Revenues / Tax Revenues (%)
1982-83 to 1995-96	1.5	10.3
1996-97 to 2007-08	-2.5	-17.0
2008-09 to 2012-13	0.1	0.3

[6] As per the calculations of Reinhart and Sbrancia (2011), the annual financial repression revenues worked out to be 1.5 per cent of GDP and 27.2 per cent of tax revenues for India during the period 1949-1980.

[7] Giovannini and de Melo (1993), based on the ex-post differential between the domestic and international interest rates and the stock of government debt held outside the central bank, estimated that an annual average revenue of at least 2.86 per cent was earned by the Government from financial repression during 1980-85 in India.

Following a gradual development of market-based instruments to finance government deficits, move towards a market-determined interest rate system through auction of government securities, phasing out of the automatic monetisation of fiscal deficit through the two Supplemental Agreements between the Government and the Reserve Bank and discontinuation of the Reserve Bank's subscription to primary issuances of government securities from April 1, 2006, the liquidation effect ceased to exist during the period 1996-97 to 2007-08, when the real interest rates turned positive. During the last 5 years (except 2009-10), the real interest rate has again turned negative, despite sharp increases in market borrowings of the central government. The annual financial repression revenue accruing to the government was, however, of much smaller magnitude at 0.1 per cent of GDP and 0.3 per cent of tax revenues during this period.

IV.5: Growth and Interest Differentials: Impact on Public Debt

The growth of public debt in nominal terms depends on two parameters, *viz.*, interest rate on public debt and the size of the primary surplus/deficit. In case the primary balance is in deficit, both interest liabilities and primary deficits contribute to accumulation of additional debt liabilities in any economy. However, when public debt relative to GDP is considered, its evolution also depends on an additional variable *i.e.*, the growth-interest rate differential. This implies that in case the interest rate is lower than the growth rate of the economy, it helps to offset the impact of primary deficit on debt growth and it may be possible to keep debt to GDP ratio stable even in a situation of primary deficits.

Theoretically, in case the real (nominal) rate of interest is lower than the rate of growth of real (nominal) GDP, the debt stabilising primary balance can be negative[8]. However, it is desirable that government primary expenditure minus government revenue as a proportion to GDP is less than or equal to zero, on an average, so that the debt burden is ultimately liquidated.

[8] Charles *et al.* (2010) find that the debt stabilising surpluses for several countries in developing Asia had been negative.

In the Indian context, it has been observed that the favourable growth-interest rate differential has muted the impact of persistence of primary deficits on public debt-GDP ratio (Table 2). Rangarajan and Srivastava (2003, 2005) in their study covering the period 1955-2000 find that even with persistence of primary deficits for a long period of time, the debt to GDP ratio could be contained in India as the GDP growth exceeded the interest rates. Available data shows that the primary surplus was recorded only in two years: 2006-07 and 2007-08. Considering the fact that the interest rate - growth rate differential has gradually narrowed down with a progressive move towards market determination of yields on government debt issuances and given the difficulties in sustaining high rates of growth, it would be challenging to maintain fiscal/debt sustainability in absence of a turnaround in primary balance position in the medium to long run.

IV.6: Public Debt in India *vis-a-vis* Other Country Groups

Public Debt in India (as a per cent to GDP) has witnessed a steady decline since 2004, aided, in large part, by the FRBM Act 2003 of the central government and similar fiscal responsibility legislations at the state level and high nominal GDP growth *vis-à-vis* incremental debt. Although fiscal deficit to GDP ratio increased in 2008-09 and

Table 2: Decomposition of Debt Accumulation Relative to GDP

(per cent)

	Changes in Debt-GDP ratio	Cumulative Primary deficit-GDP ratio	Cumulative Interest rate and Growth differential
1980-81 to 1989-90	22.13	48.01	-38.34
1990-91 to1999-00	2.00	26.15	-41.03
2000-01 to 2009-10	-3.36	20.87	-28.66
2010-11 to 2012-13	0.46	8.58	-13.70
Memo:			
Debt-GDP Ratio at the end of			
1980-81	47.94		
2012-13	66.00		

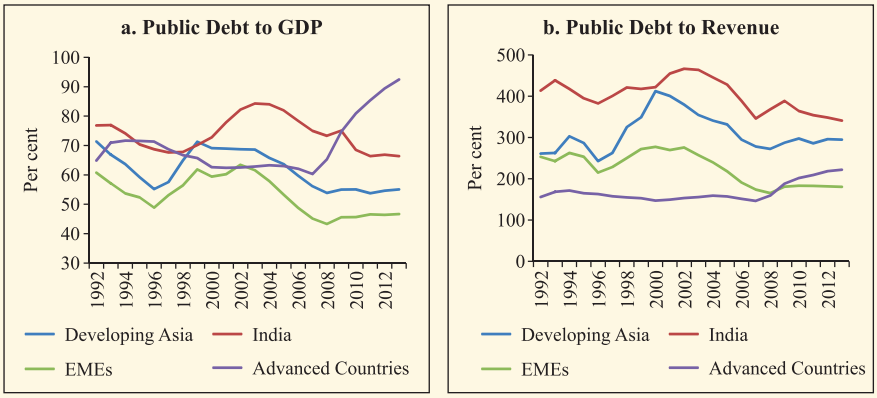
Source: Handbook of Statistics on the Indian Economy, RBI, and National Accounts Statistics, CSO.

2009-10 due to counter-cyclical measures taken by the government to insulate Indian economy from the adverse impact of global economic crisis, the declining trend in debt-GDP ratio was maintained, which was largely supported by higher nominal GDP growth up to 2011-12. In 2012-13, with the nominal GDP growth in India falling below the growth in public debt, the debt-GDP ratio increased again. India's public debt - GDP ratio has, in general, been significantly higher than the average for emerging markets, developing Asia and advanced economies (Figure 3a).

Public debt to government revenue ratio, which is a useful indicator of the vulnerability of a country's public finances and the solvency of the government, shows that India's public debt as a ratio to revenue is very high, although it has declined during the recent period (Figure 3b). So, the country's capacity to support high levels of public debt is constrained by its ability to raise revenues.

A comparison of debt and other fiscal indicators across major emerging market and developing economies (EMDEs) suggests that India is an outlier in almost all parameters. Countries which have high debt-GDP ratio, such as, Brazil and Hungary have a lower debt-revenue ratio than India (Table 3).

Figure 3: Trend in Public Debt[9]



Source: World Economic Outlook, IMF.

[9] May not be strictly comparable across countries due to definitional and data coverage issues.

Table 3: Fiscal Indicators for Select Emerging Market Economies

(Per cent)

Countries	2006				2012				2013			
	Debt-GDP	Debt-Revenue	Overall Balance-GDP	Primary Balance-GDP	Debt-GDP	Debt-Revenue	Overall Balance-GDP	Primary Balance-GDP	Debt-GDP	Debt-Revenue	Overall Balance-GDP	Primary Balance-GDP
Argentina	76.4	256.4	-1.1	4.0	47.7	118.7	-4.3	-0.9	47.8	114.6	-3.6	-1.3
Brazil	67.0	193.6	-3.5	3.3	68.0	180.4	-2.7	2.2	68.2	183.8	-3.0	1.9
China	16.2	89.0	-0.7	-0.2	26.1	115.0	-2.2	-1.4	22.9	103.2	-2.5	-1.8
Colombia	36.8	134.8		1.7	32.8	115.9	0.2	1.8	32.5	115.7	-1.0	0.7
Egypt	90.3	315.7	-9.2	-4.2	80.6	356.6	-10.7	-5.2	88.7	371.1	-14.7	-7.3
Hungary	65.9	154.0	-9.4	-5.7	79.2	170.3	-2.0	2.0	79.8	167.6	-2.7	1.2
India	77.1	379.8	-6.2	-1.3	66.7	343.8	-8.0	-3.6	67.2	342.9	-8.5	-3.8
Indonesia	39.0	192.1	0.2	2.6	24.0	134.8	-1.7	-0.4	25.8	142.5	-2.2	-0.8
Malaysia	41.5	172.2	-2.7	-1.7	55.5	219.4	-4.5	-3.1	57.1	229.3	-4.3	-3.0
Mexico	37.8	175.0	-1.0	1.8	43.5	184.3	-3.7	-1.2	43.6	193.8	-3.8	-1.2
Pakistan	54.4	400.0	-3.4	-0.5	63.8	487.0	-8.4	-4.0	66.5	503.8	-8.5	-3.9
Peru	33.1	164.7	1.9	3.7	20.5	94.5	2.1	3.0	18.3	88.4	0.3	1.1
Philippines	51.6	271.6	0.0	4.8	41.9	234.1	-0.9	1.7	41.0	226.5	-0.8	1.8
Poland	47.7	118.7	-3.6	-1.0	55.6	144.8	-3.9	-1.1	57.8	157.1	-4.6	-1.9
Russia	9.0	22.8	8.3	8.9	12.5	33.9	0.4	0.8	13.8	37.5	-0.7	-0.2
South Africa	32.6	111.6	1.2	4.1	42.3	151.6	-4.8	-2.1	43.0	154.7	-4.9	-2.1
Thailand	42.0	188.3	2.2	3.5	45.4	197.4	-1.7	-0.8	47.2	219.5	-2.7	-2.2
Turkey	46.5	141.8	-0.7	4.4	36.1	103.7	-1.6	1.2	36.1	99.7	-2.3	0.7

Source: World Economic Outlook Database and Fiscal Monitor, 2013, International Monetary Fund.

Section V
Public Debt Sustainability

Sustainable level of public debt varies across different countries depending on the country-specific circumstances. Besides the magnitude of debt, the characteristics of public debt – currency composition, maturity pattern and debt servicing at fixed or floating rates – also contribute significantly to determining the sustainable level of debt. This section looks at public debt sustainability in the Indian context, based on different approaches to assessment of sustainability of public debt.

V.1: Indicator Analysis

Following the conventional debt sustainability analysis, the sustainability of public debt in India has been examined using indicator analysis, taking period averages of various indicators during four different phases (Table 4). These phases have been identified on the basis of the inflexion points in the general government debt. Phases I and III witnessed distinct pressure on debt sustainability, with the average nominal public debt growth exceeding the average nominal GDP growth during these periods. The stability condition which requires the

Table 4: Fiscal Sustainability of General Government : Indicator-based Analysis *(Contd.)*

Sl. No.	Indicators	Symbolic Representation	Phase-I (1981-82 to 1991-92)	Phase II (1992-93 to 1996-97)	Phase III (1997-98 to 2003-04)	Phase IV (2004-05 to 2012-13)
1	Rate of growth of public debt (D) should be lower than rate of growth of nominal GDP (G)	D - G < 0	4.45	- 2.84	4.14	- 2.98
2	Rate of growth of public debt (D) should be lower than effective interest rate (i)	D - i < 0	12.94	5.26	5.82	4.21
3	Real rate of interest (r) should be lower than real output growth (g)	r - g < 0	-7.67	-7.58	-1.57	-6.67
4(a)	Primary balance (PB) should be in surplus	PB / G > 0	-0.05	-0.02	-0.03	-0.02
4(b)	Primary revenue balance (PRB) should be in surplus and should be adequate enough to cover interest payments (IP)	PRB / G > 0	-0.01	-0.01	0.00	-0.02
		PRB/IP>100	-42.93	-29.05	3.47	-36.42
5(a)	Revenue Receipts (RR) as a per cent to GDP should increase over time	RR/ G ↑↑	18.41	17.76	17.22	19.86
5(b)	Revenue variability should decline over time	CV (RR/G) ↓↓	4.86	2.54	4.40	4.31
5(c)	Public debt to revenue receipts ratio should decline over time	D / RR ↓↓	3.37	3.90	4.34	3.63
5(d)	Public debt to tax revenue ratio should decline over time	D / TR ↓↓	4.22	4.88	5.41	4.45

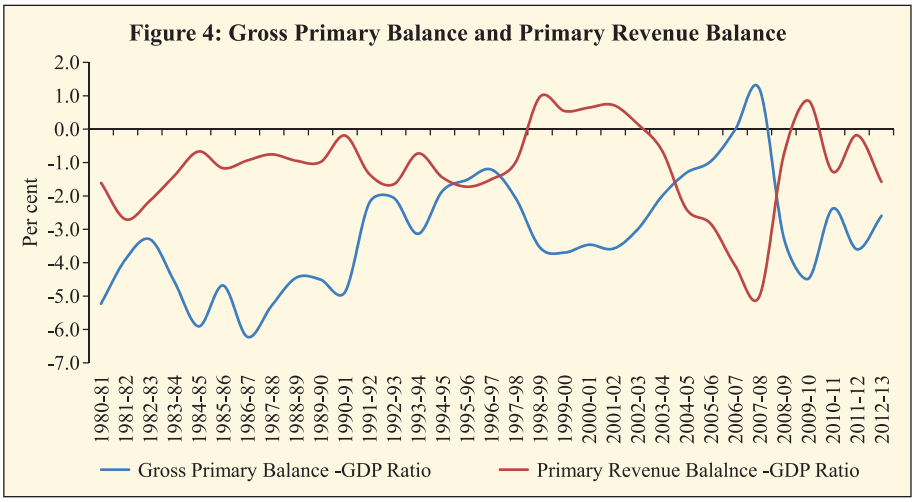
Table 4: Fiscal Sustainability of General Government : Indicator-based Analysis *(Concld.)*

Sl. No.	Indicators	Symbolic Representation	Phase-I (1981-82 to 1991-92)	Phase II (1992-93 to 1996-97)	Phase III (1997-98 to 2003-04)	Phase IV (2004-05 to 2012-13)
6(a)	Interest burden defined by interest payments (IP) as a per cent to GDP should decline over time	IP / G ↓↓	3.28	4.86	5.71	5.06
6(b)	Interest payments (IP) as a per cent of revenue expenditure (RE) should decline over time	IP / RE ↓↓	15.84	22.92	24.66	22.10
6(c)	Interest payments (IP) as a per cent of revenue receipts (RR) should decline over time	IP / RR ↓↓	17.72	27.38	33.13	25.54

real interest rate to remain below the real output growth, was, however, satisfied in all the four phases.

The necessary conditions for sustainability as given in indicators 1 and 3 of Table 4 were fulfilled during the periods of fiscal consolidation, *viz.,* phases II and IV, but the sufficient condition of generating primary surpluses was not met during any of the four phases. In fact, with the exception of 2006-07 and 2007-08, primary balances of the general government remained in deficit during the last three decades (Figure 4). Favourable interest rate-growth differential has, however, more than compensated for the absence of primary surpluses, resulting in a sharp decline in debt-GDP ratio between 2004-05 and 2010-11, barring a brief increase in the immediate aftermath of the global financial crisis. With a decline in the interest rate-growth differential and an increase in primary deficits, the growth in public debt has increased in 2012-13.

Although the debt-GDP ratio declined in phase II reflecting the impact of reforms, debt sustainability indicators in terms of debt service burden (as expressed by indicators 5 and 6 in Table 4) deteriorated. There was a regime shift from large dependence on monetised financing (through the issuance of 91-day Treasury bills (T-bills))



to bond financing, resulting in a rise in the average effective cost of debt during this phase. This was also evident from the decline in the share of T-bills (91-day and 182/364-day T-bills) in outstanding debt of central government to 6.6 per cent in phase II (from 10.5 per cent in phase 1). The debt service burden deteriorated further in phase III as it was characterised by an up-trend in interest rates. However, this trend reversed in phase IV due to the combined impact of improvement in revenue buoyancy and reduction in interest rates from the highs seen in the 1990s and early 2000s. The average interest payments have, however, continued to pre-empt around one-fourth of revenue receipts during phase IV, which is higher than the tolerable ratio of interest burden[10]. The high level of incremental debt which was acquired during 2008-09 and 2009-10 has contributed significantly to the rising interest burden in recent years.

Post-crisis fiscal correction in India had been slow and the observed improvement in 2010-11 was primarily due to large one-off receipts from spectrum auctions. The central government has, however, reverted to a revised path of medium-term fiscal consolidation in line with the Kelkar Committee recommendations in 2012-13. A progressive move towards fiscal sustainability, if maintained, would facilitate further

[10] Interest payments as one-fifth of revenue receipts is considered a tolerable ratio of interest burden (Dholakia *et al.*, 2004).

improvement in the public debt-GDP ratio. This would be more credible and sustainable from the viewpoint of debt sustainability in case it is driven by the objective of achievement of primary surpluses.

V.2: Inter-temporal Budget Constraint

Going beyond the indicator - based analysis, the fiscal/debt sustainability issue has been examined empirically through the assessment of inter-temporal government budget constraint. In the empirical work, this is analysed through test of stationarity properties of the government debt stock (in level and first difference), examination of the long-term relationship between government revenues and expenditures and that between primary balances and debt.

In this Section, we have made an attempt to test empirically, whether India's fiscal policy stance is sustainable, *i.e.,* whether it satisfies the inter-temporal budget constraint. This test of fiscal policy sustainability examines whether the past behaviour of government revenue, expenditure and the fiscal deficit could be continued indefinitely without prompting an adverse response from the investors who finance government borrowings. The inter-temporal budget constraint as derived by Cashin and Olekalns (2000) is as follows:

$$G_t - R_t = \sum_{S=0}^{\infty} (1 + r)^{-S+1} (\Delta R_{t+s} - \Delta G_t + r \Delta B_{t+s-1})$$

Where G is government expenditure including interest payments, R is government revenue, B is the stock of debt, and r is the real rate of interest. The inter-temporal budget constraint, under the assumption that the funding of interest payments are not made from the new debt issuances (*i.e.,* no-*ponzi* scheme), imposes restrictions on the time series properties of government expenditures and revenues. This requires that government expenditure, revenue and stock of debt are all stationary in the first differences. The stationarity property also restricts the extent of deviation of G_t from R_t over time. In case G_t and R_t are I (1) and cointegrated, then the error correction mechanism would push government finances towards the level required by the inter-temporal budget constraint and ensure fiscal and debt sustainability in the long term.

The stationarity properties of the stock of government debt, government expenditure and revenues in the Indian context have been

tested using annual data for the period 1980-81 to 2012-13. The variables have been converted into real terms with logarithmic transformation. The results of the Augmented Dickey Fuller (ADF) unit root test indicate that the null hypothesis of unit root cannot be rejected for all the three variables. It was also found that all the series are integrated of order 1, *i.e.,* stationary in the first difference (Table 5).

Since log R_t and log G_t were found to be I (1), the cointegration between the two series has been tested through the standard Engle and Granger's (1987) procedure. Following Hakkio and Rush (1991), cointegration between log R_t and log G_t is tested by estimating the regression:

$$\text{Log } (R_t) = \alpha + \beta \log (G_t) + \varepsilon_t, \text{ where } 0 < \beta \leq 1$$

Cointegration requires that residuals from the above equation are stationary. The equation is estimated using simple OLS. The residuals series obtained from the estimated equation was found to be stationary I(0)[11]. Thus, the two series, *viz.,* log R_t and log G_t were found to be cointegrated indicating a long-term co-movement between the two series and suggesting that the current fiscal policies in India are sustainable in the long run. This result is also supported by the study of Jha and Sharma (2004)[12].

Table 5: Unit Root Test

Variable (X)	ADF	
	Log X	D log (X)
Stock of Government Debt (B)	-0.90	-3.71*
Government Expenditure (G)	0.65	-5.20*
Government Revenue (R)	0.86	-5.52*

Note: * denotes significant at 1% level.

[11] The value of ADF test statistic for the estimated residual series was found to be -3.12 which was significant at 5 per cent level.

[12] However, there is also a view that the case for further and sustained fiscal correction based solely on the evolution of debt-GDP ratios and the inter-temporal budget constraint may be weak. It may be appropriate to look at the composition of public sector expenditure and the crowding-out or crowding-in effect of public investment on private investment besides the impact of fiscal policy on allocative efficiency of resource use in the economy. For instance, Aschauer (1988, 1989) argues that it is important to distinguish between various categories of government expenditure. The empirical results of his study revealed that the non-military public capital stock is far more important in determining productivity than either the flow of overall non-military expenditure or military expenditure.

V.3: Fiscal Policy Response Function

The time series tests of fiscal sustainability have been criticised in the empirical literature for not explicitly identifying the fiscal policy reaction functions that underlie the data. Bohn (1995, 1998), therefore, suggested an alternative model-based approach to fiscal sustainability. This approach looks at the inter-temporal budget constraint in terms of a feedback relationship from the stock of initial debt to the primary surplus in an economy characterised by risk-averse lenders and uncertainty. In this fiscal reaction function approach, it is analysed whether primary surplus relative to GDP is a positive function of public debt (relative to GDP). In case fiscal authorities take corrective measures in response to deterioration in debt position, rising debt ratios lead to higher primary surpluses relative to GDP that indicates a tendency towards mean reversion. According to Bohn, a stable and strictly positive feedback from debt stock to primary surplus is a sufficient condition for fiscal (debt) sustainability. We have also used this approach in the following analysis.

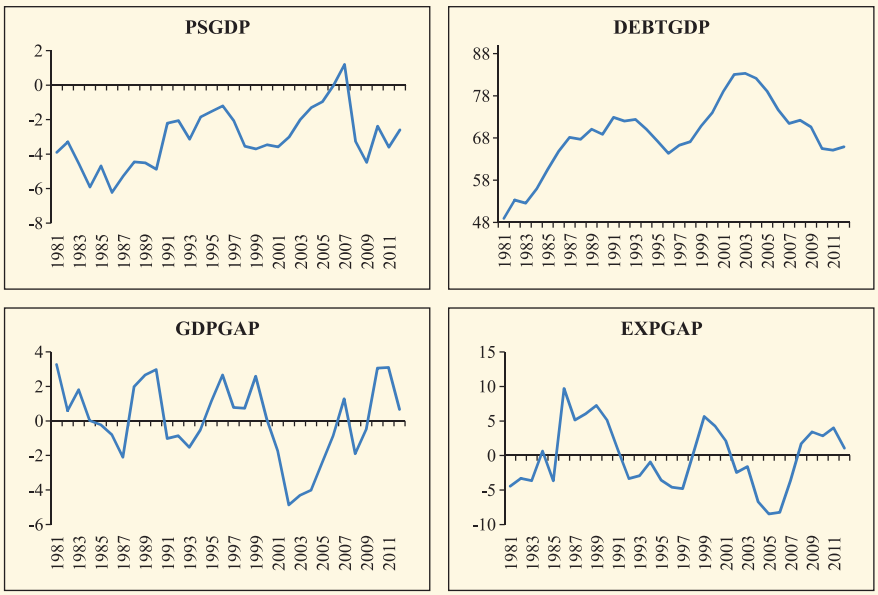
Model Specification: The following equation is estimated:

$$S_t = \alpha_0 + \beta D_{t-1} + \alpha_1 GDPGAP_t + \alpha_2 EXPGAP_t + \varepsilon$$

Here S is the primary surplus to GDP ratio; D is the public debt to GDP ratio; GDPGAP is the deviation of actual output from the trend; EXPGAP is the deviation of actual primary expenditure from the trend; and ε is the error term. The business cycle variable GDPGAP has been included to account for the fluctuations in revenues. The variable EXPGAP captures the impact of deviations of real primary expenditure from its long-term trend on the primary surplus ratio. Here 'β' is the key coefficient, which measures the response of primary surplus to debt. A value of this coefficient between zero and unity is consistent with a sustainable fiscal policy response to debt. A negative coefficient implies potentially destabilising response.

Data: Annual data for the period 1981-82 to 2012-13 has been used for the analysis. All the data pertain to the general government (centre and states combined). Primary balance of the general government has been considered as the dependent variable. Combined liabilities of the central and state governments have been used to represent public debt of India. GDP at market prices has been used for the analysis. GDPGAP has been worked out by extracting the deviation in real GDP from its

Figure 5: Plots for Variables used in the Estimation
(Figures are in per cent)



trend through HP-filter. The deviation is expressed as a per cent of real GDP. EXPGAP has been calculated in a similar manner using real primary expenditure of the general government. The movements in the dependent and the explanatory variables are plotted in Figure 5.

Results: Before proceeding with the estimation, all the series were tested for stationarity. While all the explanatory variable series were found to be stationary, *i.e.,* I (0), the dependent variable series, *i.e.,* primary surplus to GDP ratio was found to be non-stationary. However, after controlling for the years 2006-07 and 2007-08 (which were the years when the general government in India recorded primary surpluses), the series became stationary. In view of this, a dummy variable (d surplus) has been introduced in the model to control for the impact of these years. In addition, allowance has been made in the estimations for the response of primary balance to GDP ratio to be non-linear and vary with debt levels by introducing a square term of the debt to GDP ratio as an additional explanatory variable.

The OLS estimation results of the fiscal policy response function are presented in Table 6. The coefficients of all the explanatory variables

Table 6: Estimation Results

Explanatory Variables	Estimated Coefficients	
	Model 1 (Linear)	Model 2 (Non-linear)
Constant	-10.59* (0.00)	-30.83* (0.00)
D_{t-1}	0.11* (0.00)	0.71* (0.00)
D_{t-1}^{2}		-0.004* (0.01)
GDPGAP	0.25* (0.00)	0.19* (0.01)
EXPGAP	-0.22* (0.00)	-0.25* (0.00)
d surplus	1.69* (0.01)	1.62* (0.00)
AR(1)		-0.25 (0.18)
Adjusted R^2	0.81	0.88
DW	2.05	2.24
p-value of LM statistics (1st lag)	0.49	0.10

Note: 1) Figures in the parentheses represent respective P values.
2) * denotes significant at 1% level.

were found to be significant at one per cent level. Positive coefficient of D indicates that primary surplus increases (or primary deficit falls) in India in response to rising debt ratios. This implies that the primary balance in India responds in a stabilising manner to increases in debt. Positive coefficient of GDPGAP implies that primary balance improves when GDP is above the trend. The negative coefficient of EXPGAP, on the other hand, indicates that primary balance deteriorates when primary expenditure is above the trend. These findings are in line with the *a priori* expectations.

In the non-linear equation approach (Model 2), the response of the primary balance to debt is better represented in terms of a quadratic function rather than a linear response function. The results suggest that the primary balance function has an inverted 'u' shape, implying that the adjustment parameter first rises and then falls.

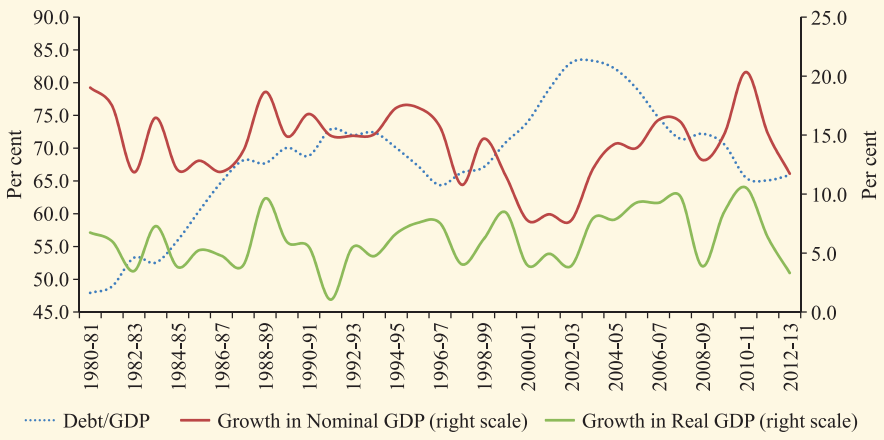
Both the models exhibited no residual serial correlation at the first lag included. The p-values of the Breusch-Godfrey LM-statistics (as presented in Table 6) are insufficient to reject the null hypothesis of no autocorrelation.

Section VI
Impact of Public Debt on Growth: Threshold Level of Debt

There is a general belief among the economists that slower growth is associated with higher level of debt. Several economists argue that growth slows down sharply when the government debt to GDP ratio exceeds a certain threshold level. There is, however, no consensus regarding the threshold level of debt, beyond which the growth suffers. In addition, the threshold level may vary widely across advanced and emerging market economies. In this section, an attempt has been made to examine the link between government debt real economic growth in India during the period 1981-82 to 2012-13. In India, the level of government debt seems to have an inverse relation with the growth in GDP at market prices (Figure 6).

Model Specification: Empirical studies have considered different set of control variables to analyse the impact of public debt on economic growth. Some of these control variables include: population, investment, export, openness, fiscal balance and years of schooling. In this paper,

Figure 6: Public Debt and Growth in GDP at Market Prices



the impact of public debt on growth has been assessed by estimating the following equation:

$$y_t - y_{t-1} = \alpha D_t + \beta_1 D_t^2 + \beta_2 (i_t - i_{t-1}) + \beta_3 \pi_t + \beta_4 (T_t - T_{t-1}) + \beta_5 GFD_t + \varepsilon_t$$

where y is the real GDP; D is public debt to GDP ratio; D^2 is the square of public debt to GDP ratio[13]; i is real investment; π is inflation rate; T is international trade in real terms; GFD is the ratio of gross fiscal deficit to GDP.

Data: The dependent variable real GDP is measured by GDP at constant market prices. Combined outstanding liabilities of the central and state governments of India have been used as a measure of the level of public debt. Gross domestic capital formation at constant prices has been used as a proxy for real investment. Inflation rate is measured by growth in WPI. International trade is measured as the sum of non-oil exports and imports in rupee terms at constant prices. Gross fiscal deficit pertains to the general government. All the data are obtained from the Handbook of Statistics on the Indian Economy. Summary statistics of the relevant variables are furnished in Table 7. The correlation matrix given in Annex 2 indicates absence of any serious multicollinearity problem in the selected set of explanatory variables. It has been observed that there is no statistically significant contemporaneous correlation between debt-GDP ratio and GFD-GDP ratio.

Results: Before estimation, all the variables have been tested for their stationarity properties. Augmented Dickey Fuller (ADF) unit

Table 7: Summary Statistics

Variable	High	Low	Mean	Standard Deviation
Real GDP Growth	10.5	1.1	6.2	2.3
Public Debt to GDP	83.3	48.9	68.8	8.3
Growth in Real Investment	29.8	-16.5	8.4	9.3
Inflation rate	13.7	3.3	6.8	2.6
Growth in international trade	35.6	-0.4	18.7	9.1
Gross fiscal Deficit to GDP	9.6	4.0	7.6	1.4

[13] In several studies using the neo-classical growth model to study the relationship between debt/external debt and growth, the debt variable in quadratic form is included in the equation that captures the non-linear relationship (Boamah and Moore 2009).

root test was conducted to find out whether the time series used for the analysis are stationary or not. The results of the ADF test indicate that the null hypothesis of unit root can be rejected for all the variables. After ensuring that all the series are I (0), the equation is estimated by OLS and the results are presented in Table 8.

The coefficients of all the explanatory variables are significant and on the expected lines. The positive sign of D_t indicates that accumulation of public debt leads to higher growth in real GDP up to a certain level. The negative sign of D_t^2 shows that the association of public debt and real GDP turns negative beyond a certain threshold. The growth in real investment has the expected positive sign which is significant at 1 per cent level. Trade openness, as expressed in terms of growth in non-oil exports and imports, also has a significant positive impact on growth. High inflation and high fiscal deficit, on the other hand, have adverse impact on growth. The dummy variable (d97) which has been used to control the impact of growth slowdown in 1997-98 was found to be significant.

Based on the coefficients of D_t and D_t^2, the threshold level of public debt for India works out to be around 61 per cent of GDP.

These econometric findings are broadly in line with the results on threshold level of debt of Mohanty (2013) and debt simulation forecasts of Topalova and Nyberg (2010). While Mohanty has placed

Table 8: Estimation Results

Explanatory Variables	Estimated Coefficients	P-Value
Public Debt to GDP Ratio (D_t)	0.32*	0.00
Square of Public Debt to GDP ratio (D_t^2)	-0.003*	0.00
Growth in Real Investment ($i_t - i_{t-1}$)	0.14*	0.00
Inflation rate (π_t)	-0.36*	0.01
Growth in international trade ($T_t - T_{t-1}$)	0.08**	0.03
Gross fiscal Deficit to GDP (GFD_t)	-0.46**	0.04
Dummy Variable (d97)	-4.24*	0.01
Adjusted R^2	0.57	
DW Statistics	2.13	
LM statistics (1st lag)		0.53

Note: * and ** denote significant at 1% and 5% level, respectively.

the threshold level of debt for India at 60 per cent of GDP, Topalova and Nyberg have estimated the general government debt target/ceiling of at most 60-65 per cent of GDP to signal commitment to fiscal discipline. The debt simulation exercises undertaken by this IMF study are based on the premise that the interest rate-growth differential would remain favourable and contribute, on average, about 3 percentage points reduction in the debt to GDP ratio per annum. It may be pertinent to note that the Thirteenth Finance Commission (FC-XIII) had set a target of 68 per cent of GDP for the combined debt of centre and states to be attained by 2014-15.

Section VII
Conclusion

In this study, the sustainability of public debt in India at the general government level was assessed through indicator-based analysis as well as empirical exercises.

The empirical analysis carried out in this paper focused on estimation of inter-temporal budget constraint and fiscal policy response function to assess the sustainability of the present fiscal policy in India. The estimation results reveal that there is a co-integrating relationship between general government expenditure and revenue in India, which satisfies the inter-temporal budget constraint. Moreover, the estimated fiscal policy response function reveals that the primary fiscal balance in India responds in a stabilising manner to the increase in debt. Thus, both the results indicate that the current fiscal policies in India are sustainable in the long run. However, it would be interesting to take up a more comprehensive sustainability analysis covering broader aspects, *viz.,* costs of high public debt levels with respect to, *inter alia,* crowding out of private investment, distortions on account of large sectoral interventions like National Food Security Act, Mahatma Gandhi National Rural Employment Guarantee Act, *etc*, as areas of further research.

The paper has also examined empirically the impact of public debt on growth in the Indian context. The results of the empirical exercise revealed that there is a statistically significant non-linear relationship between public debt and growth, implying a negative impact of public

debt on economic growth at higher levels. The threshold level of general government debt-GDP ratio for India has turned out to be 61 per cent, *i.e.,* the level beyond which an inverse relationship is observed between debt and growth. This threshold level is lower than the actual level of debt at 66.0 per cent in end March 2013. There are other risks linked to volatility in international financial markets, and the narrowing down of the interest rate-growth differential domestically. In these circumstances, it would be desirable to strengthen the process of fiscal consolidation both at the level of centre and states in the medium-term so that borrowing is used only to meet capital expenditure which would aid future growth. In addition, a turnaround in primary balance position from deficit to surplus in the medium-term would be critical. It would be important in the context of inter-temporal budget constraint faced by the government and the need to provide for fiscal space to meet challenges in an uncertain domestic and global environment.

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Annex 1

Table A.1: Liabilities Position of the Centre and States

(Amount outstanding at the end of March)

(Per cent of GDP)

	Components	1990-91	2000-01	2004-05	2010-11	2011-12 RE	2012-13 BE
	1	2	3	4	5	6	7
I.	**Centre (1+2)**	**62.7**	**53.9**	**61.5**	**50.5**	**49.8**	**49.5**
	1 Internal liabilities (A+B)	**56.4**	**50.8**	**59.6**	**48.5**	**47.9**	**47.7**
	A) Internal debt (i+ii)	30.7	37.1	39.4	34.2	35.7	36.8
	i) Market loans & bonds	27.8	35.0	37.2	30.8	31.4	32.6
	ii) Ways & means from the RBI	2.9	2.1	2.2	3.4	4.3	4.3
	a. Treasury bills	1.6	1.0	1.5	3.1	3.9	3.6
	b. Securities issued to International Financial Institutions	1.3	1.0	0.7	0.4	0.3	0.7
	B) Other liabilities of which	25.7	13.8	20.3	14.3	12.2	10.9
	i) Small savings	10.0	0.3	10.2	7.3	6.3	5.5
	ii) Provident funds	2.3	1.9	1.9	1.4	1.4	1.3
	2 External debt	**6.3**	**3.0**	**1.9**	**2.0**	**1.9**	**1.8**
II.	**States**	**10.9**	**16.4**	**26.3**	**21.6**	**20.6**	**20.3**
	1. Market loans & bonds	3.1	4.0	7.5	7.9	8.4	9.1
	2. Ways & means from the RBI	0.2	0.3	0.0	0.0	0.0	0.0
	3. Provident funds *etc.*	3.4	4.3	4.0	2.9	2.8	2.7
	4. Loans from banks & other institutions	0.5	1.3	2.1	1.0	0.9	0.8
	5. Special securities issued to NSSF	0.0	2.6	8.7	6.3	5.4	4.8
	6. Reserve funds and deposits & advances	3.7	3.8	4.0	3.3	3.1	2.8
III.	**Total**	**68.9**	**73.7**	**82.1**	**65.5**	**65.5**	**66.0**

Notes: Total debt of centre and states may not add up due to adjustments on account of inter-governmental transactions.

Source: Indian Public Finance Statistics, Government of India and Handbook of Statistics on the Indian economy, RBI.

Table A.2: Ownership Pattern of Central and State Government Securities

(Per cent of Total Securities)

Category of Holders	2008	2009	2010	2011	2012
1	2	3	4	5	6
1. Reserve Bank of India (own account)	6.6	7.1	8.9	8.6	10.4
2. Scheduled commercial banks	51.0	50.4	52.0	51.4	53.8
3. Primary Dealers	0.3	0.1	0.1	0.1	2.8
4. Insurance Companies	19.7	17.6	18.3	20.6	20.3
5. Financial Institutions	1.0	1.3	2.1	2.0	0.2
6. Mutual Funds	0.3	0.5	0.2	0.4	0.5
7. Provident Funds	4.0	4.0	4.3	4.6	4.8
8.Others	17.1	18.9	14.2	12.4	7.3
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**

Source: Handbook of Statistics on the Indian Economy, RBI

Table A.3: Short Term Debt of the General Government

Year	Amount (₹ billion)	Per cent of Public Debt	Per cent of GDP
1	2	3	4
2007-08	1345	5.2	2.7
2008-09	2604	8.6	4.6
2009-10	3178	8.9	4.9
2010-11	2796	6.9	3.6
2011-12	4330	9.1	4.8

Source: Status Paper on Government Debt, GoI

Table A.4: Floating Rate Debt of the Central Government

Year	Internal Floating Debt		External Floating Debt		Total Floating Debt	
	Per cent of Public Debt	Per cent of GDP	Per cent of Public Debt	Per cent of GDP	Per cent of Public Debt	Per cent of GDP
1	2	3	4	5	6	7
2001-02	0.3	0.1	3.7	1.7	3.9	1.9
2005-06	2.3	1.0	1.8	0.8	4.1	1.7
2009-10	1.6	0.6	2.1	0.8	3.7	1.5
2011-12	1.6	0.6	2.4	0.9	3.9	1.6
2012-13 RE	1.2	0.5	2.3	0.9	3.5	1.4

Source: Status Paper on Government Debt, GoI

Annex 2

Correlation Matrix for Debt Threshold Equation					
Variables	**Public Debt to GDP**	**Growth in Real Investment**	**Inflation Rate**	**Growth in International Trade**	**Gross Fiscal Deficit to GDP**
1	2	3	4	5	6
Public Debt to GDP	1.00				
Growth in Real Investment	0.33 (0.07)	1.00			
Inflation Rate	-0.02 (0.92)	-0.18 (0.31)	1.00		
Growth in International Trade	0.26 (0.15)	0.06 (0.73)	0.49* (0.00)	1.00	
Gross Fiscal Deficit to GDP	0.24 (0.18)	-0.06 (0.75)	-0.10 (0.59)	-0.14 (0.46)	1.00

Note: 1. Figures in the parentheses indicate respective p values.
2. * indicates significant at 1 per cent level.