



IMPLICATIONS OF FISCAL POLICY ON GROWTH: ALTERNATIVE SCENARIOS

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Abstract

Expenditure and Taxation are the two-major instrument of fiscal policy to attain the objective of economic growth. India is a developing country where deficit has to be incurred so as to able to undertake public investment to promote growth. Higher deficit will always lead to higher Debt. Deficit is incurred on account of higher investment. Higher investment may lead to higher growth which in turn may lead to reduction in debt-gdp ratio. Higher growth can be achieved by either increasing the tax revenues or by increasing expenditure. In this study, we model the growth, expenditure and revenue sides. In simulation exercise, we analyze as to whether increase in expenditure in terms of more investment or increase in revenue will lead to reduction in debt-gdp ratio. India is a developing country where irrespective of revenues through taxes, expenditure is high. Increase in expenditure in terms of higher investment may lead to higher revenues which in turn reduce the debt-gdp ratio. While increasing revenue through increased tax rates may not be as efficient as increase in expenditure in reducing debt-gdp ratio. Increase in expenditure rather increase in taxes is more efficient in increasing the growth rate.

Index Terms: Growth, Public debt, Deficit, Sustainability, Tax, and Expenditure.

I. INTRODUCTION

In the second half of the 1990s, policymakers around the world have been increasingly concerned about the high debt in many developing countries which that is limiting growth and development. Higher debt levels lead to negative impact on growth. Public debt is a major



consequence of expansionary fiscal policy, as it arises from persistent accumulation of fiscal deficit over time. No wonder, high fiscal deficit has been of much concern for many countries over the recent decades. Sustainability, solvency and macroeconomic effects of debt with their feedback effects on inflation, growth, exchange rate movements and private investments have been widely discussed.¹

The widely used term sustainability embodies concern about the sustained ability of the government to service its debt. According to Maastricht Treaty, (1992)² government debt was agreed not to exceed 60% of GDP and annual deficit itself was limited to be no larger than 3% of GDP for each fiscal year. But how these numbers came up is an interesting story. The EU is a monetary union in which this power rests on a package of critical commitments by the European Union members. Critical in the sense that if the individual nations do not comply with the package, the Euro will not survive as a common currency. Members of Eurozone came to a consensus that a inflation should not exceed 1.5 per cent over the average of three member states with the lowest inflation and public debt should not exceed 60 per cent of GDP, and most importantly, its fiscal deficit should not exceed 3 per cent of its GDP. This '3' percent made its debut in the fiscal economic discourse. Dr S Rangarajan and Dr Subbarao explained the logic of the magic 3 per cent with respect to India thus: out of the average financial savings of India, which was 13 per cent, 5 per cent would go to private sector corporates and of the balance 8 per cent, 2 per cent would go to public sector undertakings leaving 6 per cent for central and state governments to be appropriated 50:50 between them to fund their deficits. The 3 per cent limit for the central government in FRBM was conceptualized.³

In table 1 (Fiscal and Growth indicators) we can see that except for China all major countries have debt-gdp ratio more than 60% with their growth rates also not so significant. India and China however, are exceptions for year 2015. Compared to other countries India is doing fairly well but it needs to think of reducing the deficit. But what is sustainable and what is desirable at any point of time for a specific economy depends upon its specific economic profile. Nevertheless, each of the above mentioned measures have to be within limits. A higher debt-to-GDP ratio may be acceptable for example in case of Japan, when the economy in question is rapidly growing. For, its future earnings are expected to enable it to pay off the debt along with the interest on it.

As in many countries, the nexus between debt and growth has become a matter of major concern for the Indian economy, which went through the process of fiscal consolidation and fiscal prudence in three phases; in 1990-91 (when New Policy Regime: Liberalization, Privatization and Globalization was introduced), in the year 2001-02 when combined deficit of both centre and states touched 9.6 percentage of gdp to curtail which Fiscal Responsibility and Budget Management Bill was passed in 2002-03 and in the year 2011-12 when deficit was high around 7.8 percent of gdp Kelkar Committee and Thirteenth Finance commission were introduced to curb this deficit in 2012-13. Fiscal consolidation includes reduction of fiscal deficit

¹ The effect of debt on other macroeconomic variables has been discussed in the further sections of the paper.

² Formally the treaty relates to the European Union and was signed by the members of European community in 1992 to integrate by the members of the European Community in Maastricht, Netherlands. One of the obligations of the treaty for the members was to adopt "sound fiscal policies".

³ S Gurumurthy (2016), Fiscal Deficit: Story of magic '3' percent, Indian Express, 25th Feb.



through expenditure and tax reforms meant to match these two on a sustainable basis. The current policies regarding tax reforms include implementing DTC (The Direct Taxes Code which was meant to replace the existing Indian Income Tax Act, 1961 and GST (The Goods and Services Tax)⁴. It is meant to replace all indirect taxes (such as Central Excise duty, Central Sales tax, Service Tax, State Level VAT) levied on goods and services by the Central and State governments in India. It is designed to be comprehensive by including most of the goods and services. Expenditure reforms substantially deal with better targeting of subsidies. Fiscal consolidation has always resulted in favorable results with regard to reduction of fiscal deficit in case of the Indian Economy. The after years for eg. (1991-92, 2003-04 and 2009-10) of fiscal consolidation has led to the reduction of fiscal deficit. (Refer to Table 2 on Fiscal Indicators of Central Government)

Taking note of the crises in different countries heading for a debt trap⁵, it is necessary to look at the right combination of debt and growth scenarios to achieve sustainability and stable development. Fiscal prudence involves exercise of good judgment, common sense, and even caution in the conduct of fiscal policies especially on the expenditure front. This study deals with the effect of debt on growth whereas our study looks into relationship between growth and debt.

Table1. Fiscal and Growth Indicators of Major Countries (Year 2015)

Country	Debt-gdp ratio	Annual Growth Rate	Budget Deficit (%)
United States	102.98	1.90	4.1
United Kingdom	88.60	1.90	5.6
China	41.06	6.80	1.8
Brazil	66.23	-5.90	1.7
India	66.10	7.30	6.6
Spain	100.70	3.50	6.6
Japan	230.0	0.70	5.8
France	96.20	1.40	2.6
Germany	71.60	2.10	0.0
Canada	86.51	0.50	1.7

Source: Fiscal Monitor (2015), IMF and www.tradingeconomics.com

Trends profile of Fiscal Indicators

Fiscal indicators for the Indian economy have gone through the usual cycle of ups and downs. Fiscal deficit touched close to 7.6 percent and growth of GDP reduced to 5.29 percent in 1990-91. This resulted in a serious foreign exchange crisis and the twin deficit (Fiscal and Current account) problem. The twin deficits hypothesis implies that, given a certain level of private savings, an increase in the government deficit will have to be balanced by either a reduction in private investment or an increase in the Current Account Deficit (CAD.) The CAD then needs to be financed through external capital inflows, government external debt or drawdown of foreign

⁴ Value Added Tax (VAT) to be implemented in India as early as possible. However the decision on this is still pending in the parliament.

⁵ A situation in which a debt is difficult or impossible to repay, typically because high interest payments prevent repayment of the principal.



exchange reserves. Government's funding of the deficit through domestic sources tends to be inflationary.

The reasons for the crisis were caused by import liberalization, rupee depreciation both coinciding with the Gulf war. To deal with the emerging problem India introduced the new economic policy which included Liberalization, Privatization and Globalization. This meant opening of the economy and significant structural changes with it. Economic reforms led to increase in growth and fiscal consolidation which became visible after 1993-94. In 1994-95, fiscal deficit was reduced to 5.52 percent of GDP and growth of overall GDP and non-agricultural GDP increased to 6.39 percent and 7.08 percent respectively. But in 1998-99 deficit was high at 6.29 percent of GDP. After 2000-01 deficit started to increase which was around 5.3 percent and overall growth and non-agricultural GDP growth reduced to 4 percent and 5.6 percent respectively. This downturn led to proposals for fiscal prudence⁶ and fiscal consolidation⁷ in the form of FRBM Bill (Fiscal Responsibility and Budget Management Bill). This bill was introduced in parliament in the year 2000 and passed in 2003. The main provisions of the FRBM were to eliminate revenue deficit and bring down fiscal deficit to 3 percent by 2007-08. It was agreed that the total liabilities (i.e internal debt, internal liabilities and external liabilities) of the Union Government should not rise by more than 9 per cent a year. The government could achieve the target of reducing the fiscal deficit below 3 percent of GDP. In 2007-08, deficit came down to 2.54 percent of GDP. With this we can conclude that FRBM aided to curtail the growth in fiscal deficit.

After the global financial crisis in 2008-09 the economy was in a bad shape for a year as rates of growth and investment were low while fiscal deficit was around 6 percent. To give push to the economy government had to intervene by releasing a set of stimulus packages like reducing many indirect taxes like excise and service tax and increasing the expenditure in rural infrastructure and social security measures which led to increase in government expenditure so even the deficit as well. The stimulus packages helped to boost the growth till 2010-11 but it could not sustain longer as in the subsequent year, the overall GDP growth and non-agricultural GDP growth reduced to 6.21 and 6.97 respectively and fiscal deficit was around 6.5 percent. The government had to step in again for a fiscal consolidation process. Under the guidance of Kelkar road map for fiscal consolidation was taken up in 2012-13. These measures included raising the Tax-to-GDP ratio, policy measures for pruning expenditure on subsidies and other items of expenditure, rightsizing the size of Plan support, and steps for increasing disinvestment proceeds. The need for the road map was for making corrective measures with respect to fiscal deficit. The main aim was speedy fiscal consolidation to avoid serious adverse consequences stemming from the current situation of high deficit and low growth which were to be averted in an efficient and timely manner. This consolidation process led to decrease in deficit to 4.43 in 2013-14 which further came down to 4.09 in 2014-15 but the overall GDP growth and non-agricultural GDP growth also reduced subsequently.

To conclude, fiscal indicators went through a process of ups and downs. It is also clear that indicators responded well during the consolidation process but the question of nexus between

⁶ Fiscal prudence means to use financial resources wisely and not spend more than your revenues.

⁷ Fiscal consolidation refers to the steps taken by any Government. to check the rising Fiscal Deficit. Fiscal Deficit = Budgetary Deficit + Market Borrowings + other liabilities.



debt and growth and the kind of their relationship need to be looked into carefully. If growth has to be achieved deficit and debt is apparently unavoidable so that the implicit sustainable level of debt can be analyzed.

Table2. Fiscal Indicators of Central Government (percentage of GDP)

YEAR	GDP Growth Rate	Nonagrgdp Growth Rate	RD	REV	EXP	GFD	DEBT
1980-81	7.17	4.87	1.36	13.56	15.21	5.55	35.30
1981-82	5.63	6.33	0.22	13.58	14.37	4.93	34.92
1982-83	2.92	4.78	0.67	14.82	15.66	5.40	40.36
1983-84	7.85	6.58	1.11	14.90	15.52	5.69	38.56
1984-85	3.96	5.28	1.65	15.54	17.00	6.79	40.12
1985-86	4.16	6.36	2.03	16.35	18.19	7.55	42.46
1986-87	4.31	6.87	2.40	16.87	19.42	8.13	46.26
1987-88	3.53	6.05	2.48	16.96	18.54	7.34	46.23
1988-89	10.16	7.78	2.41	16.82	18.11	7.08	46.44
1989-90	6.13	8.65	2.37	16.40	18.51	7.10	57.69
1990-91	5.29	6.02	3.17	16.03	17.96	7.61	59.61
1991-92	1.43	2.98	2.41	15.52	16.53	5.39	69.38
1992-93	5.36	4.74	2.40	14.24	15.83	5.19	68.19
1993-94	5.68	6.67	3.67	14.68	15.91	6.76	65.54
1994-95	6.39	7.08	2.97	15.28	15.37	5.52	60.52
1995-96	7.29	10.56	2.42	13.73	14.53	4.91	56.20
1996-97	7.97	7.09	2.30	13.23	14.16	4.70	52.26
1997-98	4.30	7.06	2.95	14.82	14.76	5.66	52.41
1998-99	6.68	6.75	3.71	15.50	15.49	6.29	52.19
1999-00	7.59	9.30	3.34	14.69	14.73	5.18	61.50
2000-01	4.30	5.60	3.91	15.01	14.95	5.46	63.79
2001-02	5.52	5.38	4.25	15.44	15.38	5.98	64.15
2002-03	3.99	7.05	4.25	16.22	16.29	5.72	64.83
2003-04	8.06	7.81	3.46	16.72	16.58	4.34	62.35
2004-05	6.97	8.70	2.42	15.62	15.37	3.88	62.67
2005-06	9.48	10.50	2.50	14.26	13.69	3.96	59.29
2006-07	9.57	10.78	1.87	13.48	13.58	3.32	58.09
2007-08	9.32	10.06	1.05	14.84	14.29	2.54	58.86
2008-09	6.72	8.06	4.50	14.92	15.70	5.99	59.62
2009-10	8.59	10.05	5.23	15.84	15.82	6.46	57.41
2010-11	9.32	8.97	3.24	15.28	15.36	4.79	56.23



2011-12	6.21	6.97	4.46	14.71	14.77	5.84	60.75
2012-13	4.99	4.98	3.65	14.33	14.12	4.91	63.31
2013-14	4.29	4.74	3.15	14.67	13.75	4.43	66.11
2014-15	7.3	4.87	2.89	13.53	13.41	4.09	-

GDP: Gross Domestic Product at Factor cost (Constant prices) (Rate of Growth)

GFD: Gross Fiscal Deficit (Percentage of GDP)

RD: Revenue Deficit (Percentage of GDP) (Revenue Receipts minus Revenue Expenditure)

REV: Total Revenues (Percentage of GDP)

EXP: Total Expenditure (Percentage of GDP)

Nonagrgdp: Non-Agricultural GDP growth rate, DEBT: Total Debt of Central Government (Percentage of GDPFC)

Source: Handbook of Statistics (Reserve Bank of India different issues).

In this paper, in section 1 the theory behind debt and growth will be discussed. Section 2 the empirical literature review regarding debt and growth will be discussed. In section 3 empirical framework will be examined and in section 4 the implications of the empirical results will be evaluated summing up the whole topic in the concluding section.

1. Theoretical Framework

Financial crisis and debt are generally inter-linked. In 2008 United States and many other developed countries had gone through a public debt crisis, as a sequence to the financial crisis (Refer Table 2). Due to the financial crisis in 2008 the economy was facing downturns to uplift the economy; a stimulus package was introduced in the form of increase in government expenditure. This led to increase in deficit, debt and growth. It also included governments to support financial institutions to overcome the crisis through pumping trillions of dollars in terms of fiscal stimulus that led to a dramatic increase in public debt relative to GDP. Many countries like Italy, Japan and Greece (Shown in Table 2) had accumulated a huge amount of public debt relative to GDP well before the outbreak of the crisis, had got into more severe trouble. This development had resulted in dealing with the question of how public debt can affect growth. The IMF (2012) fiscal monitor report estimated that the level of public debt for advanced countries increased from about 75 percent of GDP before the crisis to above 100 percent of GDP in 2011, a level unprecedented since the Second World War. In case if India the debt-gdp ratio was favorable as it started declining from 2011. A risk of possibility of another Great Depression triggered expansionary fiscal policies through fiscal stimulus in many countries in 2009. However, fiscal stimulus accounted for only a small fraction of the increase in debt, whereas collapsing revenues and higher unemployment and social benefits contributed the largest share according to fiscal monitor report (IMF, 2011).



Table 3 General Government debt 2008-16 (As percent of gdp)

	2008	2009	2010	2011	2012	2013	2014	Projections	
								2015	2016
Gross Debt									
World	65	75.4	77.7	78.7	80.5	79.1	79.8	80.4	80
Advanced Economies	78.8	92.1	98.6	102.6	106.8	105.2	105.3	105.4	105.1
United States	72.8	86	94.8	99.1	102.4	103.4	104.8	105.1	104.9
Euro Area	68.6	78.4	83.9	86.5	91.1	93.4	94	93.5	92.4
France	67.9	78.8	81.5	85	89.2	92.4	95.1	97	98.1
Germany	64.9	72.4	80.3	77.6	79	76.9	73.1	69.5	66.6
Greece	108.8	126.2	145.7	171	156.5	174.9	177.2	172.7	162.4
Ireland	42.6	62.2	87.4	111.1	121.7	123.3	109.5	107.7	104.9
Italy	102.3	112.5	115.3	116.4	123.2	128.6	132.1	133.8	132.9
Portugal	71.7	83.6	96.2	111.1	125.8	129.7	130.2	126.3	124.3
Spain	39.4	52.7	60.1	69.2	84.4	92.1	97.7	99.4	100.1
Japan	191.8	210.2	216	229.8	236.8	242.6	246.4	246.1	247
United Kingdom	51.8	65.8	76.4	81.8	85.8	87.3	89.5	91.1	91.7
Canada	70.8	83	84.6	85.3	87.9	87.7	86.5	87	85
Emerging Market and									
Middle Income Economies	35.2	39.7	39.4	38.4	38.6	39.7	41.7	43.9	44.6
Asia	40.1	42.8	42.3	41.7	41.8	42.9	44.1	46	47.7
China	31.7	35.8	36.6	36.5	37.3	39.4	41.1	43.5	46.2
India	74.5	72.5	67.5	68.1	67.5	65.5	65	64.4	63.3
Europe	23.8	29.6	29.4	28	27.2	28.5	30.9	33.9	32.5
Russia	8	10.6	11.3	11.6	12.7	14	17.9	18.8	17.1
Turkey	40	46	42.3	39.1	36.2	36.2	33.5	33.4	32.5
Latin America	46.5	49.2	48.4	48	48.2	49.2	52.2	52.3	52.2
Brazil	61.9	65	63	61.2	63.5	62.2	65.2	66.2	66.2
Mexico	42.8	43.9	42.2	43.2	43.2	46.3	50.1	51.4	51.7
South Africa	25.9	30.3	34.4	37.6	40.5	43.3	45.9	47.5	48.2
Low Income Developing Countries	29.7	33	30.5	30	30.2	30.7	31.3	33.9	34.4
Oil Producers	21.8	24.7	23.1	21.2	21.2	22.2	24.2	26.7	26.3

Source: IMF staff estimates and projections.

Orthodoxy/Classical view on public debt

The Classical view considered public debt as detrimental as it burdens the future generations by raising taxes. They believed that higher public debt could push the economy towards bankruptcy. Hume, one of the Classics, 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. Classical economist Ricardo (1817) viewed the economic effect of public debt on a nation as destructive.



Keynesian view on 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. However, according to Keynes the extent to which government can resort to debt-financing has a limit. If the government recurses 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 capital. The effects of expansionary fiscal policy⁸ on capital formation may be strengthened through the accelerator effects and thereby raise economic growth.

According to Keynesians, by debt-financing, government can tap surplus savings and thus can utilize these for productive uses and bring about an increase in national income. The followers and believers of Keynesian economic theory 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.

New-Classical view on public debt

In contrast to the view taken above Barro (1974), the New-Classical/Rational Expectationist, bases his argument on Ricardo's hypothesis of neutrality of public debt⁹, claiming 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 unchanged¹⁰. This implies that stimulative policy raises consumer spending while a repressive policy (resulting from increased taxes) lowers it. Therefore, a repressive policy financed through

⁸ Refer, William Branson (2003), Macroeconomic Theory and Policy for IS-LM framework, concept of Multiplier and accelerator that leads to business cycles.

⁹ The Ricardian Equivalence theory noted that the financing of public expenditure via taxation and borrowings are equivalent. Its argument is that the repayment of debt will take place through future taxation, which means individuals will increase their savings by buying the bonds that have been issued by the government. So, according to Ricardo there is a neutral effect or no effect of public debt on economic growth.

¹⁰ Balanced Budget Multiplier



taxes on the individuals followed by a stimulative policy financed through issue of bonds would have no impact on the economic activity.

On the other hand, the monetarists argue that the macroeconomic effect of debt financed is crowding out the private investment through increasing levels of interest rates. Hence, public debt will affect economic growth in a negative manner. Debt overhang theory suggests that if future debt gets larger than the country's repayment ability, the expected debt-service costs will discourage further domestic and foreign investment, and thus harm economic growth.

The contention of Barro regarding the impact of public debt has not remained unchallenged. As there is a growing evidence for developing countries going against the Ricardian equivalence proposition (Haque and Montiel, 1989; Corbo and Schmidt-Hebbel, 1991). Substantive criticisms are levelled against the impracticability of assumptions underlying the proposition and others like Seater (1993) 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. 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.

To summarize, public debt in classical view is burden to the society. Public debt in neoclassical view is detrimental to investment and growth. Under the Ricardian views, government debt is considered equivalent to future taxes which implies neutrality of debt to growth; whereas in the Keynesian paradigm, it constitutes a key policy perspective. The neoclassical and Ricardian schools focus on the long-run, however the Keynesian view emphasizes the short-run effects that is important in this context.

II. REVIEW OF LITERATURE ON RELATIONSHIP BETWEEN DEBT AND GROWTH

Relationship between public debt, on the one hand, and economic growth, on the other hand, has been the subject of many studies. Empirical literature on the transmission channels where high debt is likely to have adverse effects on growth is quite limited. There is a lot of literature available on the channels through which government debt is found to have an impact on the economic growth rate.¹¹ A few points are discussed below.

Both theory and policy discussions indicate that the effect of debt on growth could occur through all the main sources of growth. The capital-accumulation channel is supported, in particular, by two arguments. First, the debt-overhang concept (Krugman, 1988; Sachs, 1989) implies that when external debt grows large, investors lower their expectations of returns in anticipation of higher and progressively more distortionary taxes needed to repay debt, so that new domestic and foreign investments are discouraged. This in turn, slows capital-stock accumulation. Alternative literature reaches parallel conclusions by stressing that in high indebted countries, investors restrain their investments, due to uncertainties about debt servicing from the countries' own resources. This concludes that nonlinear effects of debt on growth are probable to occur through lower capital accumulation.

¹¹ Meade (1958), Krugman (1988), Patillo et al. (2004), Elmendorf and Mankiw (1999), Cochrane (2011), DeLong and Summers (2012), Checherita-Westphal, Hughes Hallett, and Rother (2012), Greiner (2011) and Ramey and Ramey (1995).



Debt overhang's effect on growth may not only be through the volume of investment, but also through the channel of low productivity growth. Many authors have argued for a broader interpretation of debt overhang theory, since any activity that requires incurring costs today for the sake of increased output in the future will be discouraged, as part of the proceeds will be taxed away by creditors (Corden, 1989). This implies that high debt levels may also constrain growth by lowering total factor productivity growth. The poorer policy environment, in turn, is likely to affect the efficiency of investment and productivity. Instability related to the debt overhang is likely to hinder incentives to improve technology or to use resources efficiently. For example, as in other high-uncertainty environments, investment may be misallocated to activities with quick returns, rather than long-term, higher-risk irreversible investment which would be more conducive to long-run productivity growth. Misallocated resources and less efficient investment projects could thus contribute to slower productivity growth.

Serven (1997) theory thus suggests that debt may have nonlinear effects on growth, either through capital accumulation or productivity growth. The paper by Pattillo (2004) investigates the channels through which debt affects growth through the channels discussed above. It, specifically, talks whether debt affects growth through factor accumulation or total factor productivity growth. The methodology used in this paper is discussed below:

Use of Growth Accounting to Analyze the Channels through Which Determinants Affect Growth

Growth accounting decomposes output growth into the contribution of changes in factor inputs—capital and human capital accumulation—and a residual, total factor productivity (TFP). Construction of the growth accounts examines the channels through which debt and other independent variables affect growth. Constant return to scale production function is assumed in the form:

$$Y = AK^\alpha H^\beta L^{1-\alpha-\beta} \quad \text{eq1}$$

where K measures physical capital, H measures human capital (educational attainment) traditionally this goes as technological growth, and L is the labor force. This specification is consistent with the "augmented" neoclassical Solow growth model used in Mankiw, Romer, and Weil (1992) (thereafter MRW). Physical and human capital income shares α and β are both equal to 0.33 for the entire sample is assumed, based on the coefficients implied by the MRW study. In per capita form and taking logs, equation (1) can be rewritten, after first difference

$$\ln(y_t) - \ln(y_{t-1}) = \alpha [\ln(k_t) - \ln(k_{t-1})] + \beta [\ln(h_t) - \ln(h_{t-1})] + [\ln(A_t)] \quad \text{eq2}$$

Equation (2) decomposes the growth in output per capita, y , into the contributions of growth in capital per capita, k , increases in human capital per capita, h , and the contribution of improvements in TFP, A . TFP growth can then be calculated as a residual, rewriting equation (2) as follows:

$$\ln(A_t) - \ln(A_{t-1}) = [\ln(y_t) - \ln(y_{t-1})] + \alpha [\ln(k_t) - \ln(k_{t-1})] + \beta [\ln(h_t) - \ln(h_{t-1})] \quad \text{eq3}$$

They calculate three-year averages of all the variables, to net out the effects of short run fluctuations, while maintaining the ability to utilize the time series dimension of the data. The nonlinear relationship between debt and sources of growth is estimated using the spline Function



$$y_{it} = \alpha_{(it)} \beta X_{it} + \gamma D_i \quad \text{eq4}$$

where y_{it} is the logarithmic difference in GDP, physical/human capital per capita or TFP, and X_{it} are control variables (including lagged GDP per capita). D^* represents the debt threshold and Z is a dummy equal to 1 if debt is above D^* (and 0 otherwise). This specification allows the impact of debt on the dependent variable to have a structural break, in the sense that the impact is different below and above the threshold if χ is significantly different from zero.

Elmendorf and Mankiw (1999) paper surveys the literature on the macroeconomic effects of government debt. It presents the conventional view of the effects of government debt, which emphasizes that the issuance of government debt stimulates aggregate demand and economic growth in the short run but crowds out capital and reduces national income in the long run.

According to Panizza and Presbitero (2013), the theoretical literature focuses on the relationship between public debt and economy and realizes in the long-run a negative growth relationship through a standard crowding out effect, while uncertainty and policy credibility may amplify the negative effect of crowding out. This idea is supported by the results of many empirical studies that have proven the above relationship in advanced and emerging economies¹². It is also hard to find full-fledged theoretical models that predict non-monotonicity or threshold effects in the relationship between public debt and economic growth. There are a lot of empirical studies which focus on developing countries and look at the relationship between debt and economic growth. These empirical studies support that the debt is negatively correlated with economic growth and that this correlation becomes particularly strong when debt reaches a certain threshold¹³.

Some of the important studies, which particularly address the issues in the Indian context, are as follows: Singh (1999) has examined the long run relationship between domestic debt and economic growth using the Johansen cointegration technique. His study supported the hypothesis of Ricardian equivalence in India. Kannan and Singh (2007) showed that public debt and a high level of fiscal deficit had an adverse effect on interest rates, output, inflation and the trade balance in the long run in India. Similarly, Rangarajan and Srivastava (2005) argued that a large fiscal deficit and interest payments to GDP adversely affected economic growth. They also pointed out that public debt negatively affected the growth of the Indian economy. Balbir Kaur and Atri Mukherjee (2012) find the debt threshold for India is 61 percent. Mohanty (2013) has estimated the threshold level of debt for India at 60 per cent of GDP while Topalova and Nyberg have estimated it to be at 60-65 per cent of GDP. 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.

Some of major issues are highlighted are as follows.

¹² See, Diamond (1965), Saint-Paul (1992), Schclarek (2004), Adam and Bevan (2005), Aizenman et al (2007), Krugman (1988), Aschauer (2000), Meade (1958), Elmendorf and Mankiw (1999), Cohen's (1993), DeLong and Summers (2012), Cochrane (2011), Sachs (1989), Checherita-Westphal, Hughes Hallett, and Rother (2012), Greiner (2012) and Hausmann and Panizza (2011).

¹³ See, Pattilo et al. (2002), Reinhart and Rogoff (2010), Kuman and Woo (2010), Cordella et al. (2010), Cechetti et al. (2011), Checherita and Rother (2012), Clements et al. (2003), Smyth and Hsing (1995), Cohen (1997), Reinhart and Rogoff (2010), Alogoskoufis (2012), Laopodis et al. (2014), Cecchetti, Mohanty and Zampolli, (2011), Checherita and Rother (2010) and Clements, Bhattacharya and Nguyen (2003).



A. Economic consequences of high and persistent public debt and the channels through which public debt can potentially affect economic growth.

B. Causality between debt and growth

C. Debt threshold above which it has a negative impact on the growth.

A. Economic Consequences:

The *first issue* relates to the economic consequences of a regime of high and persistent public debt and the channels through which public debt can potentially affect economic growth. While high levels of public debt are likely to be deleterious for growth, this negative effect is non-linear and is observed only above a certain level of debt which we discussed in the previous issue. Modigliani (1961), argued on the works of Buchanan (1958) and Meade (1958), that the national debt is a liability for next generations through reduced flow of income from a lower stock of private capital. Diamond (1965) adds the effect of taxes on the capital stock and differentiates between public external and internal debt. He concludes that, public debt reduces the available lifetime consumption of taxpayers, saving and thus the capital stock. Adam and Bevan (2005) find interaction effects between deficits and debt stocks, with high debt stocks exacerbating the adverse consequences of high deficits. Cohen's (1993) theoretical model postulates a non-linear impact of foreign borrowing on investment.

An important channel through which public debt accumulation can affect growth is that of long-term interest rates. Elmendorf and Mankiw, (1999) finds that higher long-term interest rates, resulting from more debt-financed government budget deficits, can crowd-out private investment, thus dampening potential output growth. Higher public financing push up sovereign debt yields; this may induce an increased net flow of funds out of the private sector into the public sector. This may lead to an increase in private interest rates and a decrease in private spending growth, both by households and firms. While the empirical findings on the relationship between public debt and long-term interest rates are diverse, a significant number of recent studies suggest that high debt and deficits may contribute to rising sovereign long-term interest rates and yield spreads. Other channels may be total factor productivity, as proposed in Pattillo, Helene Poirson and Luca Ricci (2004), or increased uncertainty about future policy decisions, with a negative impact on investment and further on growth. Other effects are large debt are high interest rates, deadweight loss of the taxes needed to service that debt, the alteration in the political process that determines fiscal policy which makes it more vulnerable to a crisis of international confidence, danger of diminished political independence or international leadership.

B. Causality:

The *second issue* is regarding the causality between debt and growth i.e relationship between public debt and economic growth. IMF (2012) opines that the problem with high public debt is that it may lower economic growth. However, high debt may itself be the result of sluggish growth. Alternatively, it could reflect a third factor that may a war or a financial crisis at the same time increases debt and reduces growth. They highlight that there is no simple relationship between debt and growth. In fact their analysis emphasizes that there are many factors that explain on the one hand a country's growth and on the other debt performance. It is also emphasized that there is no single threshold for debt ratios that can delineate the "bad"



from the “good”. Carmen Reinhart, Vincent Reinhart, and Rogoff, (2012) find evidence that public debt is negatively correlated with GDP growth with respect advanced economies like United States, United Kingdom, France Greece etc. like since the early 1800. The presence of such a correlation does not necessarily imply the direction of causality. The relation between public debt and economic growth could be determined by the fact that it is low economic growth that leads to high levels of debt. Alternatively, the observed correlation between debt and growth could be due to a third factor (i.e a war or a financial crisis as mentioned earlier) that has a joint effect on the two variables. The weight of evidence suggests that a public debt overhang does slow down the rate of economic growth, and given the length of these episodes of public debt overhang, losing even 1 percentage point per year from the growth rate will produce a substantial decline in the level of output, and a massive cumulative due to the cyclical effects of slowdowns on public finances. Ferreira (2009) performs Granger causality tests for 20 OECD countries over the time period from 1988-2001, where he studies annual growth rates. It turns out that higher debt to GDP ratios exert a negative effect on the growth rates of economies.

Kumar and Woo (2010) use dummy variables for pre-determined ranges of debt to highlight non-linear effects in a sample of emerging and advanced economies like United States, United Kingdom, France, Greece etc. They find that only very high levels of debt above 90 percent of GDP have a significant and negative impact on growth for advanced and emerging economies. The relationship between debt and growth is analyzed by taking a group of 30 advanced and emerging market economies over the period 1970-2007. They experiment with different estimations techniques and argue that the system GMM estimator allows them to address endogeneity. Their results are similar to those of Cecchetti, Mohanty, and Zampolli (2012). Saint-Paul (1992) and Aizenman, Kenneth Kletzer and Brian Pinto (2007) analyze the impact of fiscal policy, proxied by the level of public debt and find a negative relation as well. Empirical studies that find a non-linear effect of external debt on growth include Smyth and Hsing (1995) and Cohen (1997). On the other hand, Schclarek (2004) finds a linear negative impact of external debt on per-capita growth. No robust evidence of a statistically significant relationship is found for a sample of 24 industrial countries with data averaged over seven 5- year periods between 1970 and 2002.

Ugo Panizza Andrea F. Presbitero (2013) surveys the recent literature on the links between public debt and economic growth in advanced economies. Many studies have found a negative correlation between debt and growth; they conclude that there is no paper that can make a strong case for a causal relationship between debt and economic growth. They observe that the presence of thresholds is in general of a non-monotone relationship between debt and growth. They observe that it is hard to find full-fledged theoretical models that predict non-monotonicity or threshold effects in the relationship between public debt and economic growth. Empirical evidence shows that causality is hard to establish and there is no paper that can make a strong case for a causal relationship going from public debt to economic growth. Panizza and Presbitero (2012) reject the hypothesis that high debt causes lower growth. Once they instrument debt with a variable that captures valuation effects brought about by the interaction between foreign currency debt and exchange rate volatility, they find no effect of debt on



growth. They do not address the challenging causality issue here. Rather, by focusing on performance after a certain debt-to-GDP ratio has been crossed.

Bal and Rath (2014) examines the effect of public debt on economic growth in India between 1980 and 2011. Using the autoregressive distributed lag ARDL model, the paper traces a long-run equilibrium relationship between public debt and economic growth. The error correction model (ECM) results show that central government debt, total factor productivity (TFP) growth, and debt-services are affecting the economic growth in the short-run consistent with a priori expectation.

Reinhart and Rogoff's (2010) analysis high levels of debt are negatively correlated with economic growth, but that there is no link between debt and growth when public debt is below 90 percent of GDP. They illustrate this threshold effect by collecting annual data on debt and output growth for 20 advanced economies over 1946-2009 and splitting their sample into four groups: (i) country-years for which public debt is below 30 percent of GDP (443 observations); (ii) country-years for which public debt is between 30 and 60 percent of GDP (442 observations); (iii) country-years for which public debt is between 60 and 90 percent of GDP (199 observations); and (iv) country years for which public debt is above 90 percent of GDP (96 observations). They compute median and average GDP growth for each group and show that there are no large differences among the first three groups, but that average and median GDP growth are substantially lower in the fourth group. They show that in the high debt group median growth is approximately 1 percentage point lower and average growth is nearly 4 percentage points lower than in other groups.

The empirical work by Camen and Rogoff (2011) used UK data to show that public debt has a significant impact on economic growth. Qureshi and Ali (2010) found that the high level of public debt had negatively affected the economy of Pakistan between 1981 and 2008. Similarly, Rangarajan and Srivastava (2005) argued that a large fiscal deficit and interest payments to GDP adversely affected economic growth. They also pointed out that public debt negatively affected the growth of the Indian economy.

C. Debt Threshold Behavior:

The *third issue* is about debt threshold above which it has a negative impact on the growth. One school of thought has argued that high levels of debt are associated with particularly large negative effects on growth. Andrea Pescatori (2014) finds no evidence of any particular debt threshold above which medium-term growth prospects are dramatically compromised. Reinhart and Rogoff (2010, 2012) observe forty-four countries spanning about two hundred years find that there is a threshold effect whereby debt above 90 percent of GDP is associated with dramatically worse growth outcomes. An opposing perspective is advanced by those who dispute the notion that there is a clear debt threshold above which debt sharply reduces growth and raise concerns whereby weak growth is the cause of particularly high levels of debt. Thus, according to this view, the priority should be increasing growth rather than reducing debt and consequently, that much less short-term fiscal austerity is appropriate.

Cecchetti, Mohanty and Zampoli (2011) find that beyond 96 percent of GDP, public debt becomes a drag on growth leading them to conclude that "countries with high debt must act quickly and decisively to address their fiscal problems". Baum, Checherita-Westphal, and



Rother (2012) paper investigates the relationship between public debt and economic growth they use a dynamic threshold panel methodology in order to analyse the non-linear impact of public debt on GDP growth. Their empirical results suggest that the short-run impact of debt on GDP growth is positive and highly statistically significant, but decreases to around zero and loses significance beyond public debt-to-GDP ratios of around 67%. This result is robust throughout in the dynamic and non-dynamic threshold models alike. For high debt-to-GDP ratios (above 95%), additional debt has a negative impact on economic activity. Caner, Thomas J Grennes and Friederike N. Kohler-Geib (2010) analyze 101 countries over the time period 1980-2008 and detect a critical value for the debt ratio beyond which the relation between debt and growth becomes negative. The threshold of the debt to GDP ratio is about 77 percent. Checherita-Westphal, A.H Hallett and P.Rother (2014) estimate regressions for various subsamples of OECD countries and find values for the threshold of the debt to GDP ratio that range between 43 and 63 percent of GDP. Pattillo, Helene Poirson and Luca Ricci (2002) use a large panel dataset of 93 developing countries over 1969-1998 and find that the impact of external debt on per-capita GDP growth is negative for net present value of debt levels above 35-40% of GDP. Clements, Rina Bhattacharya and Toan Quac Nguyen (2003) investigate the same relationship for a panel of 55 low-income countries over the period 1970-1999 and find that the turning point in the net present value of external debt is at around 20-25% of GDP. Checherita and Rother (2010) expressing growth as a quadratic functional form of debt in a sample of twelve euro area countries over a period starting in 1970, they find significant evidence for a concave (inverted U-shape) relationship. The debt turning point, beyond which debt starts having a negative impact on growth, is found at about 90-100%. Cecchetti, Mohanty and Zampolli (2011) use a sample of 18 OECD countries for the period 1980-2010 and obtain a threshold for government debt at 85% of GDP. They find a negative impact on growth in the high debt regime. Andrea Pescatori, Damiano Sandri, and John Simon (2014) Using a novel empirical approach and an extensive dataset developed by the Fiscal Affairs Department of the IMF, they find no evidence of any particular debt threshold above which medium-term growth prospects are dramatically compromised. Balbir Kaur and Atri Mukherjee (2012) empirical results 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.

III. EMPIRICAL FRAMEWORK

Expenditure and Taxation are the two-major instrument of fiscal policy to attain the objective of economic growth. India is a developing country where we have to incur deficit so as to be able to undertake public investment to promote growth. Higher deficit will always lead to higher Debt. Deficit is incurred on account of higher investment. Higher investment may lead to higher growth which in turn may lead to reduction in debt-gdp ratio. Higher growth can be achieved by either increasing the tax revenues or by increasing expenditure. In this study, we model the growth, expenditure and revenue sides. In simulation exercise, we analyse as to whether increase in expenditure in terms of more investment or increase in revenue will lead to



reduction in debt-gdp ratio. India is a developing country where irrespective of revenues through taxes, expenditure is high. Increase in expenditure in terms of higher investment may lead to higher revenues which in turn reduce the debt-gdp ratio. While increasing revenue by increasing tax rates (direct and indirect taxes) may not be as efficient as increase in expenditure in reducing debt-gdp ratio. Increase in expenditure rather increase in taxes (direct and indirect taxes) is also more efficient in increasing the growth rate.

The sample period of study is from 1976 to 2013. All the variables in the model have been checked for stationarity. All the variables are taken in constant prices and in growth form. The two sources for data are Handbook of Statistics by Reserve bank of India and National account statistics. Lags are used in each equation depending upon Akaike criterion. Dummies are used in each equation to capture the outliers. All the major parameters like t-statistic, R-square, DW statistic and F-statistic are quite significant in all equations. The first three equations are on growth which consists of agriculture, industry and services gdp as dependent variable. Agriculture gdp is dependent on total area, total production and total agriculture capital stock (Public+Private) and total expenditure. Agricultural capital stock is effecting agricultural gdp at one year lag, which means that investment in previous year starts giving results in next year. Agricultural capital stock is stationary at first difference other variables are at levels stationary. All have positive relations which are true according to economic theory. Industrial gdp is dependent on service gdp with a lag effect. It is also dependent on industrial capital stock which is also with a lag effect. The other independent variable is total expenditure with three years lag which is estimated through Akaike criterion. All the variables are stationary at levels except for industrial capital stock. All have positive relations which are true according to economic theory. Service gdp is dependent on industrial gdp, world gdp, service capital stock at lag one, total expenditure is at two lags. All the variables are stationary and levels. The next two equations (4 and 5) are from revenue side. Direct and indirect taxes have been taken as dependent variable on industrial and service gdp which implies tax buoyancy. Auto regressive at one lag has been used as an independent variable in Indirect taxes equation which turns out to be significant. The next two equations (6 and 7) are from expenditure side. Capital expenditure is dependent on total receipts which has a positive relationship which implies higher revenue higher expenditure. The other independent id inflation (proxy is wholesale price index) which implies higher inflation lead to lower expenditure to cut the aggregate demand. Revenue expenditure is also dependent on total receipts and inflation which has also positive relationship like in previous equation. The other independent variable is agriculture gdp which is affecting revenue expenditure at one lag and it has negative relationship which implies higher agricultural gdp lead to lower revenue expenditure in terms of subsidies. The equations output and identities for the model are given below.

IV. EMPIRICAL RESULTS

1. Agrgdp = f(total area, total production, total expenditure, agriculture capital stock)

$$\text{AGRGDP} = -0.14 + 0.63 * \text{TOTAREA} + 0.60 * \text{TOTPROD} + \\ \quad \quad \quad (4.09) \quad \quad \quad (5.92) \\ + 0.22 * \text{TOTEXPCON} + 1.44 * \text{D(AGRNFCSCON(-1))} \\ \quad \quad \quad (3.58) \quad \quad \quad (4.34)$$



$$+ 7.85 * DUMAGRIGDP \\ (6.65)$$

R²=0.86 F statistic =37.60 DW statistic=1.75

2. Indgdp= f(servgdp, total expenditure, industrial capital stock)

$$INDGDPCON = 2.74 + 0.40 * SERVGDP(1) + 0.68 * D(INDNFCSCON(1)) + \\ (2.49) \quad (2.41)$$

$$0.14 * TOTEXPCON(3) + 6.36 * DUM42 \\ (2.50) \quad (7.49)$$

R²=0.70 F statistic =17.12 DW statistic=2.23

3. Servgdp = f(indgdp, worldgdp, totexpenditure, service capital stock)

$$SERVGDP(1) = 0.44 + 0.34 * INDGDPCON + 0.47 * SERVNFCSCON(1) + \\ (7.14) \quad (6.68)$$

$$0.55 * WORLDGDP + 0.05 * TOTEXPCON(2) + \\ (4.16) \quad (1.90)$$

$$3.48 * DUMSERVGDP \\ (6.89)$$

R²=0.82 F statistic =26.86 DW statistic=2.01

4. DIRTAX= f(servgdp, indgdp)

$$DIRTAXCON = - 11.64 + 1.98 * SERVGDP(1) + 0.87 * INDGDPCON \\ (2.39) \quad (1.82)$$

$$+ 21.20 * DUM1 \\ (5.49)$$

R²=0.55 F statistic =13.91 DW statistic=1.60

5. Indtax= f(servgdp, indgdp)

$$INDTAXCON = - 9.09 + 1.56 * SERVGDP(1) + 0.65 * INDGDPCON + \\ (2.95) \quad (2.47)$$

$$19.30 * DUM51 + 0.43 * AR(1) \\ (9.15) \quad (2.36)$$



$R^2=0.75$ F statistic =24.33 DW statistic=1.88

6. Capital expenditure= f(inflation, total receipts)

$$\text{CAPEXPCON} = 4.37 - 0.816 * \text{WPIINF} + 1.18 * \text{TOTRECCON} + 34.49 * \text{DUM50}$$

(-1.92) (4.84) (8.93)

$R^2=0.85$ F statistic =63.74 DW statistic=2.02

7. Revenue expenditure = f(inflation, agrgdp, total receipts)

$$\text{REVEXPCON} = 9.52 - 0.51 * \text{WPIINF} - 0.20 * \text{AGRGDPCON}(-1) +$$

(-2.86) (-1.87)

$$0.25 * \text{TOTRECCON} + 7.64 * \text{DUM60}$$

(2.71) (6.62)

$R^2=0.70$ F statistic =18.68 DW statistic=2.12

Identities

$$\text{taxrev} = \text{dirtax} + \text{indtax}$$

$$\text{revrec} = \text{taxrev} + \text{nontax}$$

$$\text{revdis} = \text{revrec} + \text{disrec}$$

$$\text{gfdexp} = \text{totexp} + \text{otrgfdexp} - \text{recloan}$$

$$\text{gfdrec} = \text{revdis} + \text{otrrevrec}$$

$$\text{totexp} = \text{capexp} + \text{revexp}$$

$$\text{gfd} = \text{gfdexp} - \text{gfdrec}$$

$$\text{totdebt} = \text{totdebt}(-1) + \text{gfd} + \text{otrdebt1}$$

$$\text{gdpfc1} = \text{agrgdp} + \text{indgdp} + \text{servgdp}$$

$$\text{indtax} = ((\text{indtaxcon} / 100) + 1) * \text{indtax}(-1)$$



$$\text{dirtax} = ((\text{dirtaxcon} / 100) + 1) * \text{dirtax}(-1)$$

$$\text{capexp} = ((\text{capexpcon} / 100) + 1) * \text{capexp}(-1)$$

$$\text{agrgdp} = ((\text{agrgdpcon} / 100) + 1) * \text{agrgdp}(-1)$$

$$\text{indgdp} = ((\text{indgdpcon} / 100) + 1) * \text{indgdp}(-1)$$

$$\text{servgdp} = ((\text{servgdpcon} / 100) + 1) * \text{servgdp}(-1)$$

$$\text{gwgdpc} = ((\text{gdpc1} - \text{gdpc1}(-1)) / \text{gdpc1}(-1)) * 100$$

$$\text{gwtotdebt} = ((\text{totdebt} - \text{totdebt}(-1)) / \text{totdebt}(-1)) * 100$$

$$\text{revrecon} = ((\text{revrec} - \text{revrec}(-1)) / \text{revrec}(-1)) * 100$$

$$\text{totexpcon} = ((\text{totexp} - \text{totexp}(-1)) / \text{totexp}(-1)) * 100$$

$$\text{revexp} = ((\text{revexpcon} / 100) + 1) * \text{revexp}(-1)$$

$$\text{totrecon} = ((\text{totrec} - \text{totrec}(-1)) / \text{totrec}(-1)) * 100$$

$$\text{caprecon} = ((\text{caprec} - \text{caprec}(-1)) / \text{caprec}(-1)) * 100$$

$$\text{totrec} = \text{caprec} + \text{revrec}$$

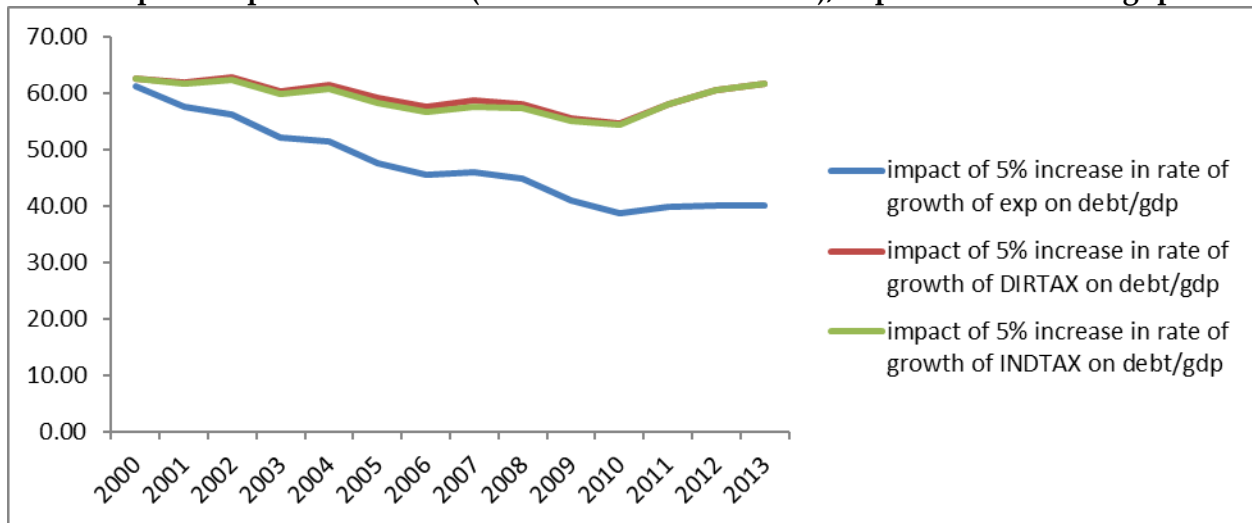
$$\text{debtgdp} = ((\text{totdebt} * \text{gdpdef}) / ((\text{gdpc1} * \text{gdpdef}) / 100)) * 100$$

Year	Baseline	Simulation increase in expenditure	5% increase in total	Simulation 5% increase in direct tax	Simulation 5% increase in indirect tax
2000	71.96	61.22		62.70	62.63
2001	68.61	57.72		61.92	61.72
2002	67.68	56.23		62.77	62.36
2003	63.92	52.18		60.39	59.79
2004	63.76	51.42		61.58	60.80
2005	60.27	47.50		59.25	58.33
2006	58.88	45.52		57.73	56.71
2007	60.48	46.09		58.65	57.72
2008	60.08	44.85		58.16	57.35
2009	56.92	41.11		55.63	55.22
2010	55.76	38.82		54.64	54.39



2011	58.38	39.85	58.15	58.03
2012	60.48	40.05	60.55	60.48
2013	62.44	40.19	61.74	61.68

Graph: 1 Impact of Revenue (Direct and Indirect Taxes), Expenditure on debt gdp



Year	5% increase in rate of growth of direct tax on growth of GDP	5% increase in rate of growth of indirect tax on growth of GDP	5 % increase in rate of growth of Expenditure on growth of gdp
2000	6.57	6.53	7.10
2001	7.88	7.90	8.51
2002	3.77	3.82	4.56
2003	8.31	8.34	8.83
2004	6.48	6.49	6.89
2005	8.33	8.34	8.95
2006	9.59	9.63	10.15
2007	8.80	8.77	9.00
2008	7.60	7.64	8.39
2009	8.63	8.54	9.15
2010	7.35	7.27	7.94
2011	6.95	6.85	7.68
2012	4.49	4.47	4.94
2013	5.59	5.66	6.30

Graph: 2 Impact of Revenue (Direct and Indirect Taxes), Expenditure on Growth



V. CONCLUSION

This study mainly looks at the relation between debt and growth. The literature survey covers the three main issues relating to it that are

1. Economic consequences of high and persistent public debt and the channels through which public debt can potentially affect economic growth
2. Causality between debt and growth and
3. Debt threshold above which growth declines.

Increasing debt is manageable up to a point but becomes hazardous beyond a certain limit. The limit for the debt depends upon each country's economic condition. If growth is expected to be higher, then there is no problem of higher debt or according to domar stability condition, if rate of growth is higher, than interest rate then higher debt is not a major issue. In India, debt and deficit positions do not seem to be so favorable. Government has taken the path of fiscal consolidation to improve the current scenario of the Indian economy by appointing the committee under the leadership of Vijay Kelkar in the year 2012. This Committee was mandated by the Finance Minister to give a report outlining a roadmap for fiscal consolidation in a medium term framework in pursuit of the FRBM Act and related targets. The effort of this committee report has helped to curtail the fiscal deficit upto 4.09 percent of GDP in 2014-15.

Expenditure and Taxation are the two-major instruments of fiscal policy to attain the objective of economic growth. India is a developing country where we have to incur deficit so as to be able to undertake public investment to promote growth. Higher deficit will always lead to higher Debt. Deficit is incurred on account of higher investment. Higher investment may lead to higher growth which in turn may lead to reduction in debt-gdp ratio. Higher growth can be achieved by either increasing the tax revenues or by increasing expenditure. In this study, we have discussed the relation between debt and growth. Literature says that as debt is



unavoidable with respect to countries like India, short run increase in debt leads to increase in growth. However, in long run increase in debt may lead to decrease in growth. Many studies have discussed about the threshold of debt after which debt has a negative effect on growth.

The major conclusions from the study are

- In this study we have modelled the growth, expenditure and receipts.
- In simulation exercise we analyze as to whether increase in expenditure in the form of investment or increase in revenue will lead to reduction in debt-gdp ratio.
- India is a developing country where irrespective of revenues through taxes, expenditure is high. Increase in expenditure in terms of higher investment may lead to higher revenues which in turn reduce the debt-gdp ratio.
- While increasing revenue by increasing tax rates (direct and indirect taxes) may not be as efficient as increase in expenditure in reducing debt-gdp ratio.
- Increase in expenditure rather increase in taxes (direct and indirect taxes) is also more efficient in increasing the growth rate.

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