

PAKISTAN INSTITUTE OF DEVELOPMENT ECONOMICS

PIDE WORKING PAPERS
No. 156



**Measuring the Sufficient Debt
Sustainability Condition
in Pakistan**

**Beenash Malik
M. Ali Kemal**

July 2018

PIDE Working Papers
No. 156

**Measuring the Sufficient Debt
Sustainability Condition
in Pakistan**

Beenash Malik

Pakistan Institute of Development Economics, Islamabad

And

M. Ali Kemal

Pakistan Institute of Development Economics, Islamabad

PAKISTAN INSTITUTE OF DEVELOPMENT ECONOMICS
ISLAMABAD
2018

Editorial Committee

Dr Abdul Qayyum
Dr Durr-e-Nayab
Dr Anwar Hussain

Head
Member
Secretary

All rights reserved. No part of this publication may be reproduced, stored in a retrieval system or transmitted in any form or by any means electronic, mechanical, photocopying, recording or otherwise without prior permission of the Publications Division, Pakistan Institute of Development Economics, P. O. Box 1091, Islamabad 44000.

Pakistan Institute of Development Economics
Islamabad, Pakistan

E-mail: publications@pide.org.pk
Website: <http://www.pide.org.pk>
Fax: +92-51-9248065

Designed, composed, and finished at the Publications Division, PIDE.

C O N T E N T S

	<i>Page</i>
Abstract	v
1. Introduction	1
2. Debt Sustainability	2
3. Overview of Public Debt in Pakistan	6
4. Methodology and Data	7
4.1. Data	8
5. Results	8
5.1. Debt to GDP ratio fixed at 60 percent of GDP	8
6. Summary and Conclusions	14
References	15

List of Tables

Table 1.	Sustainable Debt Thresholds	3
Table 2.	Public Debt Sustainability Conditions	4
Table 3.	External Debt Sustainability Conditions	4
Table 4.	Magnitudes of Debt Burden	5
Table 5.	Fiscal Deficit 5 Percent at Debt to GDP Ratio 60 Percent	9
Table 6.	Fiscal Deficit 4.5 Percent at Debt to GDP Ratio 60 Percent	10
Table 7.	Fiscal Deficit 4 Percent at Debt to GDP Ratio 60 Percent	11
Table 8.	Fiscal Deficit 3.5 Percent at Debt to GDP Ratio 60 Percent	12
Table 9.	Fiscal Deficit 3 Percent at Debt to GDP Ratio 60 Percent	13
Table 10.	Total Debt in 2025	14
Table 11.	GDP Growth Needed to Maintain Debt to GDP Ratio at 60 Percent	14

List of Figures

Figure 1.	Total Debt	6
-----------	------------	---

ABSTRACT

A debt sustainability issue is important when government do not follow any fiscal cliff and interest payments are consuming significant part of the resources. This thesis calculates sufficient condition of debt sustainability in Pakistan. It uses simple textbook methodology of government budget constraint, accounting approach to measure sustainability of debt. We have checked the extent of nominal as well as real GDP growth required to main the debt-GDP ratio level at 60 percent, 50 percent and 40 percent with level of fiscal deficit 5 percent, 4.5 percent, 4 percent, 3.5 percent and 3 percent. Thesis concludes that lower the fiscal deficit higher possibility of maintaining the debt at its sustainable level. Moreover, lower the fiscal deficit higher will be the chances to finance development expenditures as well redistribute the impact of growth. Moreover, it is also examined that maintaining debt-GDP ratio at certain level implies that we do not need to retire debt further and growth in national income is used to serve development expenditures instead of using it for debt retirement. Reducing the debt to GDP ratio by debt repayments may costs us the projects which can be beneficial for growth in those year. The projects may not set up during the time of debt retirement, thus long run growth may suffer and long run impact will be negative. Therefore, it is better to select a threshold level which maximises the use of government spending.

“Developing countries need to borrow in order to finance their development but this need to be balanced by ability to make repayments as well as ensuring that the borrowed funds are used for productive expenditures” (Debt Policy Statement 2006-07).

1. INTRODUCTION

Debt is a double-bladed sword. If it is used wisely and in balance, it noticeably improves welfare. On the other hand, when it is used irresponsibly the consequences can be adverse. Large amount of debt weakens the government’s ability to provide necessities to its people. Kemal (2001) describes that domestic and external debt accumulation and debt servicing disturb the poor adversely.

Greece recently is the alarming example of it whose debt rose from 100 percent of GDP to 173 percent of GDP in five year. On the other hand Pakistan has reduced its debt burden from 100 percent to 56 percent in 2005-06 and then tried to maintain it though it never crossed 70 percent of the GDP since then.

This raises the issues of debt sustainability, which is an important indicator of the achievement of the Millennium Development Goals (MDGs) by 2015”.¹ It is generally defined by IMF and World Bank as the ability of a country to meet its current and future debt servicing obligations without recourse to debt rescheduling or accumulation of arrears and without compromising growth.²

Debt sustainability is an important indicator of Fiscal Responsibility and Debt Limitation (FRDL) Act, 2005, which states “within a period of ten financial year, beginning from the 1 July, 2003 and ending on 30 June, 2013, the total public debt at the end of the tenth financial year does not exceed sixty percent of the estimated gross domestic product for that year and thereafter maintaining the total public debt below sixty percent of gross domestic product for any given year [Debt Policy Statement (2006-07)].”

Mahmood, Rauf, and Ahmad (2009) reports traditional debt ratios and derive the necessary and sufficient conditions for external and public debt. These conditions deal with the real interest rate and real GDP growth of the

¹United Nations: United Nations Millennium Declaration, Resolution Adopted by the General Assembly, New York, 18 September 2000.

²Zakaria Benethelin, Ndove Titus and Tjipe Tjiveze (2004), Central Government Debt Sustainability, WP 1/2004. Bank of Namibia Research Department, Namibia.

economy³ and containing debt to GDP ratio at a constant level. Ibid solved the necessary condition but did not calculate the sufficient condition, which is the core objective of this paper. It is important to measure it because our debt is creeping up every year and we need to follow debt sustainability policy to avoid the problems related to debt.

Therefore paper focuses on measuring the sufficient condition of debt sustainability. By using the methodology of accounting approach, government budget constraint is used to derive the necessary and sufficient conditions for sustainable debt. Pakistan has currently 63 percent Debt to GDP ratio while according to FRDL 60 percent is required. Different thresholds are used for fiscal deficit such as 5, 4.5, 4, 3.5, and 3 percent.

After the introduction Section II explains theoretical framework, literature review, Section III provides the methodology adopted in measuring the debt sustainability i.e. the accounting approach which uses the government budget constraint to find out the necessary and sufficient condition, Section IV reports the results for public debt sustainability sufficient condition. The summary and conclusions are stated in the last section of the thesis.

2. DEBT SUSTAINABILITY

In the literature debt sustainability has been studied using two approaches, i.e. the Accounting approach and the Present Value approaches [Cuddington (1996)]. Though the initial point of both the approaches includes the government budget constraint, the accounting approach involves the usage of derived necessary and sufficient conditions for evaluating the debt sustainability problem discussed in detail in the methodology section. While the present value budget constraint approach assesses debt sustainability with the help of econometric testing of the strength of the present value of the budget constraint or else Non-Ponzi game (NPG) conditions. Empirical evidence concerning the use of this methodology to check the stationarity of discounted debt series and budget deficit is limited and the existing literature delivers mixed results. For example, [Hamilton and Flavin (1986)] accounts stationarity of both series, while Wilcox (1989) and Trehan and Walsh (1988) report weak proof of discounted debt series sustainability. Likewise, Luporini (1999) report mixed outcomes about the stationarity of the discounted debt series of Brazil.

Hamilton and Flavin (1986) uses applies test of stationarity over the discounted debt factor by using dickey-fuller test for unit root as well as restricted and generalised flood-Garber tests for stationarity. The basic idea is that any debt will be sustainable in the long run if its discounted factor is stationary. They applied these methodologies on the US data from 1960 to 1981

³The necessary condition for debt to be sustainable holds, if interest rate is less than the growth rate of GDP i.e. $r_t < g_t$. On the contrary if $r_t > g_t$ the debt ratio is unsustainable and it will not stabilise so long as interest rate is greater than GDP growth.

and found that government must promise to balance its budget in expected present value terms in order to be able to issue interest bearing debt.

Mehmood and Rauf (2012) analyses the debt sustainability issue in Pakistan using the present value budget constraint (PVBC) approach. Using unit root test on the series of discounted debt; where the stationarity shows sustainability. The second approach involves using co-integration test. Besides these tests they used the dynamic OLS estimator technique. The empirical analysis showed that when PVBC approach was used, public debt was found to be unsustainable throughout the period 1971 to 2011. In 2000s debt was sustainable and in 2011 it again turned unsustainable. In another paper Mehmood, Rauf, and Ahmed (2009) examines the public and external debt sustainability in Pakistan. This paper adopts two approaches. The first one is based on traditional threshold debt ratios which are widely used in the literature. For this they used the traditional debt indicators approach [Gray (1998)] express the debt servicing and debt stock as a ratio of selected indicators, then these indicators are used to compare with the benchmark thresholds. In this paper the traditional threshold public debt indicators include the ratio of public debt to GDP and public debt to revenue. Whereas, the present value based debt ratios of external debt to GDP, to foreign exchange earnings and to export of goods and services are used as an indicators of external debt. He reports the results in the table.

Table 1
Sustainable Debt Thresholds

Institutions	PV Debt/ Exports	PV Debt/ Revenue	Additional Criteria
HIPC (2004)	150	250	Debt servicing / Exports ratio is 15-20%
DRI	140	151	Debt Servicing / Exports ratio is 12% and Debt Servicing / Revenue ratio is 13 %
IMF	180	201	PV/GDP is 42% and Debt Servicing/Revenue is 30%
World Bank (2004)	190	189	[PV/Exports is 220% and PV/GNI is 80 %]* [Also Debt stock/GDP is 50%, Debt stock/ Exports is 275%, Debt Servicing/Exports is 30%]**
CIPA Index	Poor/Medium/ Strong	Poor/Medium/ Strong	Debt servicing as 15, 20 and 25 % of exports for poor, medium and strong institutions
	100/150/200	200/250/300	Debt servicing as 25, 30 and 35 % of revenue for poor, medium and strong institutions

Source: Mehmood and Rauf (2012).

The second approach is based on theoretical models which derive the debt sustainability conditions for external and public debt separately from the accounting approach which derive the necessary. Ibid identifies the key factors that are responsible for public and external debt sustainability. The necessary condition for public debt sustainability is $r_t < g_t$ (Table 2).

Table 2

<i>Public Debt Sustainability Conditions</i>								
Decade	r	G	Ps	μh_{t-1}	s	$r < g$	$s > 0$	Conclusion
1970s	-9.8	4.8	-6.1	0.8	-5.2	$r < g$	$s < 0$	Unsustainable
1980s	-1.4	6.6	-3.5	-0.1	-3.6	$r < g$	$s < 0$	Unsustainable
1990s	-1.2	4	-1.3	0.1	-1.2	$r < g$	$s < 0$	Unsustainable
2000s	1.6	5	2	0.2	2.2	$r < g$	$s > 0$	Sustainable
FY 2007	-1.9	6.4	-1.5	1.1	-0.4	$r < g$	$s < 0$	Unsustainable

Source: Mehmood, Rauf, and Ahmed (2009).

The necessary condition for external debt sustainability is $r_t^* < g_t$ which means that real foreign interest rate must be less than GDP growth. Ibid finds that for the entire period this condition is met and the real foreign interest rate has mostly remained negative and low comparative to GDP growth that was on average 5 percent. It means GDP growth and interest rate were not as much of significant in external debt accumulation and raising the debt ratios.

Table 3

<i>External Debt Sustainability Conditions</i>						
Decades	Rate of Interest (Real)	Growth of GDP (Real)	Primary CAB (% of GDP)	Conditions for Debt Sustainability		Outcomes
	r^*	G	pcab	$r^* < g$	pcab	
1970s	-10.7	5.5	-4.1	$r^* < g$	pcab < 0	Unsustainable
1980s	-3.5	7.1	-1.2	$r^* < g$	pcab < 0	Unsustainable
1990s	-3.6	4.4	-1.1	$r^* < g$	pcab < 0	Unsustainable
2000s	0.9	4.7	4.5	$r^* < g$	pcab > 0	Sustainable
2005	-2.9	6.4	0.4	$r^* < g$	pcab > 0	Sustainable

Source: Mehmood, Rauf, and Ahmed (2009).

They conclude that since the last three decades, public and external debt sustainability levels have been far away from the debt sustainability levels. Results show that both the debt sustainability conditions and sustainable threshold indicators are similar and disclose that throughout the decades of 1970s to 1990s the public debt and external debt was unsustainable. While, the debt situation was better in the first half of 2000s, but started to decline in the second half of 2000s.

High fiscal deficit would be the core problem of rising total debt. Nonetheless if fiscal deficit is caused due to increase in current expenditures then there will be no payback in future and thus debt will go up. Bilquees (2003) explains that high deficits worsen macro indicators such as savings, interest rate, investment, current account deficit, growth, etc.

Pasha and Ghaus-Pasha (2000) is composed on different sections. One section identifies the macro determinants for the rate of debt accumulation rate in economy. Here they uses the basic debt accumulation equation. According to which the variations in debt to GDP ratio is affected by: whether the primary budget is in surplus or deficit; the amount to which the domestic real interest rate go beyond the growth rate of economy. If r is smaller than g , this will put downward force on debt to GDP ratio; the amount to which external real interest rate go beyond the real GDP growth rate; the amount of capital loss on the external debt due to real exchange rate depreciation. If there is a depreciation of nominal exchange rate which surpasses the difference among world and domestic rate of inflation so the debt to GDP ratio will rise.

Another section discuss the reasons for the comparatively rapid rise in the debt to GDP ratio during the decade of 80s and 90s. Magnitudes of debt burden are shown in table, it appears that the comparatively large size of primary budget deficit at above 3 percent of GDP per annum was the main reason for rapid rise in the 80s whereas during 90s it was 0.5 percent of the GDP. Real interest rate on domestic debt was higher in 80s as compare to 90s. The low inflation rate indicates higher real interest rate in 80s. But this negative factor was cancelled out by the significantly greater GDP growth rate. The real exchange rate depreciation appears to be higher in 80s thus contributing to greater capital losses on external debt.

Table 4

Magnitudes of Debt Burden

Factor	80s	90s
Primary Budget Deficit (-) / Surplus (+) as % of GDP	-3.2	-0.5
Nominal Interest Rate on Domestic Debt (%)	9.5	11.7
Nominal Interest Rate on External Debt (%)	2.8	3.9
Rate of Nominal Exchange Rate Depreciation (%)	8.2	9.4
Rate of Domestic Inflation (%)	7.3	9.8
Real Interest Rate on Domestic Debt (%)	2.2	1.9
GDP Growth Rate (%)	6.1	4.6

Source: Pasha and Ghaus-Pasha (2000).

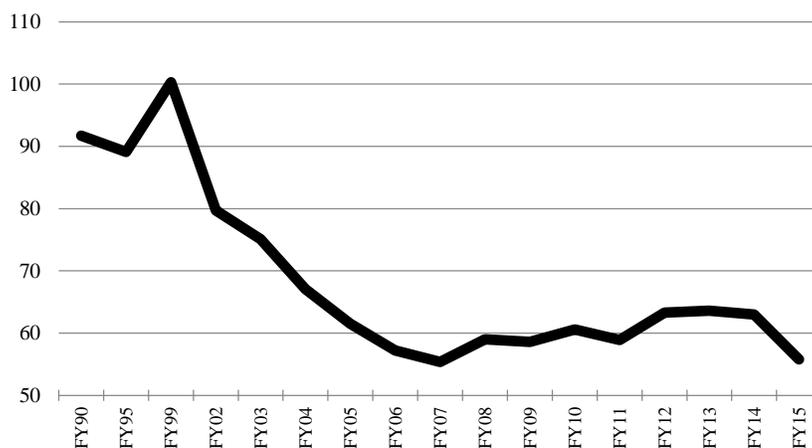
3. OVERVIEW OF PUBLIC DEBT IN PAKISTAN

Debt burden increases due to several factors. To name some fiscal deficit and current account deficit can take the top spot. Fiscal deficit in the absence of capital expenditures and continuous declining current account deficit are the major contributor of worsening debt problems. Other than these two GDP growth, interest rate and exchange rates are among the core variables which change the overall burden of total debt. Interest rate especially manoeuvres the domestic debt while exchange rate manoeuvres the external debt.

Although GDP growth rate was increasing at steady rate through 1970s (5 percent) and 1980s (6.5 percent) but in 1990s it declined to 4.4 percent. By the year 2000 total debt has reached 100 percent of GDP, which was 54.4 percent of GDP in 1980 and 91 percent in 1990. These show two things (1) increase in debt leads to increase in growth in 1980s and vice versa in 1990s, though effectiveness of aid also depends on the purpose of aid as well but we are not discussing this issue in this paper. (2) Stabilisation policies of 1990s may helped in mitigating the speed of debt piling but growth rate was also low which hurt the process of paying back the debt. The bifurcation into external and domestic debt may help us more to understand the exact picture of debt. Due to higher total debt, debt servicing was also increased from 43 percent of total revenues in 1980 to 63 percent of total revenues in 2000. The increase in debt servicing is associated with the high cost of short term borrowing in 1990s to fixed the balance of payments gap.

Figure 1 show that during 2008-2014 total debt increased slightly. However, in 2015 we can see a drop. This is a wish of current government to decrease total debt in this year. Increase in debt to GDP ratio during the last seven years can also associated with the increase in oil prices, nonetheless,

Fig. 1. Total Debt



external debt was not increased much during the same era due to increase in remittances. Therefore, oil price cannot be counted as one of the determinants of pilling public debt. Another reasons of increase in public debt are: spending on war on terror and security, revenue shortfall due to high cost of doing business, lower GDP growth than expected, severe energy shortages and increase in current expenditures.

4. METHODOLOGY AND DATA

Any debt strategy is incomplete without a supporting fiscal policy. The root cause of increase in debt is fiscal imbalances so the importance of a prudent fiscal policy cannot be overemphasised. A sound fiscal policy is essential for preventing macroeconomic imbalances and realising the full growth potential. There is also a general consensus that a prolonged commitment to financial discipline can only come from a rule-based fiscal policy.

The paper uses the accounting approach in which the annual budget constraint of government is used⁴. It involves all kind of expenditures i.e. government purchases, G_t plus interest on privately held outstanding debt must be funded by three sources of revenue: taxes, new borrowing from the private sector, and changes in the stock of money.

$$G_t + i_t D_{t-1} = T_t + (D_t - D_{t-1}) + (M_t - M_{t-1}) \quad \dots \quad \dots \quad (1)$$

Lately in Pakistan, especially in 1990s privatisation receipts are part of the deficit financing, thus the above equation becomes;

$$G_t + i_t D_{t-1} = T_t + (D_t - D_{t-1}) + (M_t - M_{t-1}) - \textit{Privatisation} \quad (1')$$

Privatisation receipts appear with a minus sign because it decreases the amount of expected loan to be taken. Rearranging equation 1':

$$D_t = G_t - T_t + i D_{t-1} + D_{t-1} - (M_t - M_{t-1}) - \textit{Privatisation}$$

Total budget balance is known as primary balance if interest payments are not part of it. Primary balance can be written as $B_t = G_t - T_t$. Consequently $B_t > 0$ recognises a primary deficit.

$$D_t = B_t + (1 + i_t) D_{t-1} - (M_t - M_{t-1}) - \textit{Privatisation}$$

The budget constraint of the government can be simplified to show that the year-to-year alteration in nominal government debt is the sum of four factors: the interest paid on outstanding debt, the primary deficit, changes in money supply and privatisation receipts. Greater interest rate and drop in tax receipts incline to increase a country's debt.

⁴This method is usually used by IMF and World Bank.

So, the annual budget constraint of the government can be written as:

$$D_t = (1 + i_t)D_{t-1} + B_t - \Delta M_t - \text{Privatisation} \quad \dots \quad \dots \quad (2)$$

$$D_t = D_{t-1} + (B_t + iD_{t-1}) - \Delta M_t - \text{Privatisation} \quad \dots \quad \dots \quad (3)$$

Here $(B_t + iD_{t-1})$, is the overall balance i.e. the primary balance minus interest payments on the outstanding debt, the fiscal surplus (if positive) or deficit (if negative). The surplus reduces the outstanding debt while the deficit increases D_t .

Analysis in the paper ignores the last two terms which may add at the end for further analysis. Thus the equation we have used

$$D_t = D_{t-1} + (B_t + iD_{t-1}) \quad \dots \quad \dots \quad \dots \quad \dots \quad \dots \quad (4)$$

4.1. Data

The ultimate goal is to calculate GDP growth needed to maintain debt-GDP ratio level at 60 percent of GDP which is in accordance with the announced FRDL. However, the target is further examined at different levels of primary deficit, overall fiscal deficit along with current account deficit.

Fiscal deficits targets are taken using threshold level of fiscal deficit mentioned in (Onwioduokit, 2012), i.e., 5 percent for West African countries, 4 percent and Johnson (2001) estimated threshold level of 3 percent for EU countries. Besides these three values debt sustainability is also calculated with existing interest payment in conjunction with zero, 1 and 2 percent of primary deficit along with 1, 2 and 3 percent of current account deficit.

As the study aims to estimate the sufficient condition of sustainable debt we needed to collect data on Budget Deficit, Interest Payments, Total Debt, GDP Currents at market price and Constant factor cost. The data is collected for the year 2010-2014 from Pakistan Economic Survey and Handbook of Pakistan.

5. RESULTS

5.1. Debt to GDP ratio fixed at 60 percent of GDP

As discussed above the results of one scenario i.e. 60 percent and 5 sub scenarios are given below. Interest payments are calculated by using the average rate of interest in 2014. Average rate of interest is calculated by dividing total interest payments by total accumulated debt.

5.1.1. Fiscal Deficit is 5 Percent

Following table is calculated by fixing budget deficit at 5 percent level, fixing debt to GDP ratio at 60 percent, and 9 percent annual inflation. The table shows that if 60 percent level is achieved in 2015 then we need to have nominal GDP growth rate as high as 20.91 percent and real growth rate by 10.93 percent.

We know that this is a difficult task and cannot be achieved in a year thus it is good to reach at 60 percent level in three years by reducing total debt to GDP ratio by one percent in each year.

Nevertheless, the important findings are the when 60 percent level is achieved, then in order to maintain the debt-GDP ratio with 5 percent level of fiscal deficit and no change in interest payments rate we need 15.6 percent growth in nominal GDP and 6.05 percent growth in real GDP. It is noteworthy to mention that total debt will keep on increasing but Debt to GDP ratio remains the same.

Table 5

Fiscal Deficit 5 Percent at Debt to GDP Ratio 60 Percent

Years	Total Debt (Rs. Millions)	GDP Current Growth Rate	GDP Constant Growth Rate
2010	9006200	12.63	2.58
2011	10766900	22.93	3.62
2012	12695300	9.68	3.83
2013	14292900	12.18	3.69
2014	15996500	12.95	4.13
2015	18428471	20.91	10.93
2016	21302694	15.60	6.05
2017	24625200	15.60	6.05
2018	28465906	15.60	6.05
2019	32905633	15.60	6.05
2020	38037808	15.60	6.05
2021	43970431	15.60	6.05
2022	50828344	15.60	6.05
2023	58755862	15.60	6.05
2024	67919806	15.60	6.05
2025	78513019	15.60	6.05

5.1.2. Fiscal Deficit is 4.5 Percent

Following table is calculated by fixing budget deficit at 4.5 percent level, fixing debt to GDP ratio at 60 percent, and 9 percent annual inflation. The table shows that if 60 percent level is achieved in 2015 then we need to have nominal GDP growth rate as high as 20.08 percent and real growth rate by 10.16 percent. We know that this is a difficult task and cannot be achieved in a year thus it is good to reach at 60 percent level in three years by reducing total debt to GDP ratio by one percent in each year.

Nevertheless, the important findings are the when 60 percent level is achieved, then in order to maintain the debt-GDP ratio with 4.5 percent level of fiscal deficit and no change in interest payments rate we need 14.76 percent

growth in nominal GDP and 5.29 percent growth in real GDP. It is noteworthy to mention that total debt will keep on increasing but Debt to GDP ratio remains the same.

Table 6

Fiscal Deficit 4.5 Percent at Debt to GDP Ratio 60 Percent

Years	Total Debt (Rs. Millions)	GDP Current Growth Rate	GDP Constant Growth Rate
2010	9006200	12.63	2.58
2011	10766900	22.93	3.62
2012	12695300	9.68	3.83
2013	14292900	12.18	3.69
2014	15996500	12.95	4.13
2015	18301461	20.08	10.16
2016	21003363	14.76	5.29
2017	24104156	14.76	5.29
2018	27662728	14.76	5.29
2019	31746663	14.76	5.29
2020	36433523	14.76	5.29
2021	41812318	14.76	5.29
2022	47985202	14.76	5.29
2023	55069408	14.76	5.29
2024	63199478	14.76	5.29
2025	72529815	14.76	5.29

5.1.3. If Fiscal Deficit is 4 Percent

Following table is calculated by fixing budget deficit at 4 percent level, fixing debt to GDP ratio at 60 percent, and 9 percent annual inflation. The table shows that if 60 percent level is achieved in 2015 then we need to have nominal GDP growth rate as high as 19.25 percent and real growth rate by 9.40 percent. We know that this is a difficult task and cannot be achieved in a year thus it is good to reach at 60 percent level in three years by reducing total debt to GDP ratio by one percent in each year.

Nevertheless, the important findings are the when 60 percent level is achieved, then in order to maintain the debt-GDP ratio with 4.5 percent level of fiscal deficit and no change in interest payments rate we need 13.93 percent growth in nominal GDP and 4.52 percent growth in real GDP. It is noteworthy to mention that total debt will keep on increasing but Debt to GDP ratio remains the same.

Table 7

Fiscal Deficit 4 Percent at Debt to GDP Ratio 60 Percent

Years	Total Debt (Rs Million)	GDP Current Growth Rate	GDP Constant Growth Rate
2010	9006200	12.63	2.58
2011	10766900	22.93	3.62
2012	12695300	9.68	3.83
2013	14292900	12.18	3.69
2014	15996500	12.95	4.13
2015	18174452	19.25	9.40
2016	20706149	13.93	4.52
2017	23590512	13.93	4.52
2018	26876666	13.93	4.52
2019	30620580	13.93	4.52
2020	34886021	13.93	4.52
2021	39745637	13.93	4.52
2022	45282196	13.93	4.52
2023	51589997	13.93	4.52
2024	58776474	13.93	4.52
2025	66964025	13.93	4.52

5.1.4. If Fiscal Deficit is 3.5 Percent

Following table is calculated by fixing budget deficit at 3.5 percent level, fixing debt to GDP ratio at 60 percent, and 9 percent annual inflation. The table shows that if 60 percent level is achieved in 2015 then we need to have nominal GDP growth rate as high as 18.41 percent and real growth rate by 8.64 percent. We know that this is a difficult task and cannot be achieved in a year thus it is good to reach at 60 percent level in three years by reducing total debt to GDP ratio by one percent in each year.

Nevertheless, the important findings are the when 60 percent level is achieved, then in order to maintain the debt-GDP ratio with 3.5 percent level of fiscal deficit and no change in interest payments rate we need 13.10 percent growth in nominal GDP and 3.76 percent growth in real GDP. It is noteworthy to mention that total debt will keep on increasing but Debt to GDP ratio remains the same.

Table 8

Fiscal Deficit 3.5 Percent at Debt to GDP Ratio 60 Percent

Years	Total Debt (Rs Million)	GDP Current Growth Rate	GDP Constant Growth Rate
2010	9006200	12.63	2.58
2011	10766900	22.93	3.62
2012	12695300	9.68	3.83
2013	14292900	12.18	3.69
2014	15996500	12.95	4.13
2015	18047442	18.41	8.64
2016	20411052	13.10	3.76
2017	23084216	13.10	3.76
2018	26107474	13.10	3.76
2019	29526678	13.10	3.76
2020	33393682	13.10	3.76
2021	37767135	13.10	3.76
2022	42713364	13.10	3.76
2023	48307382	13.10	3.76
2024	54634030	13.10	3.76
2025	61789256	13.10	3.76

5.1.5. If Fiscal Deficit is 3 Percent

Following table is calculated by fixing budget deficit at 3 percent level, fixing debt to GDP ratio at 60 percent, and 9 percent annual inflation. The table shows that if 60 percent level is achieved in 2015 then we need to have nominal GDP growth rate as high as 17.58 percent and real growth rate by 7.87 percent. We know that this is a difficult task and cannot be achieved in a year thus it is good to reach at 60 percent level in three years by reducing total debt to GDP ratio by one percent in each year.

Nevertheless, the important findings are the when 60 percent level is achieved, then in order to maintain the debt-GDP ratio with 3 percent level of fiscal deficit and no change in interest payments rate we need 12.26 percent growth in nominal GDP and 2.99 percent growth in real GDP. It is noteworthy to mention that total debt will keep on increasing but Debt to GDP ratio remains the same.

Table 9

Fiscal Deficit 3 Percent at Debt to GDP Ratio 60 Percent

Years	Total Debt (Rs Million)	GDP Current Growth Rate	GDP Constant Growth Rate
2010	9006200	12.63	2.58
2011	10766900	22.93	3.62
2012	12695300	9.68	3.83
2013	14292900	12.18	3.69
2014	15996500	12.95	4.13
2015	17920433	17.58	7.87
2016	20118072	12.26	2.99
2017	22585214	12.26	2.99
2018	25354910	12.26	2.99
2019	28464262	12.26	2.99
2020	31954924	12.26	2.99
2021	35873656	12.26	2.99
2022	40272955	12.26	2.99
2023	45211754	12.26	2.99
2024	50756214	12.26	2.99
2025	56980607	12.26	2.99

5.1A Economic Implication of 60 percent Debt to GDP Ratio

Debt to GDP ratio stands at 63 percent. To decrease three percent we need higher level of growth; 20.91 percent nominal GDP growth and 10.93 percent real GDP growth, which is close to impossible. Therefore, reducing it one percent per year and achieve the target of 60 percent in three years would be more feasible.

Long run impact on growth deals with two things (i) when the debt to GDP ratio stabilises then there is no need for extra spending on interest payments and growth in national income is used to serve development expenditures instead of debt (ii) the projects which can be beneficial for growth may not set up during the time of debt retirement, thus long run growth may suffer and long run impact will be negative.

Fiscal deficit plays important role in shaping the overall debt positions. Following table shows that with different level of fiscal deficit we can achieve 60 percent level of debt to GDP ratio but accumulation of total debt will be alarming. Currently, almost 100,000 per capita is our debt which will be more than doubles in the year 2025.

Table 10
Total Debt in 2025

Fiscal Deficit	Total Debt
5	78513019
4.5	72529815
4	66964025
3.5	61789256
3	56980607

Moreover, as table shows, for higher the fiscal deficit higher GDP growth is needed to maintain the debt-GDP ratio at 60 percent level, therefore lower the fiscal deficit higher possibility will be to finance development expenditures as well redistribute the impact of growth.

Table 11
GDP Growth Needed to Maintain Debt to GDP Ratio at 60 Percent

Fiscal Deficit	Nominal GDP Growth	Real GDP Growth
5	15.60	6.05
4.5	14.76	5.29
4	13.93	4.52
3.5	13.10	3.76
3	12.26	2.99

6. SUMMARY AND CONCLUSIONS

The purpose of this study is to find out the sufficient condition for debt sustainability in Pakistan. As Pakistan is not in a position to meet the sustainability criteria agreed in the FRDL (2005) and debt has become a very sensitive topic for upcoming years. Previous studies only focus on the necessary condition of debt sustainability accounting approach. But in this study we are finding the sufficient condition which states that debt to GDP ratio remains constant.

Using accounting approach, i.e. considering government budget constraint to derive the necessary and sufficient conditions. Identity derived thus used to calculate sustainability of debt to GDP ratio for the year 2010 to 2025 using threshold levels of 60 percent with different levels of fiscal deficit, i.e., 5 percent, 4.5 percent, 4 percent, 3.5 percent, and 3 percent. Moreover, 9 percent rate of inflation is used to calculate real value of GDP growth, which is in accordance with the (Mubarik, 2005) estimates of threshold level of inflation in Pakistan.

Our results show that for higher fiscal deficit higher GDP growth is needed to maintain the debt-GDP ratio. The total debt will increase by 2025 but we need a growth rate to maintain debt to GDP ratio each year.

Lowering the fiscal deficit may or may not have higher possibility to reduce the debt. Lowering fiscal deficit may imply lower development spending thus lesser chances of payback in future. This may imply that to pay off debt we may need high revenues which creates more distortions and hampered the on-going growth process.

Contrary to the above argument, fiscal deficit comes with higher future interest payments which hurts the growth significantly (Kemal, Siddique, & Qasim, 2017). Therefore, as suggested in Ibid prudent fiscal measures are required to finance development expenditures, while curtailing higher interest payments in futures.

Since the objective of the paper is to measure sufficient condition of debt sustainability when government wants to maintain fiscal deficit at 60 percent of GDP. Nonetheless, it would be good to see if debt to sustainability ratio drops to 50 percent. Albeit to do that we need to reduce our overall debt along with speed up the growth process. Though there is a clear trade-off among the two or fiscal deficit needs to be increased at least by the amount of increase in extra debt repayments each year.

Main concluding points of the study are (i) development expenditures are necessary to pay out future payments, (ii) nominal debt will increase substantially and it could be three to four times compared to current level, even though it is maintained at 60 percent of GDP and (iii) growth is the remedy to sustain debt to GDP ratio.

REFERENCES

- Bilquees, F. (2003) An Analysis of Budget Deficits, Debt Accumulation, and Debt Instability. *The Pakistan Development Review* 42:2, 177–195.
- Cuddington, J. (1996) Analysing the Sustainability of Fiscal Deficits in Developing Countries. Economics Department, Georgetown University.
- Gray, S. (1998) Debt Sustainability and Developing Economies. Available via Internet.
- Hamilton, J. D. and M. A. Flavin, (1986) On the Limitations of Government Borrowing: A Framework for Empirical Testing. *The American Economic Review* 76:4, 808–819.
- Johnson, A. (2001) Key Issues for Analysing Domestic Debt Sustainability. *Debt Relief International* 5.
- Kemal, A. R. (2001) Debt Accumulation and Its Implication for Growth and Poverty. *The Pakistan Development Review* 40.
- Kemal, M., O. Siddique, and A. Qasim (2017) Fiscal Consolidation and Economic Growth: KInsights from the Case of Pakistan. *The Pakistan Development Review* 56:4, 349–368.

- Luporini, V. (1999) Sustainability of the Brazilian Fiscal Policy and Central Bank Independence. *Revista Brasileira De Economia*, 201–226.
- Mahmood, T., S. A. Rauf, and H. K. Ahmad (2009) Public and External Debt Sustainability in Pakistan (1970s–2000s). *Pakistan Economic and Social Review* 47, 243–267.
- Mahmood, T., S. Rauf, and H. U. Rehman (n.d.) Debt Dynamics and its Burden on National Economy: A Case Study of Pakistan (1970-2005).
- Mehmood, T. and S. A. Rauf (2012) Public Debt Sustainability Evidence from Developing Country. *Pakistan Economic and Social Review* 50, 23–40.
- Mehmood, T., S. Rauf, and H. Ahmed (2009) Public and External Debt Sustainability in Pakistan (1970s–2000s). *Pakistan Social and Economic Review* 47:2, 234–267.
- Mubarik, Y. A. (2005) Inflation and Growth: An Estimate of the Threshold Level of Inflation in Pakistan. *SBP-Research Bulletin*.
- Onwioduokit, E. (2012) An Empirical Estimation of the Optimal Level of Fiscal Deficit in the West African Monetary Zone. *Journal of Monetary and Economic Integration* 12:1, 1–33.
- Pasha, H. A., and A. Ghaus-Pasha (2000) Macroeconomic Framework for Debt Management. (Policy Paper No. 19).
- Rais, S. I. and T. Anwar (2012) Public Debt and Economic Growth in Pakistan: A Time Series Analysis from 1972 to 2010. *Academic Research International* 2.
- Trehan, B. and C. Walsh (1988) Common Trends, Intertemporal Budget Balance, and Revenue Smoothing. *Journal of Economics Dynamics and Control*, 425–444.
- Wilcox, D. (1989) The Sustainability of Government Deficits: Implications of the Present-Value Borrowing Constraints. *Journal of Money, Credit, and Banking*, 291–306.
- Contessi, S. (2012, May/June) An Application of Conventional Sovereign Debt Sustainability Analysis to the Current Debt Crises. *Federal Reserve Bank of St. Louis Review*, 197–220.