Economics Bulletin

Volume 44, Issue 4

Short-term debt is not bad for economic growth. Really?: Empirical evidence from developing countries

Yongseung Han
University of North Georgia

Myeong Hwan Kim
Purdue University Fort Wayne

Abstract

This study examines the impact of debt maturity on the relationship between external debt and economic growth. First, we established the stylized facts on the external debt, the share of short-term debt, and economic growth – 1) there is an inverse correlation between the ratio of total external debt to GDP and the share of short-term debt, 2) the lower the debt-to-GDP ratio, the higher the economic growth, as measured by the GDP per capita growth rate, and 3) only when the debt-to-GDP ratio is low, the higher the proportion of short-term debt, the higher the economic growth. Then, we estimated the impact of short-term debt on economic growth in a different specification to find that the GDP per capita growth rate drops by 2.4% at the median value of the debt-to-GDP ratio (55%). However, the exact magnitude of the decline depends on the share of short-term debt. Thanks to the positive effect of short-term debt, GDP per capita growth can be positive when the debt-to-GDP ratio is very low, e.g., below 20%.

Citation: Yongseung Han and Myeong Hwan Kim, (2024) "Short-term debt is not bad for economic growth. Really?: Empirical evidence from developing countries", *Economics Bulletin*, Volume 44, Issue 4, pages 1584-1596
Contact: Yongseung Han - yongseung.han@ung.edu, Myeong Hwan Kim - kimm@pfw.edu.
Submitted: September 02, 2024. **Published:** December 30, 2024.

Economics Bulletin

Volume 44, Issue 4

Short-term debt is not bad for economic growth. Really?: Empirical evidence from developing countries

Yongseung Han
University of North Georgia

Myeong Hwan Kim
Purdue University Fort Wayne

Abstract

This study examines the impact of debt maturity on the relationship between external debt and economic growth. First, we established the stylized facts on the external debt, the share of short-term debt, and economic growth – 1) there is an inverse correlation between the ratio of total external debt to GDP and the share of short-term debt, 2) the lower the debt-to-GDP ratio, the higher the economic growth, as measured by the GDP per capita growth rate, and 3) only when the debt-to-GDP ratio is low, the higher the proportion of short-term debt, the higher the economic growth. Then, we estimated the impact of short-term debt on economic growth in a different specification to find that the GDP per capita growth rate drops by 2.4% at the median value of the debt-to-GDP ratio (55%). However, the exact magnitude of the decline depends on the share of short-term debt. Thanks to the positive effect of short-term debt, GDP per capita growth can be positive when the debt-to-GDP ratio is very low, e.g., below 20%.

Citation: Yongseung Han and Myeong Hwan Kim, (2024) "Short-term debt is not bad for economic growth. Really?: Empirical evidence from developing countries", *Economics Bulletin*, Volume 44, Issue 4, pages 1584-1596
Contact: Yongseung Han - yongseung.han@ung.edu, Myeong Hwan Kim - kimm@pfw.edu.
Submitted: September 02, 2024. **Published:** December 30, 2024.

1. Introduction

The external debt of a country, which refers to the money owed to nonresidents and is repayable in currency, goods, or services (as defined by the World Bank), can have an impact on economic growth. If managed properly, external debt can increase domestic savings in the long term, thereby promoting investment and economic growth (Avramovich, 1964). Developing countries often lack sufficient savings (Chenery and Strout, 1966), so they rely on debt to make necessary investments for economic growth. However, according to the "debt overhang" theory, once debt exceeds a certain threshold, it can hinder investment and economic growth (Krugman, 1988; Sachs, 1989). As a result, whether external debt has a positive or negative impact on economic growth is a matter of empirical investigation. Many empirical studies support the negative relationship between external debt and economic growth (Clements and Krolzig, 2003; Patillo et al., 2004; Siddique et al., 2016; among others[1]).

Despite numerous studies on the relationship between external debt and economic growth, relatively little attention has been given to the role of debt maturity structure in this relationship. This paper aims to investigate the impact of debt maturity on the relationship between external debt and economic growth, with a specific focus on the influence of short-term debt on economic growth. To achieve this, the paper will analyze data on external debt and its short-term ratio in developing countries, initially establishing a stylized fact, and then estimating the role of short-term debt in economic growth.

2. Literature Review

There has been much debate about the connection between external debt and economic growth. Various studies have looked into whether external debt inhibits economic growth and how it affects growth if it does. While most studies support the "debt overhang" theory that external debt has a negative impact on economic growth, some have suggested that the relationship might follow an inverted U-shaped curve, known as the debt-Laffer curve. The following summary outlines what previous studies have discovered about this relationship.

First, the relationship is empirically negative – external debt hinders economic growth. The earliest studies, among others, which focused on the impact of external debt on investment as the "debt overhang" theory indicates for the channel of the relationship, were made by Greene and Villanueva (1991) and Desphande (1997). Greene and Villanueva (1991), using the 23 developing countries during the period of 1975-1987, found that an increase in the previous year's debt-to-gross domestic product (GDP) lowers private investment. However, they also found that the impact of debt on economic growth is larger when the debt-to-GDP ratio is high. In comparison, Desphande (1997), by analyzing 13 highly indebted countries from 1971 to 1991, found the same negative impact of external debt on investment but showed that there was not much difference in the magnitude of the negative impact between the higher-debt period (1983-1991) and lower-debt period (1971-1982). Desphande (1997) concluded that the difference in investment between the two different periods is due to some other effect, e.g., the time effect.

Recent studies have directly analyzed the relationship between external debt and economic growth (e.g., Al Kharusi and Ada, 2018; Abdelaziz et al., 2019; etc.) and have identified channels

[1] In addition to these studies that used panel data estimation, many studies on individual countries used a time series analysis.

other than investment suggested by the "debt overhang" theory[2] (e.g., Qureshi and Liaqat, 2020; Hassan and Meyer, 2021; etc.). Al Kharusi and Ada (2018) used time series data for Oman and found that a 1% increase in the debt-to-GDP ratio is associated with a 0.04% decrease in Oman's GDP growth. Abdelaziz et al. (2019) studied 23 low-income countries during the period of 2000-2017 and estimated that a 1% increase in the ratio of external debt to gross national income (GNI) decreased the growth rate of GDP per capita by 0.03%. Qureshi and Liaqat (2020) discovered that savings are an important channel through which external debt impacts economic growth, while Hassan and Meyer (2021) found that total factor productivity is also an important transmission channel.

On the other hand, there are some studies, albeit a few, that argue that the connection between external debt and economic growth is somewhat ambiguous or even positive. Cohen (1993) demonstrated that a high level of debt was not an absolute predictor of low investment in the least developed countries. He posited that it was the actual debt service, rather than the level of debt, that crowded out investment. Through an individual country case study, Mohamed (2018) illustrated that external debt made a positive contribution to the Sudanese economy. Additionally, Demikha et al. (2021) also demonstrated the positive impact of external debt on the Ottoman Empire in the early 20th century.

The research interest in the relationship between external debt and economic growth has shifted to investigate if the relationship is non-linear, given the conflicting theories and empirical results. Clements et al. (2003) estimated a debt-Laffer curve, as argued by Elbadawi et al. (1997), to demonstrate that external debt begins to have a negative effect on economic growth after it reaches around 50% of GDP in low-income countries. Additionally, Pattillo et al. (2004) showed that the relationship is positive but insignificant at low levels of debt, while it becomes significantly negative at high levels. Furthermore, Munir and Mehmood (2018) demonstrated an inverted U-shaped relationship between external debt and economic growth in South Asian countries from 1990 to 2013.

3. Data and Stylized Facts

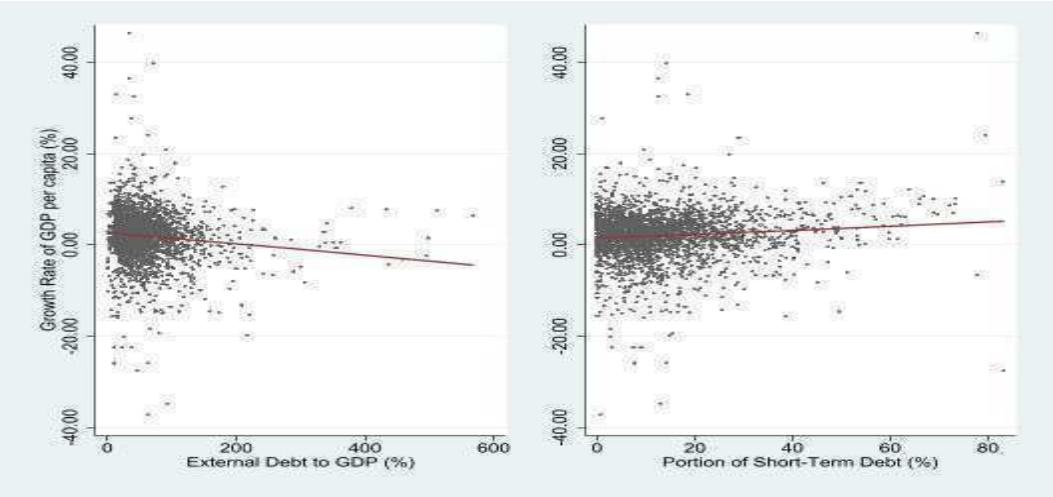
3.1 Data

We have gathered yearly data on external debt from the World Bank's Data Bank (https://databank.worldbank.org), wherever data was accessible.[3] Our dataset consists of 2,837 observations from 94 countries covering the period from 1972 to 2021, and it represents unbalanced panel data. In Figure 1, all the observations of external debt and the share of short-term debt with an original maturity of one year or less are depicted. The left panel illustrates that the simple relationship between the growth rate of GDP per capita and the ratio of external debt to GDP is negative, while the right panel shows that the simple relationship between the proportion of short-term debt and the growth rate of GDP per capita is positive.

[2] It describes a situation in which a country's debt exceeds its future ability to repay.

[3] All other variables, e.g., GDP Per Capita Growth Rate, Population growth, etc., are also collected from the World Bank. Please see Appendix for the variables.

Figure 1: Debt to GDP Ratio and the Share of a Short-Term Debt with Economic Growth



3.2 Stylized Facts on the External Debt of the Developing Countries

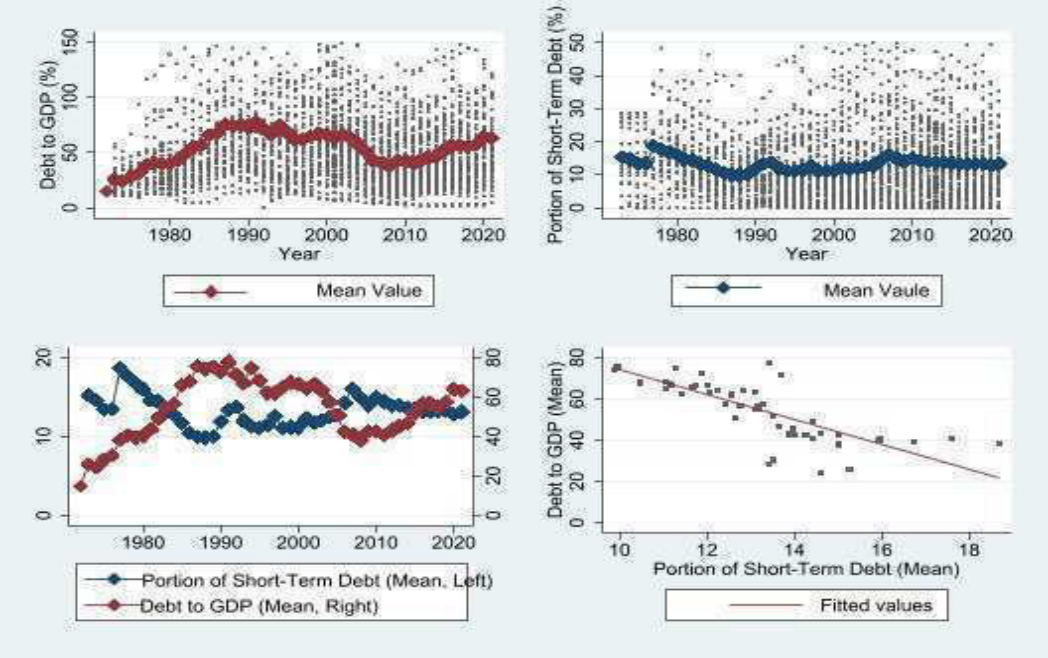
The analysis reveals the following stylized facts about the external debt of developing countries and the share of short-term debt.

Stylized Facts:

1. There is an inverse correlation between the ratio of total external debt to GDP and the share of short-term debt.
2. A lower debt-to-GDP ratio is associated with higher economic growth, as measured by the GDP per capita growth rate.
3. Economic growth is higher only when the debt-to-GDP ratio is low, and the proportion of short-term debt is higher.

The stylized fact 1 is based on information from Figure 2. The upper panel of Figure 1 illustrates the time trend of the external debt-to-GDP ratio and the share of short-term debt. Initially, the average value of the external debt-to-GDP ratio increased in the 1970s and 1980s, leading to a debt crisis in the highly indebted poor countries (Siddique et al., 2016). Subsequently, the debt-to-GDP ratio decreased during the 1990s and 2000s before starting to increase again in 2010. On the other hand, the average ratio of short-term debt shows an opposite trend to the debt-to-GDP ratio. Currently, the ratio of short-term debt has been gradually declining since 2010. This opposing trend is clearly evident when the two trend lines in the bottom panel are combined. As the debt-to-GDP ratio rises, the share of short-term debt decreases, demonstrating a negative correlation between the two values.

Figure 2: Time Trends of the Debt to GDP Ratio and the Share of a Short-Term Debt



The stylized facts 2 and 3 are based on the data from Table 1. Fact 2 shows that countries with a debt-to-GDP ratio below the average (55%) have a higher GDP per capita growth rate (2.53%) compared to countries with a ratio above the average (1.45%). This difference holds regardless of the proportion of short-term debt. Fact 3 indicates that when the proportion of short-term debt is above the average, the GDP per capita growth rate is 3.16%, compared to 2.11% when the proportion of short-term debt is below average. However, this difference only occurs when the debt-to-GDP ratio is low. When the debt-to-GDP ratio is high, this difference disappears.

Table 1: Data Analysis on GDP Per Capita Growth, Debt to GDP and Short-Term Debt Ratio

			Debt to GDP Ratio (%)		
			Below Average (55%)	Above Average (55%)	Total
Portion of Short-Term Debt (%)	Below Average (13%)	GDP PC Growth (%)	2.11	1.46	1.84
		Debt to GDP (%)	31.76	95.86	58.03
		Short term Debt Ratio (%)	5.94	6.31	6.09
	Above Average (13%)	GDP PC Growth (%)	3.16	1.42	2.54
		Debt to GDP (%)	29.75	91.92	51.81
		Short term Debt Ratio (%)	24.85	23.5	24.37
	Total	GDP PC Growth (%)	2.53	1.45	2.11
		Debt to GDP (%)	30.95	94.49	55.65
		Short term Debt Ratio (%)	13.57	12.31	13.08

4. Estimation Methodology

We consider the following single-equation model[4] to analyze the empirical relationship between economic growth and external debt as employed in Woo and Kumar (2015), Munir and Mehmood (2018), etc.

$$GDPPCGR_{it} = \beta_1 DtoGDP_{it} + \mathbf{XB} + v_i + \varepsilon_{it} \quad (1a)$$

where *GDPPCGR* is the growth rate of GDP per capita and *DtoGDP* is the ratio of external debt to GDP and β_1 is the coefficient to *DtoGDP*. **X** in the equation (1a) denotes a vector of variables indicating socio-economic factors, e.g., population, investment, the year of schooling, trade, etc., and **B** is the vector of the corresponding parameters while v_i is either an unobserved state-specific variable or time fixed variable and ε_{it} denotes idiosyncratic errors to cope with panel data.

Another variant model, as employed in Hassan and Meyer (2021) and Le and Phan (2022), is that we investigate the empirical relationship in the framework of economic growth literature where conditional convergence is regarded as important. As a way to structure the conditional convergence, we add the lagged value of the dependent variable to the explanatory ones.

$$GDPPCGR_{it} = \beta_0 L.GDPPCGR_{it} + \beta_1 DtoGDP_{it} + \mathbf{XB} + v_i + \varepsilon_{it} \quad (1b)$$

where *L.GDPPCGR* is the lagged value of the dependent variable and β_0 is the coefficient of the lagged variable.

Given two basic models, we investigate two research questions. The first one is to see whether the empirical relationship is non-linear or not, and the second one is to figure out how the share of short-term debt plays a role in the empirical relationship. For the first question, we consider the following variations in the single-equation model.

$$GDPPCGR_{it} = \beta_1 DtoGDP_{it} + \beta_2 DtoGDP_{it}^2 + \mathbf{XB} + v_i + \varepsilon_{it} \quad (2a)$$

and

$$GDPPCGR_{it} = \beta_0 L.GDPPCGR_{it} + \beta_1 DtoGDP_{it} + \beta_2 DtoGDP_{it}^2 + \mathbf{XB} + v_i + \varepsilon_{it} \quad (2b)$$

where $DtoGDP^2$ is the square of *DtoGDP* and β_2 is the corresponding coefficient. For the second question, we consider the

$$GDPPCGR_{it} = \beta_1 DtoGDP_{it} + \beta_2 DtoGDP_{it}^2 + \beta_3 SDRATIO + \mathbf{XB} + v_i + \varepsilon_{it} \quad (3a)$$

and

[4] If our objective is to analyze the channels of the impact of external debt on economic growth, we would consider a multiple-equations model that can be estimated by either seemingly unrelated regressions (SUR) or a simultaneous equations model (SEM) as investigated in Beyene and Kotosz (2023) and Abdelaziz et al. (2019).

$$GDPPCGR_{it} = \beta_0 L.GDPPCGR_{it} + \beta_1 DtoGDP_{it} + \beta_2 DtoGDP_{it}^2 + \beta_3 SDRATIO + \mathbf{XB} + v_i + \varepsilon_{it} \quad (3b)$$

where SDRATIO is the share of short-term debt and β_3 is the corresponding coefficient.

To estimate (1a), (2a) and (3a), we use 3 basic regression methods for static panel data – pooled OLS, fixed-effects, and random-effects estimation. By performing some statistical tests, e.g., Breusch-Pagan test, Hausman test, etc., we will choose only one regression method and infer the research findings. Together with this static panel estimation, we estimate (1b), (2b) and (3b) by dynamic panel estimation developed by Arellano and Bond (1991).

5. Empirical Results

We conducted regressions to explore our research questions using a different specification outlined in the preceding section. This involved three comparisons. Firstly, we investigated whether the debt to GDP ratio (*DtoGDP*) follows a linear or quadratic pattern. Secondly, we examined whether the growth-related variables are controlled or not. Lastly, we looked at whether a ratio of short-term debt (*SDRATIO*) is included in the analysis.

In Table 2, we present the results of the fixed effects panel estimation using three comparisons in the specification. The fixed effects estimation is preferred because we conducted several tests. First, we tested for a year effect and included year effects in the estimation. Then, we carried out the Breusch-Pagan test to check if the variance of the country-specific effects is 0. We found that the variance is not 0, indicating that the random effects estimation is superior to OLS. Subsequently, we conducted the Hausman test and rejected the null hypothesis of no correlation between the errors and the explanatory variables. Therefore, the fixed effects estimation remains consistent.

In the fixed effects estimation, it was found that the debt-to-GDP ratio (*DtoGDP*) has a negative effect on economic growth, as indicated by the GDP per capita growth rate (*GDPPCGR*). It was also observed that the quadratic form of the debt-to-GDP ratio (DtoGDP2) has minimal effect on economic growth. Specifically, economic growth decreases by 0.1 to 0.2 percentage points when the debt-to-GDP ratio increases by 10 percentage points. Additionally, the study found that controlling for growth-related factors does not significantly impact the effect of the debt ratio on economic growth. When the ratio of short-term debt is considered, it was noted that short-term debt (*SDRATIO*) has a statistically significant positive impact on economic growth, while the debt-to-GDP ratio still exhibits a negative effect. However, it is important to note that the combined effect of the short-term debt ratio (*SDRATIO*) and the debt-to-GDP ratio (*DtoGDP*) seems to be positive, indicating that the overall impact of debt is to promote economic growth.

Because of this aspect, we suspect that the estimate is subject to autocorrelation. For this reason, we performed the Wooldridge test to find that there is autocorrelation in the errors. The parameters of autocorrelation are 0.18~0.21. Table 3 shows the fixed effects estimation with autocorrelation. We find that the statistical significance of the debt-to-GDP ratio (*DtoGDP*) weakens significantly, and the share of short-term debt (*SDRATIO*) is no longer statistically significant. From this result, we cannot reliably say that external debt affects economic growth.

Table 2: Regression Results from the Fixed Effects Estimation

Dependent Variable: *GDPPCGR*	When Short-Term Debt is not Considered (1)	(2)	(3)	(4)	When Short-Term Debt is Considered (5)	(6)	(7)	(8)
DtoGDP	-0.011***	-0.011***	-0.024***	-0.011*	-0.011***	-0.012***	-0.024***	-0.011*
	(0.003)	(0.003)	(0.005)	(.006)	(0.003)	(0.003)	(0.005)	(0.006)
DtoGDP²			0.000***	0.000			0.000***	0.000
			(0.000)	(0.000)			(0.000)	(0.000)
SDRATIO					0.042***	0.021*	0.042***	0.021*
					(0.010)	(0.011)	(0.010)	(0.011)
Population		-0.154		-0.155		-0.136		-0.137
		(0.142)		(0.142)		(0.142)		(0.143)
Investment		0.113***		0.113***		0.112***		0.112***
		(0.017)		(0.017)		(0.017)		(0.017)
Schooling		0.006		0.006		0.004		0.003
		(0.012)		(0.012)		(0.012)		(0.013)
Trade to GDP		0.031***		0.031***		0.032***		0.032***
		(0.006)		(0.006)		(0.006)		(0.006)
Constant	1.335	0.739	1.555	0.734	1.157	0.426	1.376	0.418
	(4.566)	(1.21)	(4.559)	(1.217)	(4.553)	(1.221)	(4.546)	(1.228)
Within R^2	0.157	0.212	0.160	0.212	0.162	0.213	0.165	0.213
Year Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Test Statistics	$F_{49,2691}$=9.20	$F_{48,2235}$=8.99	$F_{49,2690}$=9.13	$F_{48,2234}$=8.99	$F_{49,2690}$=9.16	$F_{48,2234}$=8.95	$F_{49,2689}$=9.13	$F_{48,2233}$=8.94
Breusch-Pagan Test Statistics	χ^2_1=427.97	χ^2_1=157.18	χ^2_1=399.75	χ^2_1=157.59	χ^2_1=376.44	χ^2_1=154.53	χ^2_1=355.14	χ^2_1=155.20
Hausman Test Statistics	χ^2_{39}=61.26	χ^2_{52}=77.87	χ^2_{40}=62.48	χ^2_{53}=86.10	χ^2_{40}=62.34	χ^2_{53}=78.24	χ^2_{41}=63.79	χ^2_{54}=89.52

Standard errors are in parentheses.
*** $p<.01$, ** $p<.05$, * $p<.1$

Table 3: Regression Results from the Fixed Effects Estimation with Autocorrelation

Dependent Variable: *GDPPCGR*	When Short-Term Debt is not Considered (1)	(2)	(3)	(4)	When Short-Term Debt is Considered (5)	(6)	(7)	(8)
DtoGDP	-0.011	-0.011**	-0.024**	-0.011	-0.011	-0.012**	-0.024**	-0.011
	(0.008)	(0.006)	(0.010)	(0.010)	(0.007)	(0.005)	(0.010)	(0.010)
$DtoGDP^2$			0.000*	0.000			0.000*	0.000
			(0.000)	(0.000)			(0.000)	(0.000)
SDRATIO					0.042	0.021	0.042	0.021
					(0.032)	(0.022)	(0.031)	(0.022)
Population		-0.154		-0.155		-0.136		-0.137
		(0.253)		(0.252)		(0.254)		(0.253)
Investment		0.113***		0.113***		0.112***		0.112***
		(0.030)		(0.030)		(0.031)		(0.030)
Schooling		0.006		0.006		0.004		0.003
		(0.015)		(0.015)		(0.015)		(0.015)
Trade to GDP		0.031***		0.031***		0.032***		0.032***
		(0.011)		(0.011)		(0.011)		(0.011)
Constant	1.335***	0.739	1.555***	0.734	1.157***	0.426	1.376***	0.418
	(0.234)	(1.305)	(0.244)	(1.285)	(0.214)	(1.348)	(.238)	(1.333)
Year Effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Within R^2	0.157	0.212	0.160	0.212	0.162	0.213	0.165	0.213
Autocorrelation Parameter ρ	0.182	0.210	0.186	0.210	0.186	0.213	0.190	0.213
Wooldridge Autocorrelation Test Statistics	$F_{1,93}$=6.14	$F_{1,92}$=19.90	$F_{1,93}$=7.91	$F_{1,92}$=21.91	$F_{1,93}$=6.18	$F_{1,92}$=20.79	$F_{1,93}$=8.09	$F_{1,92}$=23.05

Standard errors are in parentheses.
*** $p<.01$, ** $p<.05$, * $p<.1$

Based on these findings, we suggest that the influence of debt on economic growth might persist for several years. It's logical to assume that previous debt has an impact on current economic growth because it takes a long time to repay a debt. To account for this, we employed dynamic panel estimation to include the lagged value of the dependent variable (*L.GDPPCGR*) in the explanatory variables. The results of the estimation are presented in Table 4. Here's what we discovered.

First, when the debt-to-GDP ratio increases by 10%pt, the growth rate of GDP per capita decreases by 0.24 to 0.63%pt. The impact of the debt-to-GDP ratio on economic growth is more pronounced when growth-related factors are properly controlled for, and when the quadratic form of the ratio is considered. However, including short-term debt does not affect the impact of the debt-to-GDP ratio on economic growth.

Second, the effect of short-term debt (*SDRATIO*) on economic growth is positive. The growth rate of GDP per capita increases by 0.32~0.45%pt when the proportion of short-term debt increases by 10%pt under the ceteris paribus assumption on the debt-to-GDP ratio. That is, if the debt-to-GDP ratio remains the same, switching from long-term to short-term debt is growth-enhancing. Given the study by Patillo et al. (2004), which shows that investment is the primary channel through which external debt leads to economic growth, it is not difficult to assume that a short-term debt typically has lower interest rates and thus helps to increase the rate of return on investment and thus economic growth.

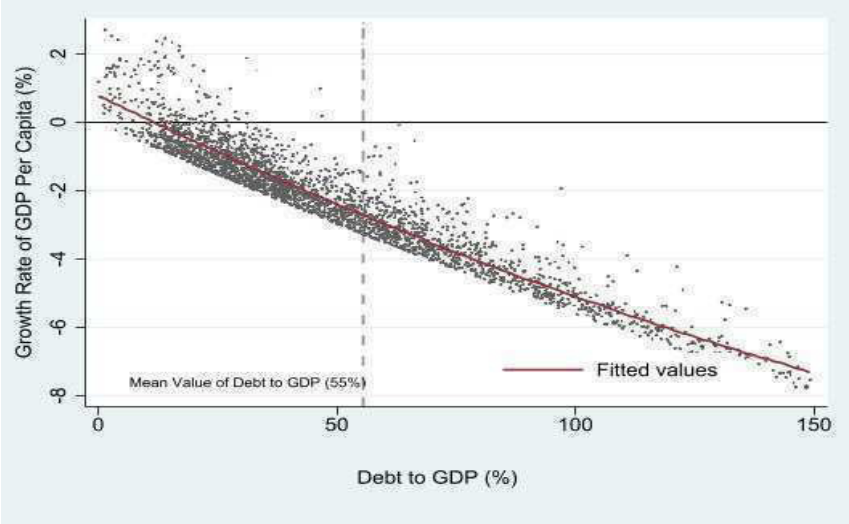
Despite the positive effect of a shorter debt maturity, the overall effect of debt is still negative. When these two effects are combined, economic growth is hampered by 0.18~0.22%pt. Taking the specification (8) in Table 4 as our baseline estimation, the effect of external debt on economic growth can be shown in Figure 3. At the median value of the debt-to-GDP ratio (55%), the GDP per capita growth rate is lower by about 2.4%, other things being equal. However, the exact magnitude of the decline depends on the share of short-term debt. Thus, the decline in the GDP per capita growth rate is smaller when the proportion of short-term debt is high, while it is larger when the proportion is low. Therefore, thanks to the positive effect of short-term debt, GDP per capita growth can be positive when the debt-to-GDP ratio is very low, e.g., below 20%.

Table 4: Regression Results from the Dynamic Panel Estimation

Dependent Variable: *GDPPCGR*	When Short-Term Debt is not Considered				When Short-Term Debt is Considered			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
L.GDPPCGR	0.263***	0.077***	0.255***	0.075***	0.258***	0.073***	0.251***	0.071***
	(0.019)	(0.022)	(0.019)	(0.022)	(0.019)	(0.022)	(0.019)	(0.022)
DtoGDP	-0.024***	-0.046***	-0.046***	-0.063***	-0.023***	-0.046***	-0.045***	-0.063***
	(0.004)	(0.005)	(0.007)	(0.010)	(0.004)	(0.005)	(0.007)	(0.010)
DtoGDP²			0.000***	0.000*			0.000***	0.000*
			(0.000)	(0.000)			(0.000)	(0.000)
SDRATIO					0.035***	0.045***	0.032**	0.045***
					(0.013)	(0.016)	(0.013)	(0.016)
Population		-0.533***		-0.526***		-0.531***		-0.523***
		(0.181)		(0.180)		(0.180)		(0.180)
Investment		0.040*		0.038		0.038		0.036
		(0.024)		(0.024)		(0.024)		(0.024)
Schooling		-0.048***		-0.048***		-0.057***		-0.057***
		(0.015)		(0.015)		(0.015)		(0.015)
Trade to GDP		0.075***		0.074***		0.074***		0.074***
		(0.010)		(0.010)		(0.010)		(0.010)
Constant	2.935***	0.554	3.815***	1.189	2.456***	0.227	3.341***	0.866
	(0.229)	(0.896)	(0.318)	(0.957)	(0.294)	(0.901)	(0.374)	(0.961)

Standard errors are in parentheses.
*** *p<.01,* ** *p<.05,* * *p<.1*

Figure 3: Estimated Values of GDP Per Capita Growth Rate on the External Debt



6. Concluding Remarks

This research analyzed how the maturity of debt affects the relationship between external debt and economic growth. The study used data from the World Bank to highlight three key findings: 1) There is a negative connection between the total external debt to GDP ratio and the proportion of short-term debt. 2) Lower debt-to-GDP ratios are associated with higher economic growth, as indicated by the GDP per capita growth rate. 3) Only when the debt-to-GDP ratio is low, a higher proportion of short-term debt is linked to higher economic growth.

Then, we estimated the impact of short-term debt on economic growth in a different specification in which the quadratic form of the debt-to-GDP ratio, growth-related control variables, and the proportion of short-term debt are compared. Given the fact that it may take several years to pay off debts, we chose a dynamic panel estimation with the control variables and the share of short-term debt as our baseline estimation and found that the GDP per capita growth rate drops by 2.4% at the median value of the debt-to-GDP ratio (55%). However, the exact magnitude of the decline depends on the share of short-term debt. Thanks to the positive effect of short-term debt, GDP per capita growth can be positive when the debt-to-GDP ratio is very low, e.g., below 20%.

References

Abdelaziz, H., Rim, B. and Majdi, K. (2019) "External Debt, Investment, and Economic Growth." *Journal of Economic Integration* 34(4), 725-745.

Al Kharusi, S. and Ada, M. S. (2018) "External Debt and Economic Growth: The Case of Emerging Economy." *Journal of Economic Integration* 33(1), 1141-1157.

Avramovich, D. (1964) *Economic Growth and External Debt.* Baltimore: The Johns Hopkins Press.

Beyene, S. D. and Kotosz, B. (2021) "The Impact of External Debt on Total Factor Productivity and Growth in HIPC: Non-linear Regression Approaches." *International Journal of Development Issues* 21(2), 173-194.

Clements, B., Bhattacharya, R. and Nguyen, T. (2003) *External Debt, Public Investment, and Growth in Low-Income Countries*. Washington: IMF, IMF Working Paper No. 249, WP/03/249.
Cohen, D. (2013) "Low Investment and Large LDC Debt in the 1980s." *American Economic Review* 83(3), 437-449.
Demikha, L., Shaharuddin, A. B. and Ridzuan, A. R. (2021) "The Effects of Foreign Direct Investment, External Debts and Trade Openness on Economic Growth: Evidence from the Ottoman Empire 1881-1912." *International Journal of Economics and Business Research* 21(3), 387-410.
Deshpande, A. (1997) "The Debt Overhang and the Disincentive to Invest." *Journal of Development Economics* 52(1), 169-187.
Elbadawi, I. A., Ndulu, B. J. and Ndung'u, N. (1997) "Debt Overhang and Economic Growth in Sub-Saharan Africa," in *External Finance for Low-Income Countries*, ed. Iqbal, Z. and Kanbur, R. USA: International Monetary Fund.
Greene, J. A. and Villanueva, D. (1991) *Private Investment in Developing Countries.* Washington: IMF, IMF Staff Papers 38:1.
Hassan, A. and Meyer, D. (2021) "Exploring the Channels of Transmission between External Debt and Economic Growth: Evidence from Sub-Saharan African Countries." *Economies* 9(2), 50.
Krugman, P. (1988) "Financing vs. Forgiving a Debt Overhang: Some Analytical Notes." *Journal of Development Economics* 29(3), 253-268.
Le, T. H. and Phan, L. T. T. (2022) "Examining the Non-Linear Impact of External Debt on Economic Convergence." *Journal of Economic Integration* 37(3), 377-422.
Mohamed, E. S. E. (2018) "Effects of External Debt on Economic Growth of Sudan: Empirical Analysis (1969-2015)." *Journal of Economic Cooperation and Development* 39(1), 39-62.
Pattillo, C., Poirson, H. and Ricci, L. (2004) *What Are the Channels Through Which External Debt Affects Growth?* Washington: IMF, IMF Working Paper No. 15, WP/04/15.
Qureshi, I. and Liaqat, Z. (2020) "The Long-term Consequences of External Debt: Revisiting the Evidence and Inspecting the Mechanism Using Panel VARs." *Journal of Macroeconomics* 63(March), 103184.
Sachs, J. (1989) "The Debt Overhang of Developing Countries." in *Debt Stabilization and Development: Essays in Memory of Carlos Diaz Alejandro*, ed. Guillermo A. Calvo, Ronald Findlay, Pentti Kouri and Jorge Braga De Macedo, 80-102. Oxford: Basic Blackwell.
Siddique, A., Selvanathan, E. A. and Selvanathan, S. (2016) "The Impact of External Debt on Growth: Evidence from Highly Indebted Poor Countries." *Journal of Policy Modeling* 38(5), 874-894.

Appendix: Descriptive Statistics

Variable	Unit	Mean	Std. Dev.	Min	Max
Debt to GDP Ratio (*DtoGDP*)	%	55.65	46.62	.14	567.42
Short-term Debt Ratio (*SDRatio*)	%	13.08	11.78	0	83.15
Population Growth (*Population*)	%	1.76	1.31	-6.85	11.79
Investment Ratio (*Investment*)	%	22.81	8.36	2.78	93.55
Schooling (*Schooling*)	%	20.95	20.63	.21	125.76
Trade to GDP Ratio (*Trade to GDP*)	%	68.40	35.29	8.93	274.97
Real GDP Per Capita Growth (*GDPPCG*)	%	2.11	5.13	-37.22	46.47