

# Analysis of the Relationship between External Debt Sustainability and Economic Growth: A Case of BRICS-TM Countries

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## ABSTRACT

The examination of the relationship between external debt sustainability and economic growth has gained significant importance due to the expansionary fiscal and monetary policies implemented for some reasons including the Covid-19 pandemic, the energy crisis resulting from the Russia-Ukraine war, the breach of borrowing limits in certain major economies, and natural disasters. The significance of this examination arises from the vulnerable financial and economic structures of the examined countries. This study focuses on the relationship between external debt sustainability and economic growth in BRICS-TM countries through models based on annual data for the period 2001-2021. The cointegration relationship between the variables was examined using the panel ECM method. Furthermore, the panel AMG test was utilized to estimate the cointegration coefficients on both the panel and country basis. The test results indicated that external debt sustainability has a moderate impact on economic growth. The economy with the highest impact on economic growth by external debt sustainability was found to be China with a score of 1.10, whereas Turkey was the economy with the weakest impact with a score of 0.325.

**Keywords:** Economic Growth, External Debt Sustainability, Selected Economic variables, BRICS-TM Countries, Panel Data Analysis.

**Jel Codes:** E<sub>6</sub>, G<sub>0</sub>, O<sub>1</sub>

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## I. INTRODUCTION

Certain reasons such as the Covid-19 pandemic that emerged at the end of 2019 in China, the energy crisis brought by the Russia-Ukraine war, and the exceedance of the borrowing cap in some major economies have had great consequences on global economies. The duration of the quarantine period, coupled with global supply chain issues and energy problems, initially led to significant declines in consumption, production, growth, and employment. In response to the crises, economic decision-makers and policymakers implemented expansionary fiscal and monetary policies. Expansionary monetary policies implemented by developed countries in the global market led to a high amount of liquidity and capital inflows in the capital market for the first time after the 2008 global crisis. And the financial system has been provided to support the economy with money transfer mechanisms. Furthermore, in addition, the expansionary fiscal policies contributed to sustaining investment and consumption expenditures. While these policies had a positive impact on the economic development of the countries, they also had negative implications for certain macroeconomic variables, particularly foreign borrowing.

Central banks strive to achieve price stability and target specific inflation levels. However, in certain circumstances, public deficits are financed through debt rather than seigniorage revenues. Consequently, investment and consumption expenditures, deficits in public budgets, and private sector savings are financed through external borrowing. While trying to keep inflation under control with these policies, the impact of high-interest rates on public debts has become significant, particularly concerning private sector investments and the sustainability of debts. Consequently, the challenges of high borrowing, budget deficits, and inflation have emerged as primary issues for global economies, stemming from the expansionary fiscal and monetary policies implemented post-crises. Additionally, the timing of implementing these policies to mitigate the effects of crises has become a matter of preference for both policymakers and economic decision-makers. For instance, the question of whether the implemented stability policies will potentially trigger a larger global crisis in the future remains a topic of discussion. To ensure a higher level of prosperity for future generations, it is indeed essential that borrowings generate an income increase in the future that outweighs the burden of interest. Otherwise, it can

result in reduced growth, investment, and consumption to pay the debts and interests which in turn leads to a loss of welfare for future generations.

The high debt burden faced by BRICS-TM (Brazil, Russia, India, China, South Africa, Turkey, and Mexico) countries poses a significant risk to the sustainability of their external debt. The review of relevant studies indicated that the examination of debt sustainability often revolved around the public debt/GDP or budget deficit. Indeed, in addition to public deficits, it is crucial to examine variables related to production processes and foreign trade that can impact the accumulation or reduction of foreign debt. Therefore, the current study examines the effects of the interrelations between the foreign trade balance, net current transfers, total foreign debt, Libor (interest cost of total debt), and CDS (Credit Default Swap) risk premium variables on economic growth -which are considered essential components of foreign debt sustainability- based on the annual data from BRICS-TM countries covering the period from 2001 to 2021. The CDS risk premium variable particularly holds significant importance for developing countries within the analyzed sample. This is because the weaker macroeconomic structure of these countries often results in higher borrowing interest rates.

This study differs from other studies in the literature for several reasons. Firstly, it is expected to make a unique contribution by focusing specifically on the BRICS-TM countries and utilizing the most up-to-date data available. Secondly, the examination of external debt sustainability in BRICS-TM developing countries holds particular significance due to their structural economic fragility, despite their globalized financial and foreign trade integration. The failure of these countries to pay their debts is likely to trigger a crisis by affecting the global economy. Finally, the examination of the foreign trade balance in this study provides insights into the foreign exchange creation capacity of the private sector. Indeed, the inclusion of variables that increase and decrease foreign debt in the analysis allows for a comprehensive examination of the balance or imbalance between investments and savings in both the public and private sectors and to reach more detailed findings regarding the impact of these variables on economic growth. Accordingly, in the subsequent sections of the study, the conceptual framework related to the relationship between external debt sustainability and economic growth was explored. And the findings, derived from the literature review and econometric analysis, were discussed and some recommendations were presented.

## CONCEPTUAL FRAMEWORK

In macroeconomic policies, the issue of debt is theoretically examined in terms of public debt and the associated budget deficit. For example, in research conducted by credit assessment institutions that prepare macroeconomic stability reports on countries, the analysis generally focuses on the public savings deficits and debts of countries. According to the Maastricht Agreement, which was signed in the European Union in 1992 in the context of macroeconomic stability, countries are expected to maintain a public debt-to-national income ratio below 60% (Maastricht Treaty, 1992). However, the financial liberalization that followed the adoption of liberal economic policies allowed non-public financial institutions to engage in borrowing, leading to an increase in borrowing rates for the private sector. Therefore, including the proportion of external debt to national income in research related to the sustainability of external debt is believed to make such studies more comprehensive and inclusive.

The primary reasons for economies to engage in borrowing are the deficits in savings both in the public budget and the private sector. In this regard, the calculation of national income using the expenditure method is expressed as follows (Duman, 2018):

$$(Y = C + I + G + (X - M)) \quad \text{Eq. 1.}$$

Where  $Y$  represents total production,  $C$  represents private consumption,  $I$  represents private investments, and  $G$  represents public expenditures. If  $C+I+G$ , which represents total expenditures and is denoted as  $(A)$ , is put on the left side, the following equation is obtained:

$$(Y - A = X - M)$$

On the right side of the equation, total exports ( $X$ ) and imports ( $M$ ) are the two most significant components of the current account balance, and the difference between them represents net foreign trade. From here, public and private sector savings can be calculated:

$$S_G = (T - G) ; S_P = (Y - T - C)$$

Where  $T$  represents tax incomes,  $S_G$  represents public savings deficit, and  $S_P$  represents private sector savings deficits. In a country where  $Y < A$  results in  $S_G$ ,  $S_P$ , and a foreign trade deficit in the economy. Furthermore, when  $S_P < I$  and  $T < G$ , a current account deficit arises in the economy. In developing countries, the current account deficit is often financed through external debt. This means that the reason for countries' indebtedness is not only public deficits but also private sector savings deficits.

The risks that lenders may encounter regarding the sustainability of external debt can be classified into liquidity risk, moratorium risk, and debt repudiation risk (Utkulu, 1998). Liquidity risk refers to the sudden reduction or cessation of capital inflows in financial markets, which can be triggered by economic or political factors originating either from within or outside the country. In such a scenario, if there are no long-term concerns

regarding the sustainability of the debt in the market, the borrowing country can minimize liquidity risk by temporarily increasing interest rates. For instance, the implementation of expansionary monetary policies during the 2008 global crisis and the Covid-19 pandemic period has eliminated the possibility of bankruptcy resulting from liquidity risk. In the case of moratorium risk, the debt interest burden increases due to the macroeconomic conditions (exclusion of private sector investments due to high budget deficits, high unemployment, inflation, and current account deficit, etc.) of the country. In such a case, when a country becomes unable to repay its debt, it may enter into a stand-by agreement with the International Monetary Fund (IMF), which serves as the lender of last resort and minimizes the risk of a moratorium. Indeed, the risk of denial of debt is influenced by the institutional quality of a country and the moral hazard of its rulers. In this regard, lenders analyze various factors such as institutional quality and moral risk, rule of law, accountability, democracy, merit, transparency, and the implementation of structural reforms in the country. Accordingly, the pricing of borrowing is determined by evaluating the country's bankruptcy risk, which is reflected in the CDS risk premium. Countries with high CDS risk premiums face difficulties in accessing borrowing, as lenders perceive a higher risk of debt default.

## **II. LITERATURE SURVEY**

A literature review on the relationship between external debt sustainability and economic growth revealed that numerous studies have primarily focused on public debt sustainability and fiscal sustainability. The literature on the effect of external debt sustainability on economic growth is as follows:

Hakkio and Rush (1991) conducted a study on the relationship between public expenditures and revenues in the US economy using data from the period 1950-1988. Their findings indicated that public expenditures grew at a faster rate than public revenues. Plus, they emphasized that such a situation is not sustainable and to prevent it from turning into a Ponzi scheme in the long run, the amount of interest paid on the public debt should be kept lower than public expenditure.

Sawada (1994) analyzed over-indebtedness and external debt sustainability in Latin America and selected Asian countries using the data for the period of 1955-1990. The analysis results indicated that both the Philippines and several over-indebted countries in Latin America are facing a foreign debt burden that exceeds their projected future foreign trade surplus. The author also emphasized that the selected Asian countries do not face any issues related to external debt sustainability.

Hostlan and Karam (2005) examined the interrelationships between external debt sustainability and certain variables including macroeconomic volatility, risk premium, financial fragility, and capital movements in 31 developing countries based on the 2005 data. Their findings indicated that an increase in the exchange rate had a positive effect on export revenues and helped alleviate the burden of external debt.

Gapen, et al. (2005) examined the relationship between market risks and macroeconomic variables in 12 developing countries for the period of 2005. They found that in developing countries, market risks increase borrowing costs due to long-term exchange rate volatility, which in turn affects the market risk premium.

Onel and Utkulu (2006) conducted a cointegration analysis using the Turkish economy data for the period of 1970-2002. They applied the method proposed by Sawada (1994) to examine the relationship between reserves, foreign trade, and debt rate variables. The analysis results revealed a low level of foreign debt sustainability in the Turkish economy.

Afonso and Rault (2008) examined public debt/revenues and external debt sustainability of 15 EU economies using the data covering the period from 1970 to 2006. Their results suggested that fiscal policy plays a significant role in ensuring debt sustainability.

Çukurçayır (2014) examined foreign debt sustainability through cointegration analysis using the Turkish economy data for the period of 1980-2010. Their findings indicated that foreign debt is sustainable considering the reserves, foreign trade, and transfer expenditures.

Yıldız and Yıldırım (2014) examined primary surplus and debt/GDP external debt sustainability in 12 EU countries between 1995 and 2011. Their findings indicated that while the examined variables showed a cointegrated relationship, primary budget deficits were not found to be sustainable.

In the study conducted by Fincke (2015), the pre- and post-2004 periods in 8 EU countries were analyzed using the NMS panel method, utilizing annual data from 1995 to 2013. The analysis results indicated that foreign debt sustainability was positive and strong before 2004, but it became low after 2004.

Akçay and Çelik (2020) conducted a study that investigated the impact of external debt sustainability on exports in West African States (ECOWAS). Their findings revealed that the analyzed countries have unsustainable external debt, as the ratio of external debt to exports is not stable.

İnal (2020) analyzed the relationship between external debt sustainability and various factors such as primary surplus, budget balance, interest payments, budget expenditures, and revenues using annual data from the Turkish economy for the period 1975-2019. The findings indicated that the public debt stock in Turkey is not sustainable in terms of external borrowing.

Akın and Güneş (2022) examined the external debt sustainability in the fragile five countries based on the annual 2001-2019 data. Their findings revealed that the external debt sustainability in the examined countries is low.

Serin and Demir (2023) conducted a study investigating the impact of public external debt sustainability on private investments in the Turkish economy. They utilized the ARDL method and analyzed annual data from 1975 to 2020. Their findings revealed that public external debt has a negative effect on private-sector investment and is considered unsustainable.

### EMPIRICAL ANALYSIS

#### Dataset and Methodology

The current study focuses on analyzing the relationship between economic growth and various components of foreign debt sustainability including foreign trade balance, net current transfers, central banks' foreign currency reserves, Libor interest cost of total external debt, and CDS risk premium in BRICS-TM countries using the panel cointegration analysis based on the 2001-2021 data. Information about the variables is given in Table 1.

**Table 1:** Descriptive Variables and Data Sources

Variables	Data Sources
Gdp (Gross Domestic Product in Current USD)	<a href="https://www.imf.org/en/Countries">https://www.imf.org/en/Countries</a>
Ex (Goods and Services Exports in Current USD)	<a href="https://www.imf.org/en/Countries">https://www.imf.org/en/Countries</a>
Im (Goods and Services Imports in Current USD)	<a href="https://www.imf.org/en/Countries">https://www.imf.org/en/Countries</a>
Ted (Total External Debt in Current USD)	<a href="https://data.worldbank.org/indicator">https://data.worldbank.org/indicator</a>
Fcr (CB Foreign Currency Reserves USD)	<a href="https://data.worldbank.org/indicator">https://data.worldbank.org/indicator</a>
Nct (Net Current Transfers in Current USD)	<a href="https://data.worldbank.org/indicator">https://data.worldbank.org/indicator</a>
CDS (USD Credit Default Swaps)	<a href="https://www.bloomberg.com/search?query=CDS">https://www.bloomberg.com/search?query=CDS</a>
i (Libor USD Rates)	<a href="https://www.macrotrends.net/1433/historical-libor-rates-chart">https://www.macrotrends.net/1433/historical-libor-rates-chart</a>
Descriptive Variables	Definition
$\text{LnGdp}_t$	$\text{LnX}_t + \text{LnM}_t + \square_t$
$\text{LnX}_t$	$\text{Ex}_t + \text{Nct}_t + \text{Fcr}_{t-1}(1 + it)$
$\text{LnM}_t$	$(i_t + \text{CDS}_t)\text{Ted}_{t-1} + \text{Im}_t + \text{Fcr}_t$
$\text{LnX}_t$	$\text{Ex}_t + \text{Nct}_t + \text{Fcr}_{t-1}(1 + it)$
$\text{LnM}_t$	$i_t\text{Ted}_{t-1} + \text{Im}_t + \text{Fcr}_t$

This research, which examines the relationship between economic growth and the components of foreign debt sustainability in BRICS-TM countries, is important as it incorporates both economic and financial components. The significance of this study stems from its inclusion of foreign trade variables and the CDS risk premium, which influence the overall burden of external debt in addition to the interest burden of the existing debt stock in the examined countries. The basic equation utilized in this study for the  $t$  period is as follows:

$$\text{Gdp}_t + (\text{Ted}_t - \text{Ted}_{t-1}) + \text{Nct}_t = \text{AE}_t + i\text{Ted}_{t-1} + (\text{Fcr}_t - \text{Fcr}_{t-1}(1 + i_t)) \quad \text{Eq. 2.}$$

In Eq. 2, AE represents total domestic expenditures. The right side of the equation represents total revenues, while the left side represents total expenditures. Considering the foreign trade balance variables and assuming  $\text{Gdp}_t - \text{AE}_t = \text{Ex}_t - \text{Im}_t$ , the equation can be written as follows:

$$\text{Ex}_t - \text{Im}_t = i\text{Ted}_{t-1} + (\text{Fcr}_t - \text{Fcr}_{t-1}(1 + i_t)) - (\text{Ted}_t - \text{Ted}_{t-1}) - \text{Nct}_t \quad \text{Eq. 3.}$$

Where  $\text{Ex}_t$  and  $\text{Im}_t$  represent export and import values, respectively. The dynamic budget equation, which expresses the change in net external surplus in terms of total debt, can be written as follows:

$$\Delta\text{Ted} = \text{Ted}_t - \text{Ted}_{t-1} = i_t\text{Ted}_{t-1} - \text{Ex}_t + \text{Im}_t - \text{Nct}_t + \text{Fcr}_t - \text{Fcr}_{t-1}(1 + it) \quad \text{Eq. 4.}$$

This equation can be expressed as  $\Delta\text{Ted} = i_t\text{Ted}_{t-1} + \text{Im}_t + \text{Fcr}_t - (\text{Ex}_t + \text{Nct}_t + \text{Fcr}_{t-1}(1 + it))$ . A stationary  $\Delta\text{Ted}$  variable indicates that the economy has a debt surplus. The expressions in Equation 4 can be classified as external debt reducers ( $X_t$ ) and external debt increasers ( $M_t$ ). Hence, the impact of these expressions on economic growth can be written as  $X_t = \text{Ex}_t + \text{Nct}_t + \text{Fcr}_{t-1}(1 + it)$  and  $M_t = i_t\text{Ted}_{t-1} + \text{Im}_t + \text{Fcr}_t$ . Similarly, assuming that the first-order differences of the variables  $X_t$  and  $M_t$  are stationary, the cointegration relationship between the variables can be examined as follows:

$$\text{Gdp}_t = \alpha + \beta X_t + \beta M_t + \square_t \quad \text{Eq. 5.}$$

For economies to sustain their debts, it is necessary for the variables to exhibit a cointegration relationship. A cointegration vector coefficient of 0.8 and above indicates a strong relationship, 0.5-0.8 indicates a moderate effect, and -1-0.5 suggests a weak relationship (Baharumshah et al., 2003). This study includes the variables of Libor and CDS risk premium, which have a significant impact on borrowing costs. And the models created by taking the logarithm of the variables for ease of interpretation are as follows:

$$\text{Model 1: } \text{LnGdp}_{it} = \alpha_{0i} + \alpha_{1i}\text{LnX}_t + \alpha_{2i}\text{LnM}_t + \square_{it}$$

$$\text{Model 2: } \text{LnGdp}_{it} = \alpha_{0i} + \alpha_{1i}\text{LnX}_t + \alpha_{2i}\text{LnM}_t + \square_{it}$$

In the models,  $i$  represents (for model 1,  $i=1, \dots, 6$  and for model 2,  $i = 1, \dots, 7$ ) the country, and  $t$  represents the time dimension. The country group for Model 1 consists of the economies of Brazil, Russia, China, South Africa,

Turkey, and Mexico. Model 2 was created because the CDS risk premium data of the Indian economy could not be obtained and examinations in this model were performed using the Libor rates.

### III. Method

In the empirical analysis, the cross-sectional dependence of the variables and models was examined first. Correlation between cross-sections was analyzed by cross-section dependency tests. Accordingly, cross-section dependency tests were conducted and the results obtained are presented in Table 2.

**Table 2: The Results of The Cross-Section Dependency Tests**

	LM	LMadj	CD
<b>Model 1</b>			
LnGdp	94.65* (0.000)	21.24* (0.000)	11.73* (0.000)
LnX	86.52* (0.000)	20.15* (0.000)	10.12* (0.000)
LnM	79.51* (0.000)	16.45* (0.000)	9.24* (0.000)
Model 1	19.25** (0.043)	1.97*** (0.070)	1.34 (0.15)
<b>Model 2</b>			
LnGdp	58.45* (0.000)	15.62* (0.000)	9.16* (0.000)
LnX	48.43* (0.000)	12.43* (0.000)	7.47* (0.000)
LnM	42.53* (0.000)	10.74* (0.000)	6.13* (0.000)
Model 2	24.85* (0.000)	5.78* (0.000)	-0.49 (0.86)

**Note:** \*, \*\*, and \*\*\* represent significance at 1%, 5%, and 10%, respectively. ( ) shows probability values.

According to the cross-sectional dependence test results, the  $H_0$  hypothesis was rejected for the variables in both models. This result is expected, considering the economic structure of the examined countries and the impact of variables that reduce or increase external debt on economic growth. Therefore, the analyses proceeded with the second-generation panel unit root tests and the results are given in Tables 3 and 4.

**Table 3: Panel Unit Root Test Results for Model 1**

Variables	Pe	Ze	Ze <sup>+</sup>
<b>Level</b>			
LnGdp	-1.94 (0.85)	7.54 (0.85)	10.45 (0.95)
LnX	-1.68 (0.78)	7.24 (0.75)	10.26 (0.89)
LnM	-1.05 (0.63)	7.21 (1.00)	8.48 (1.00)
DLnGdp	1.95*** (0.06)	-2.85** (0.03)	3.42 (0.84)
DLnX	6.56* (0.00)	-2.74* (0.00)	-1.47* (0.00)
DLnM	8.21* (0.00)	-6.25* (0.00)	-1.42* (0.00)
<b>Level and Trend</b>			
LnGdp	4.24* (0.00)	-3.28* (0.00)	2.42 (0.82)
LnX	3.57* (0.00)	-2.75** (0.03)	1.47 (0.64)
LnM	2.05*** (0.08)	-1.46** (0.02)	3.85 (0.47)
DLnGdp	3.45* (0.00)	-3.38* (0.00)	1.43 (0.32)
DLnX	3.64* (0.00)	-2.12* (0.00)	0.49 (0.30)
DLnM	6.52* (0.00)	-4.75* (0.00)	0.25 (0.24)

**Note:** \*, \*\*, and \*\*\* represent significance at 1%, 5%, and 10%, respectively. ( ) shows probability values. The maximum number of common factors and lag length were found to be 5 and 3, respectively.

As seen in Table 3, variables have unit roots in the fixed model and become stationary when their first difference is taken.

**Table 4. Panel Unit Root Test Results for Model 2**

Variables	Pe	Ze	Ze <sup>+</sup>
<b>Level</b>			
LnGdp	-2.45 (0.84)	1.98 (0.95)	3.54 (0.95)
LnX	-2.86 (0.62)	1.82 (0.86)	3.62 (1.00)
LnM	-1.09 (0.34)	1.75 (0.80)	3.05 (1.00)
DLnGdp	6.94* (0.06)	-4.58* (0.00)	-1.24*** (0.84)
DLnX	5.66* (0.00)	-5.47* (0.00)	1.47 (0.32)
DLnM	4.21* (0.00)	-3.52* (0.00)	1.05 (0.24)
<b>Level and Trend</b>			
LnGdp	0.42 (0.20)	-1.28* (0.08)	3.42 (0.68)
LnX	0.95 (0.26)	-0.20 (0.13)	2.87 (0.54)
LnM	0.25 (0.32)	-1.64** (0.03)	3.58 (0.59)
DLnGdp	1.55* (0.00)	-1.82* (0.00)	2.34 (0.85)
DLnX	4.46** (0.03)	-3.32* (0.00)	2.23 (0.65)
DLnM	8.21* (0.00)	-4.68* (0.00)	-0.35 (0.31)

**Not:** \*, \*\*, and \*\*\* represent significance at 1%, 5%, and 10%, respectively. ( ) shows probability values. The maximum number of common factors and lag length were found to be 5 and 3, respectively.

As seen in Table 4, variables have unit roots in both Level and Level and Trend models and become stationary when their first difference is taken. To examine the long-term relationship between the variables of the countries examined, the cointegration relationship should be tested. The analysis proceeded with the panel ECM (Error Correction Model) cointegration test, which allows for analyzing the cointegration relationship between the variables under the cross-sectional dependence. First, the error correction model was estimated for the cross sections, it was then tested using group mean (GT and Ga) and panel statistics. The group mean test was conducted assuming that countries exhibit heterogeneity. Subsequently, Swamy's test was employed to determine whether homogeneous or heterogeneous statistics should be used for the ECM panel cointegration test. ECM Panel cointegration test results are given in Table 5.

**Table 5: ECM Panel Cointegration Test Results**

Test Statistics	P Asymptotic	P Bootstrap	
<b>Model 1</b>			
<i>G<sub>T</sub></i>	-12.235**	0.000	0,041
<i>G<sub>a</sub></i>	-3.154	0.002	0,142
<b>Model 2</b>			
<i>G<sub>T</sub></i>	-22.456*	0.000	0,008
<i>G<sub>a</sub></i>	-7.452**	0.001	0,045
<b>Swamy's test</b>		<b>X<sup>2</sup></b>	<b>P</b>
<b>Model 1</b>		68.45	0.010
<b>Model 2</b>		62.14	0.000

**Note:** \* and \*\* represent significance at 1% and 5%, respectively.

According to the results of Swamy's test presented in Table 5, it was determined that the parameters in both models exhibit heterogeneity. The test results were statistically significant and a cointegration relationship was established between the variables. This relationship is important in terms of the impact of countries' external debt sustainability on their economic growth. However, to interpret long-term balance parameters, the estimation of the parameter  $\beta$  is necessary. The Augmented Mean Group (AMG) estimator, which can estimate the cointegration coefficients for both the panel and individual countries considering the cross-sectional dependence, was employed and the results obtained are given in Table 6.

**Table 6: AMG Panel Cointegration Test Results**

	LnX	LnM	$\frac{LnX}{LnM}$	Fixed Term
<b>Model 1</b>				
<b>Panel</b>	0.6340** (0.01)	0.6660* (0.02)	0.6500	10.085** (0.00)
<b>Brazil</b>	0.3855** (0.00)	0.3545* (0.00)	0.3700	15.240** (0.00)
<b>Russia</b>	0.4564** (0.00)	0.4136* (0.00)	0.4350	9.450* (0.00)
<b>China</b>	1.1520** (0.00)	1.0580* (0.00)	1.1050	-0.352 (0.95)
<b>South Africa</b>	0.9550** (0.00)	0.9250* (0.00)	0.9400	-2.475 (0.75)
<b>Türkiye</b>	0.3280** (0.00)	0.3420* (0.00)	0.3350	16.953** (0.00)
<b>Mexica</b>	1.0975** (0.00)	1.1025* (0.00)	1.1000	-0.478 (0.89)
<b>Model 2</b>				
<b>Panel</b>	0.6520** (0.00)	0.6280* (0.00)	0.6400	10.052** (0.00)
<b>Brazil</b>	0.3985** (0.00)	0.3615* (0.00)	0.3800	14.240** (0.00)
<b>Russia</b>	0.4251** (0.00)	0.4049* (0.00)	0.4150	9.854* (0.00)
<b>China</b>	0.8450** (0.00)	0.8050* (0.00)	0.8250	-3.450 (0.69)
<b>South Africa</b>	1.2140** (0.00)	1.1060* (0.00)	1.1600	-0.257 (0.96)
<b>Türkiye</b>	0.9125** (0.00)	0.9075* (0.00)	0.9100	-2.460 (0.74)
<b>Mexica</b>	0.3174** (0.00)	0.3326* (0.00)	0.3250	17.125** (0.00)
<b>Brazil</b>	1.0251** (0.00)	1.0149* (0.00)	1.0200	-0.195 (0.98)

**Not:** \*, \*\*, and \*\*\* represent significance at 1%, 5%, and 10%, respectively. ( ) shows probability values.

According to the results shown in Table 6, all debt-reducing and debt-increasing variables in both models suggest that the debt sustainability of BRICS-TM countries is moderate. Accordingly, the data were analyzed on a country basis. According to both models, the magnitude of the effect of external debt sustainability on economic growth, from high to weak, was found to be China (1.10), Mexico (1.02), South Africa (0.91), India (0.825), Russia (0.415), Brazil (0.38), and Turkey (0.325) economies, respectively.

#### IV. RESULTS AND DISCUSSION

Most studies on external debt sustainability typically focus on analyzing variables related to public revenues and debt payments, with budget constraints. Many studies have examined variables related to debt

sustainability, such as debt/exports, debt/GDP, reserves/debt, and tax revenues of countries. However, there is no consensus in the literature regarding the advantages and disadvantages of using these indicators in debt sustainability analyses. In the current study, two models were developed, one including the CDS risk premium and the other without it, considering its significant impact on interest costs in BRICS-TM countries. Thus, the cointegration relationship between external debt sustainability and economic growth was examined. The effects of the variables that increase and decrease external debt in BRICS-TM countries on economic growth were examined using the annual data for the 2001-2021 period. According to the long-term panel cointegration equilibrium coefficients of Model 1 (0.65) and Model 2 (0.64), the impact of debt sustainability on economic growth was found to be moderate. The country-specific results from both models indicated that the impact of external debt sustainability on economic growth is highest in China (1.10 and 1.16) and weakest in Turkey (0.335 and 0.325).

To enhance the impact of external debt sustainability on economic growth in BRICS-TM countries, it is crucial to focus on diversifying export products and increasing income items. In this regard, advanced technological product export is an important factor. The significance of advanced technological products arises from their high-income elasticity and low price elasticity. In the current global market, the demand for advanced technological products is growing at a faster pace compared to essential goods, driven by the increasing volume of foreign trade. As a result, economies that produce high-tech products not only enjoy high competitiveness but also benefit from substantial profit margins. In light of this fact, to increase the impact of medium and weak external debt sustainability on economic growth in BRICS-TM countries (Brazil, Russia, India, South Africa, and Turkey), it is necessary to focus on increasing the exports of advanced technological products which possess both high added value and competitive power. Based on the analysis of 2021 World Bank data, China holds the leading position with an approximately 30% ratio of high-tech product exports to total manufacturing industry exports. Mexico follows as the second country with a ratio of 20%, while Turkey lags behind as the weakest performer with a ratio of 3.28%. Given this information, it is crucial for countries with low high-tech product exports to identify sectors that offer high value and differentiation. And the process of transforming knowledge about these products into actual production can be facilitated through collaborations between the government, universities, and industries, which potentially result in an increase in the export of such products. In summary, a structural economic transformation based on innovation is required to increase the export of high-tech products. This can lead to a foreign trade surplus and an increase in reserve accounts, which in turn minimize short-term debt and external debt on official reserves or even reduce them to zero.

While countries focus on strengthening the variables that reduce external debt, such as increasing production and exports through economic structural transformation, it is crucial to simultaneously enhance the external debt sustainability coefficient. This can be achieved by effectively managing the variables that contribute to increasing external debt. In this regard, to increase public revenues, it is important to reduce the issue of informality and ensure fair implementation of taxes across all segments of society. This is because high informality in the economy has several negative consequences, including an increased need for borrowing, which in turn leads to higher interest rates and an elevated risk premium. Ensuring a fair distribution of taxes across all segments of society results in institutional quality and effective audit mechanisms. Institutional quality within a country, in turn, helps lower risk premiums and use long-term financing opportunities at low-interest rates. Indeed, investments play a vital role in driving economic growth and enhancing the production process within a country.

According to the analysis results, in order to achieve a high impact of external debt sustainability on economic growth, it is important for the increase in production to outweigh the cost of borrowing. In this regard, it is crucial to implement policies that simultaneously enhance external debt-reducing variables and reduce external debt-increasing variables. By implementing a structural transformation in the country's economy, it is possible to achieve production diversity, leading to an increase in economic growth through high value-added product exports. In this case, one of the primary priorities for the country should be to increase the supply of qualified labor. Because only qualified labor can develop and produce high-tech products, commercialize knowledge, and contribute to economic transformation.

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