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TRADE BENEFITS OR DEBT-TRAP:

EXAMINING THE NET IMPACT ON ECONOMIC GROWTH OF BRI PARTICIPATING COUNTRIES

Trade Benefits or Debt-Trap: Examining the Net Impact on Economic Growth of BRI Participating Countries

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Abstract

The Belt and Road Initiative (BRI) has facilitated trade flows between China and the participating countries. At the same time, participating countries' indebtedness has increased significantly due to borrowings from China. While trade is expected to have a positive impact on economic growth, rising external debt exerts a negative impact on growth by reducing investment, increasing interest rates, and potentially leading to future economic instability. The obvious question is the net effect on economic growth. This paper makes an attempt to solve this puzzle. Specifically, the paper examines if net effect of trade enhancement is positive on economic growth. First, we explore the existing theoretical and empirical literature to have a better understanding of trade-growth and debt-growth relationships. Next, we provide detailed data visualisation and presentation using network analysis to discuss the pattern of increasing trade and debt movements trends in the BRI participating countries between 2013 and 2020. Finally, we provide some empirical evidence using data from a sample of 70 BRI countries over the period 1990 to 2020 and employing appropriate econometric techniques to compare the trade-growth nexus in the presence of external debt. The empirical results suggest that positive effect of trade outweighs the negative impact of external debt resulting in a net positive effect on economic growth among participating countries. These findings strongly indicate that participating countries need to implement sound economic policies, particularly in promoting trade openness, to mitigate the adverse effects of external debt.

Keywords: Belt-Road Initiative; Trade integration; External debt; Economic growth; Dynamic panel regression

JEL Classification: C33, F15, F55, F63, O11

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Trade Benefits or Debt-Trap: Examining the Net Impact on Economic Growth for BRI Participating Countries

1.0 Introduction

China's Belt and Road initiative (BRI), established in 2013, was aimed to liberalize trade flows and promote trade facilitation. Under the initiative China proposed a new road map that combines two major ancient trading routes, including the Silk Road Economic Route and the Maritime Economic Route.[1] The routes stretched across Southeast Asia, Eastern Europe, and Africa to connect Europe and Asia. As of December 2023, 150 countries were listed as having signed up to the BRI. The participating countries include almost 75% of the world's population and account for more than half of the world's GDP. These include 44 countries from Sub-Saharan Africa, 34 countries in Europe & Central Asia, 25 countries from East Asia & Pacific (including China), 22 countries in Latin America & Caribbean, 19 BRI countries from Middle East & North Africa, and 6 countries in Southeast Asia (Green Finance and Development Centre; n.d.).[2] A map published by The Economist shows the old and new 'one-belt-one-road' connecting all participating countries (see below).

[1] The "road" applies to the maritime trade routes traced by the admiral Zheng He in the 14th to 15th century of the Ming Dynasty's influence over Southeast Asia. The "belt" refers to the Silk Road through central Asia that thrived during the four century-long rule of the Han Dynasty two millennia ago and the 7th to 10th century of the Tang Dynasty. It formed as a belt; hence it is named One Belt One Road Initiative (OBOR) or Belt and Road Initiative (BRI).Belt and Road Initiative retrieved from https://www.ft.com/content/88d584a2-385e-11e7-821a-6027b8a20f23

[2] However, due to data limitations, only 70 BRI participating countries are included in this study.

Chart 1: Map of Belt and Road Routes

Source: The Economists (2020).

Chart 1: List of BRI countries included in this paper

Angola Austria Bangladesh Belarus Brunei Darussalam Cambodia Cameroon Chad Chile Congo, Dem. Rep. Czech Republic Ecuador Egypt, Arab Rep. Ethiopia Ghana Greece Guinea Hungary Indonesia Iran, Islamic Rep. Iraq Israel Italy Jamaica Jordan Kazakhstan Kenya Korea, Rep. Kuwait Kyrgyz Republic Lao PDR Liberia Luxembourg Malaysia Maldives Malta Mongolia Morocco Mozambique Myanmar Namibia Nepal New Zealand Nigeria Oman Pakistan Papua New Guinea Peru Poland Portugal Russian Federation Rwanda Samoa Saudi Arabia Serbia Sierra Leone Singapore Slovenia South Africa Sri Lanka Tanzania Thailand Turkey Turkmenistan Uganda Ukraine the United Arab Emirates Vietnam Zambia ZimbabweThe initiative was aimed at investing in a wide range of infrastructure projects, including ports, railways, and airports, to strengthen economic integration and connectivity among countries within the belt-road regions covering three continents. This connectivity focuses on five areas: infrastructure, coordination of development strategies and policies, trade facilitation to ensure "unimpeded trade," financial integration, and people-to-people exchange (Huang, 2016). The same year (2013), China established the Silk Road Fund and the Asian Infrastructure Investment Bank (AIIB) to support

infrastructure development in member countries. The investment by the initiative has been estimated to reach US$8 trillion (World Bank, 2019).[3]

While these infrastructure investments as well as measure to improve trade linkages helped participating countries to enhance their trade share to gross domestic product (GDP), it also substantially increased the indebtedness of the same. Theoretical and empirical literature suggests that trade (openness) exerts a positive impact on economic growth (GDP growth) while external debt negatively impacts economic growth. Therefore, it is important to include a measure of external debt to assess the above relationship better. Although researchers have investigated trade-growth and debt-growth scenarios separately, little attempt has been made to consider the simultaneous impact of trade and external debt on economic growth. We did not find any existing research which has examined the effects of trade liberalization and external debt on economic growth in the context of BRI.

Given the experience of BRI participating countries, we note a substantial increase in bilateral and multilateral trade among the bloc (see charts in section 3). We also observe an increasing trend of external debt among the same. This, obviously, raises a question: what is the net impact on growth. If the positive impact of trade outweighs the negative impact of external debt, then BRI participating countries could expect future growth, maybe at a slow pace though. However, if the opposite is true, then the same participating countries are in the worst position.

While there are studies examining BRI's impact on promoting trade liberalization and external debt individually, no study has yet examined the simultaneous effect of trade and debt on economic growth in BRI participating countries. This paper is perhaps the first attempt in this direction and can be considered as the main contribution to the body of existing research on this issue. This objective is achieved through three ways: a brief discussion of theoretical literature and existing empirical findings; presenting some stylized fact; and bringing some empirical evidence using econometric tests. Specifically, we use both data visualization through network analysis and empirical estimation techniques to investigate the impact of trade openness and external debt on growth for BRI participating countries. In data visualization, the paper compares the trade connectivity between two periods: 2013 when BRI was initiated and 2020 as the latest data

[3] Readers may refer to Blanchard & Flint (2017), Flint & Zhu (2019), Indeo (2018) and Zhexin (2018).

available. For empirical estimation, we test the net effect of trade and debt on economic growth using both variables simultaneously. Additionally, we compare pre-BRI and post-BRI data to see any changes in the net impact. The findings of this paper conclude that the net impact on growth is positive. The results of this paper would help us understand how macroeconomic policies in the form of trade policy may help participating countries offset the negative effect of external debt. That means, participating countries should identify their priorities for infrastructure development projects to reap the full benefits of investment and have an impact on trade and growth.

This paper is organized as follows: Section 2 provides a brief discussion on the theoretical literature on trade-growth and debt-growth relationships and existing empirical findings. Section 3 presents detailed discussion on trade enhancement and debt accumulation of participating countries using factual data as well as network analysis. Section 4 shares some empirical evidence brough in this paper using data from a sample of participating countries and employing econometric methodology. Finally, conclusions and policy implications are presented in Section 5.

2.0 Brief Review of Theoretical and Empirical Literature

2.1 Trade Liberalization and Economic Growth

One of the most debated topics in development economics is the relationship between international trade and economic development, particularly economic growth (Singh 2010, Salvatore, 2011). However, the relationship between trade openness and economic growth has been theoretically controversial. The neoclassical approach explains the gains from trade liberalization by comparative advantage in the form of resource endowments (the Heckscher-Ohlin model) or differences in technology (the Ricardian model). Endogenous growth theory explains that trade openness positively affects income per capita and growth through the diffusion of knowledge and technology, innovation or foreign direct investment[4], and increasing the market size that allows

[4] One may also refer to Marasco, Khalid & Tariq (2023) and Khalid & Marasco (2019) for more discussion on the impact of FDI on growth.

for economies of scale (Grossman and Helpman, 1991, 1994; Lucas, 1988; Redding, 1999; Young, 1991).[5],[6]

Empirical literature investigating the impact of trade liberalization on economic growth has provided a consistent and positive significant relationship. A large body of literature (Loayza et al., 2004; Chang et al., 2009; Jouini, 2015; Zahonogo, 2016; Chen et al., 2019; Maune, 2019; Omoke & Opuala–Charles, 2021; Hassan, 2023; Nana et al., 2023; and Tripathi, 2023). In a recent study, Sufrizul et al. (2024) empirically examines the impact of infrastructure development on trade connectivity among BRI countries. The network analysis used in this paper indicate that trade connectivity has significantly improved within BRI countries, in Asia and Europe while it lags behind in African and Central Asian regions.

2.2 External Debt and Economic Growth

The connection between external debt and economic growth is well documented theoretically and empirically. However, results are often conflicting and inconclusive. Economic theories suggest that a reasonable level of debt should help both developing and developed countries enhance their economic growth. The liquidity constraint hypothesis and debt overhang theory have also been used to understand better the implications of debt on economic growth (Krugman, 1988; Sachs, 1989; Cohen, 1995). These theories suggest that higher debt levels crowd-out economic growth because of increased government internal borrowing. The increase in lending will, in turn, increase the interest rate. This makes the cost of borrowing for both investment and consumption more expensive, hence the crowding effect. Moreover, poor management in developing countries has resulted in extensive borrowing, thereby hurting economic growth and financial sustainability. The key to accruing external debt is that the external debt may exceed sustainable national repayment capabilities. Hence, the main cost of foreign borrowing is debt service cost which is an expensive bill that developing countries must pay for from their future income (Kharusi and Ada, 2018).

[5] There are theoretical models showing that trade openness may hamper growth. Neither the existing theoretical models nor empirical analyses have produced a definite conclusion.

[6] More discussion on openness and growth can be found in Harrison (1996), Barro and Sala-i-Martin (1997), Alesina et al. (2000), Baldwin et al. (2005), Musila, & Yiheyis (2015), and Trejos & Barboza (2015).

As for empirical studies, the relationship is found to be negative by many researchers (Reinhart & Rogoff, 2010; Presbitero, 2012; Calderon & Fuentes, 2013; Guei, 2019; Dey & Tareque, 2020; Wang et al, 2021; Yasar, 2021; and Dawood et al., 2020).

Empirical literature on trade-growth and debt-growth from BRI participating countries is mixed. While most findings support that trade openness has a positive impact on economic growth (Baniya et al., 2020;) Cui and Song, 2019; and Mao et al., 2018) the evidence on debt-growth nexus is not so clear. Some studies are consistent with the crowding-out effect and found that debt has a negative impact on growth (Hurley et al., 2019; Bandiera & Tsiropoulos, 2020) while others suggest that trade could have a positive impact on growth (Singh, 2020; Twillert & Vega, 2021; and Wang et al., 2023). [7]

In summary, the theoretical and empirical literature is very clear on the positive trade- growth relationship. The trade-debt relationship, however, is not so clear but most of the literature still supports the idea that debt has a negative impact on growth. The research lacks investigating the impact of trade and debt on economic growth simultaneously. This is achieved in this paper.

3.0 Trade Enhancement and Debt Accumulation in BRI Participating Countries: Some Stylised Facts and Network Analysis

Substantial empirical work is dedicated to investigating the trade-growth relationship with mixed findings but mostly supporting a positive relationship. Logically, the same should hold for BRI countries. However, in the context of BRI, trade liberalization (enhancement) is facilitated through external debt in the form of loans received by participating counties (from China) to invest in infrastructure development projects. This, of course, has changed the mechanism defining trade growth relationships in BRI countries.

Given the discussion in section 1, it is, perhaps, imperative to further explore the issue through the lens of facts and figures. Trade data shows that the enormous investment by China seems to have

[7] This issue has also been a focus of research lately under the debt-trap diplomacy (DTD). DTD argues that Chinese excessive lending to low-income countries who may be unable to repay later resulting in relinquishment of some strategic assets to China to decrease its debt burden (debt-for-equity-swap). However, scholars suggest that DTD is far more complicated, and it should not be automatically taken as a predatory technique China strategically pursues (Himmer and Rod; 2023).

impacted regional trade flows in the BRI countries. From 2013 to 2022 the value of trade between China and BRI countries increased from 10.11 trillion yuan to 18.95 trillion yuan (US$2.59 trillion), which accounted for 45.4 percent of China's share in foreign trade. This reflects a 7 percent in the past decade, 1.5 percentage points higher than the overall growth rate of China's foreign trade. BRI trade share in China's share increased from 39.2 percent to 45.4 percent during the same period (Global Times, 2023).[8]

In 2021 the value of trade in goods between China and BRI countries reached US$1.8 trillion (11.6 trillion yuan), growing by 26.3 percent per annum (National Development and Reform Commission, 2022). Recent evidence also suggests that BRI has substantially decreased trade costs and shipping times (Fan, 2023; Gallagher et al., 2023; Konings, 2018) while trade flows have increased by 4.1 percent as well as intensified the bilateral trade between participating countries (Baniya et al., 2020). This increased trade integration between the participating nations has unleashed growth potential, leading to greater and broader economic globalization (Johns et al., 2018; Baniya et al., 2020).[9]

3.1 Network Analysis

To further emphasise this point, we used network analysis to visualise the actual trade data from the participating countries.[10]

Figure 1 (see below) compares the bilateral export trade flows by weights between the year 2013 (Figure 1a) and 2020 (Figure 1b). The color of the circles indicates the region while the size represents the value of exports in thousands of US dollars. The network suggests that most countries were widely dispersed in 2013 but moved towards the core by 2020 indicating an increase in bilateral trade between BRI countries. We also note that the size of circles has increased from 2013 to 2020 indicating the increase in the volume of trade flows. It is obvious from Figure 1 that trade with China has increased substantially. We can also observe that by 2020, most of the Asian countries have moved towards the inner part of the figure 2 implying more trade integration among the countries in the Asian region. The trade volume (value) has also considerably increased between 2013 to 2020 for countries like South Korea, Singapore, Malaysia and the Russian

[8] In 2024 total trade value between China and participating countries registered at 22.07 trillion yuan (Statista).
[9] Maliszewska and Mensbrugghe (2019) expected an increase of 0.7 percent in global income with a sizeable reduction in extreme and moderate poverty.
[10] For data visualisation, we have used the software 'python'.

Federation. The same can be observed for Europe. This data visualization is evidence of significant increase in trade since the inception of BRI. An interesting observation is that not much change has happened for the African region, in general where most of them still placed at the periphery, indicating not well connected.

Figure 1: Bilateral Export Trade Flows

Figure 1a: 2013

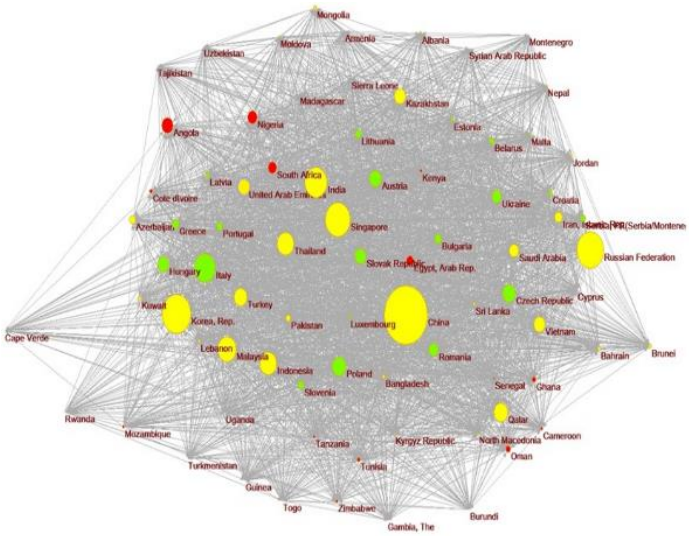
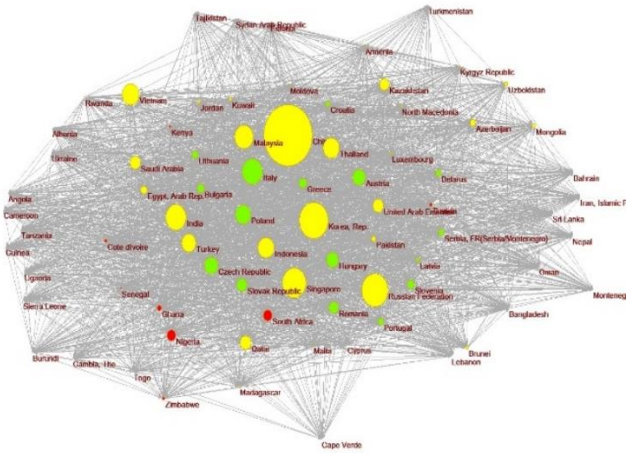


Figure 1b: 2020



Legend: Yellow: Asia; Green: Europe; Red: Africa

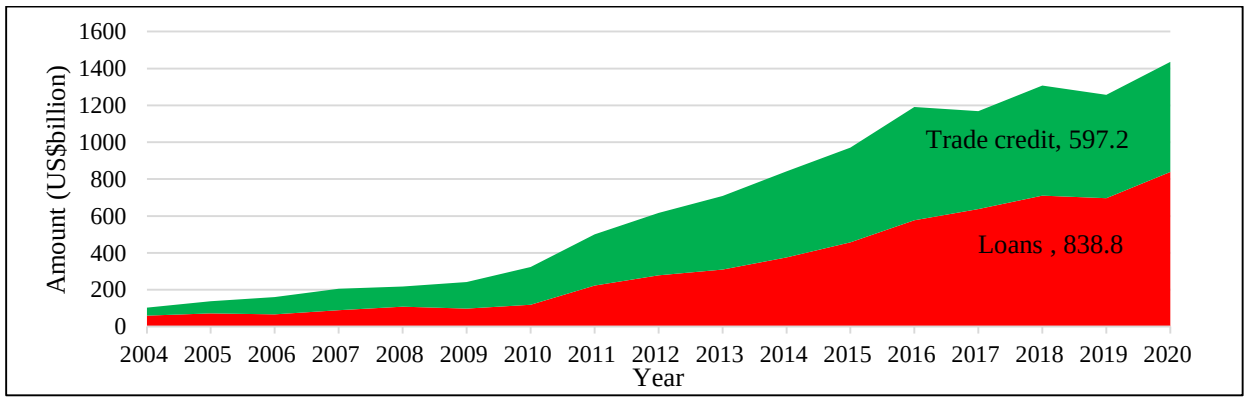
Note: Circle size indicates the volume of trade while arrows show bilateral and multilateral trade linkages. Circles moving towards the core (inner part) means more trade integration.

Source: Husseini, Khalid, & Premaratne (2024)

The above data depiction shows that trade flows in BRI countries have increased overtime which are expected to have benefitted participating countries. However, it comes with the cost of accumulating external debt. The massive investments to improve infrastructure have significantly increased the indebtedness of participating countries and raised concerns about debt sustainability (Heydarian, 2017; Krakowska, 2017; Zhang and Miller, 2017). The $8 trillion-dollar initiative could leave participating countries with debt "overhangs" that could impede economic growth (Hurley et al., 2019). As the primary lender, the loans and credits from China have increased substantially (Deloitte Insights, 2018). Yue and Wang (2020) observed that by 2019, China's total lending to 52 participating countries had increased to US$102 billion from US$49 billion in 2014. This amount is higher than the sum of all other official bilateral creditors and is reaching almost the same levels of lending by the World Bank. They also reported the five countries with the most outstanding debt owed to China at the end on 2019 were: Pakistan (US$20 billion), Angola (US$15 billion), Kenya (US$7.5 billion), Ethiopia (US$6.5 billion), and Lao PDR (US$5 billion).

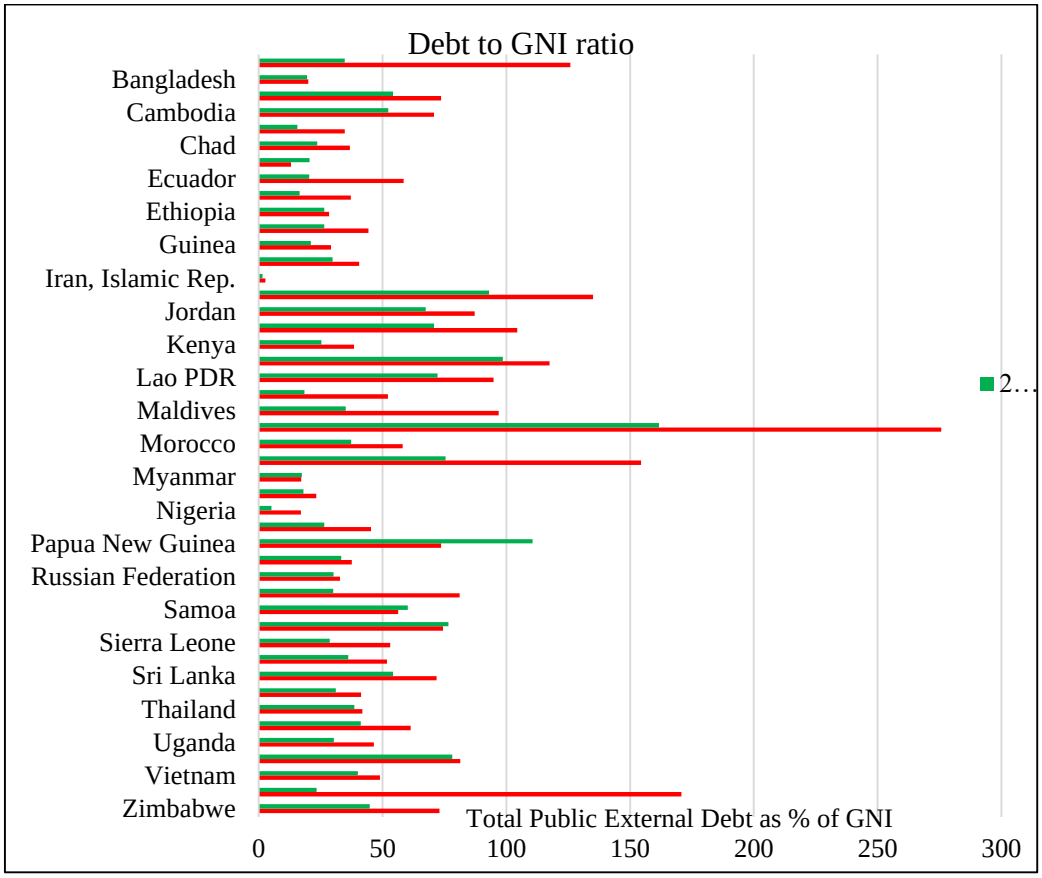
Figure 2 shows the trends of China's overseas lending from 2004 to 2020. China's overseas loans (including all foreign countries) grew almost 15 times from US$59 billion in 2004 to US$838 billion in 2020. Also, trade credit increased from US$43 billion to US$597 billion during the same period. With the rise in loans from China, public debt in BRI countries has also soared high. Figure 3 presents the Debt to GNI Ratio for BRI countries between 2013 and 2020. This substantial increase in external debt in BRI countries could expose their default risk and make future public finances unsustainable.

Figure 2: China's Loans and Trade Credit, 2004-2020



Source: State Administration of Foreign Exchange (2021)

Figure 3: Total External Public Debt to GNI Ratio for BRI countries

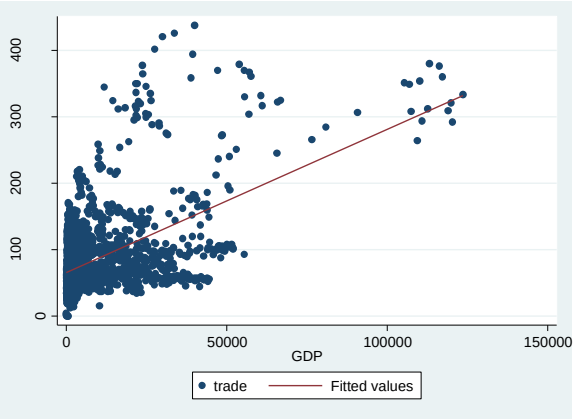


Source: Author's calculations

Data Source: World Development Indicators (2020)

To further emphasize this point we have included a scattered plot of trade against GDP (see Figure 4) as well as a scattered plot of external debt against GDP (see Figure 5) for all BRI participating countries. It is evident from Figure 5 that trade-GDP has an upward trend, implying a positive relationship. Figure 6 on debt-GDP, however, shows a downward trend meaning a negative impact on growth.

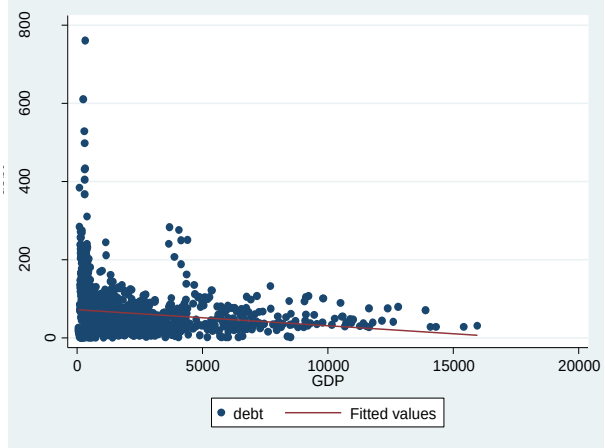
Figure 4: Scatter Plot of Trade against GDP



Source: Author's calculations

Data Source: World Development Indicators (2020)

Figure 5: Scatter Plot of Debt against GDP



Source: Author's calculations

Data Source: World Development Indicators (2020)

It is very clear from the above data presentations and data visualization using network analysis that trade has a positive impact on growth while debt has a negative relationship with economic growth. We also note that the trade-growth relationship has improved since the initiation of BRI. What we are not clear yet about is whether the net impact is positive. In other words, if the trade impact is strong enough to outweigh the negative impact of trade. This is accomplished in the next section.

4.0 Empirical Analysis

This section provides some empirical results on the trade-debt-growth relationship to ascertain if the net impact on growth is positive. Specifically, this section explores how trade liberalization under BRI affects economic growth in the presence of external debt. To do so, we first investigate the trade-growth relationship within BRI by controlling for external debt and then re-estimate the model by including an interaction term (Trade*debt) to examine whether the trade policy mitigates the negative effect of external debt on economic growth. For the brevity of discussion, and to avoid technical details, we briefly describe the methods used in empirical estimation and report a summary of the major findings.

Empirical analysis is performed to examine the relationship between trade liberalization, external debt, and economic growth. We use annual data from a balanced panel of 70 BRI countries (see Chart 2 for the list of countries included) consisting of 3 regions, Asia, Africa, and Europe, based on the Hong Kong Trade Development Council profiles of BRI countries from 1990 to 2020[11]. Standard growth regression model is used to test the impact of trade liberalization on economic growth for the sample countries.[12] We employ generalized method of moments (GMM) GMM estimation to address the endogeneity issues and control for unobserved country-specific factors.[13] To further investigate the impact of BRI, we split the sample into pre-BRI (1990-2013) and post-BRI (2013-2020). Summary results are provided in Table 1.

Summary results in Table 1 trade has a positive and significant impact on economic growth. Specific numbers (based on parameter estimates) show that this positive relationship has improved over the period (213 to 2020) with a 10 percent increase in trade increase GDP of participating countries by only 1.5 percent while the same exerts a 3.3 percent increase in GDP in the post-BRI period. The results also confirm that debt has a negative impact on economic growth which is reduced by joining BRI. The numbers suggest that a 10 percent increase in external debt reduced

[11] The data is obtained from the World Development Indicators (WDI) of the World Bank.

[12] Following equations are used for model estimation:
$Y_{i,t} = \beta_0 Y_{i,t-1} + \beta_1 trade_{i,t} + \beta_2 X_{i,t} + \mu_t + \eta_i + \varepsilon_{i,t} \ldots$ (1); $Y_{i,t} = \beta_0 Y_{i,t-1} + \beta_1 trade_{i,t} + \beta_2 debt_{i,t} + \beta_3 X_{i,t} + \mu_t + \eta_i + \varepsilon_{i,t} \ldots (2)$; $y_{i,t} = \beta_0 y_{i,t-1} + \beta_1 trade_{i,t} + \beta_2 trade_{i,t} * debt_{i,t} + \beta_3 X_{i,t} + \mu_t + \eta_i + \varepsilon_{i,t} \ldots$ (3)

[13] Our empirical approach builds on the works of Levine, Loayza, Beck (2000), Dollar and Kraay, (2004), Chang et al., (2009), Calderon and Fuentes (2013), and Ulasan (2015). We control for the effects of foreign direct investment, population growth, inflation, and investment in infrastructure.

GDP by 3.5 percent where it impacts GDP by 2.7 percent in the post-BRI period. We further tested the hypothesis that trade policy moderates the negative effect of external debt on economic growth. We found that the interaction term between trade and external debt has a positive and significant relationship, implying that the trade policy has a role in alleviating the negative effect of external debt on economic growth. These are interesting results and could be considered as the main contributions of this paper.

Table 1: Summary of Important Results

Important Varriables	**Model 1: Trade-Growth, Trade-Debt Relationship**			**Model 2: With Interactive term – Trade*Debt**		
	Full Sample	**Pre-BRI**	**Post-BRI**	**Full Sample**	**Pre-BRI**	**Post-BRI**
Trade-Growth[a]	Positive, Significant 10% increase in trade increased GDP by 3.4%	Positive, Significant 10% increase in trade increased GDP by 1.5%	Positive, Significant 10% increase in trade increased GDP by 3.3%	Positive, Significant 10% increase in trade increased GDP by 1.5%	Positive, Significant 10% increase in trade increased GDP by 1.9%	Positive, Significant 10% increase in trade increased GDP by 1.2%
Trade-Debt-Growth[b]	Negative, Significant 10% increase in debt reduces GDP by 2.4%	Negative, Significant 10% increase in debt reduces GDP by 3.5%	Negative, Significant 10% increase in debt reduces GDP by 2.7%	Negative, Significant 10% increase in debt reduces GDP by 5.5%	Negative, Significant 10% increase in debt reduces GDP by 2.9%	Negative, Significant 10% increase in debt reduces GDP by 5.6%
Trade*Debt[c]				Positive, Significant	Negative, Significant	Positive, Significant

Control variables	Mostly significant and have expected signs

a) Refer to equation1, footnote 11

b) Refer to equation1, footnote 11

c) Refer to equation1, footnote 11

Source: Author's estimation and results

5.0 Conclusion and Policy Implications

This paper explores the unsolved puzzle of trade-growth relationship in the presence of rising external debt. Although, theoretical and empirical literature supports a positive trade-growth and a negative debt-growth linkages, but both have been tested independently. The BRI participating countries are enjoying the recent surge of Chinese investment leading to a rise in trade volumes. However, at the same time, the outstanding debt of the same countries is increasing rapidly. It is, therefore, to investigate the impact of economic growth by combining the two opposite effects. An attempt is made in this paper to achieve this objective.

The findings of this paper are consistent with the existing literature supporting a positive trade-growth nexus and a negative trade-debt relationship. However, the paper shows that with the belt and road initiative, trade has exerted a stronger effect on economic growth thus overcoming the negative effect of external debt and having a net positive impact on growth. This finding infers that the trade policy has a role in moderating the adverse effect of external debt on economic growth. We believe, these are interesting findings and have important policy implications.

The first policy implication is that BRI participating countries should be mindful of excessive borrowings, as well as where borrowed funds should be used. Second, participating countries, especially those with higher levels of external debt, require well-designed policies for managing external debt. At the same time, trade agreements must be appropriately negotiated between China and participating countries to reap the full benefits of trade liberalization. Given the weak infrastructure of some BRI countries, external borrowing is inevitable. However, this study finds that well-designed trade policies that could boost trade could offset the negative impact of debt and benefit all BRI countries.

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