The Impact of Covid-19 and Trade Openness on Government Debt: Case of Low and Lower-Middle Income Countries (2010-2020)

A THESIS

Presented to the MA Programme

of the OSCE Academy

in Partial Fulfillment of the Requirements for the Degree of

Master of Arts in Economic Governance and Development

by
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January 2023

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ABSTRACT

Drawing on the vast literature on trade openness impact on government debt, the research project is aimed to investigate the relationship between trade openness and external debt in countries with commodity exports and service exports. Thereafter, ways through which COVID 19 and trade openness aggravates the debt. The study analyzed a panel of 72 low- and lower-middle-income countries over the period from 2010-2020. The main research question is "What Effect does trade openness have on external debt in countries with commodity export and service export?" And sub-questions are: Does Trade openness effect external debt positively in countries where trade is more oriented toward Commodity exports? Does Trade Openness effect external debt negatively in countries where trade is more oriented toward Service exports? And lastly whether Covid-19 aggravates the effect on the external debt? A key observation highlighted in the literature review is the absence of studies of whether opening up trade has a similar impact on countries dependent on services exports compared with countries dependent on commodities exports. This gap in the empirical literature, together with the impacts of COVID-19 on government debt of low- and lower-middle-income countries, was a major motivating factor in initiating this study. Ordinary least square is used for conducting a variance inflation factor (VIF) test in order to make sure that data is free of multicollinearity. To address the endogeneity of regressor and heterogeneity, the Fixed Effect Method dynamic panel data estimator was employed. The results of the analysis found that economic growth, investment, trade openness, foreign direct investment, remittances, and dependency ratio all had a significant impact on external debt. The direction of the relationship between these variables and external debt was consistent with previous literature, with positive relationships found between trade openness in commodity export countries, remittances, and external debt, and negative relationships found between economic growth, investment, FDI, trade openness in service export countries, and dependency ratio and external debt. The study also found that COVID-19 has exacerbated the effects of trade openness on external debt, particularly in low- and lower-middle-income countries. These findings have important implications for policymakers seeking to understand the trade-related determinants of external debt and to mitigate the negative effects of the COVID-19 pandemic on government debt.

CHAPTER 1

Introduction:

Over the last few decades, the government debt has risen dramatically, and it has become the watchword of many low and lower-income countries, especially in Asian and African developing countries where the government debt has become worrisome. The issue of foreign debt and large government debt payments is a growing and persistent strain not only to developing countries but the whole world. For example, according to data from the Central Asian Bureau for Analytical Reporting[1] Uzbekistan has the fastest rate of growth in total government debt. In 9 months of 2020, only the indicator exceeds worth $29 billion, it was worth $21.7 billion (30.8% of GDP) in 2019, and 24.2 billion (40.4 % of GDP) in early 2020 which is an increase of more than 19.7% in just 9 months. Respectively, in 2019, Kyrgyzstan's and Tajikistan's debt indicators were $3.85 billion (54% of GDP) and $6.6 billion (81.2% of GDP). When compared to the previous year, the debt volume in these countries increased nearly 2.4 times.[2] Pakistan total external debt is also remarkably higher. Pakistan's external debt was 87% of GDP in late 2019, which has then increased to 87% GDP in early 2020, an increase of more than $2.63 billion.[3]

The government debt issue is more frightening to emerging markets and developing economies, as they are more prone to default on debt due to unstable revenue streams and high level of corruption. This is because they borrow money from international banks at low interest rates with the intention of paying them back with their future growth. However, if things do not go as planned, they are left with no other option but to default on the debts. This causes economic recession, which further pushes the economy towards a financial cliff. Looking at average data for aggregate foreign debt servicing over history, there is an elevated risk of government default associated with periods in which EMDEs foreign debt servicing exceeded 22% of exports and primary income. Figure 1 shows average debt service of 123 EMDEs, with the shaded region showing more than 20 % percent default by countries in periods where debt

[1] CABAR.asia "Central Asian Bureau for Analytical Reporting", 11 Feb, 202. https://cabar.asia/en/uzbekistan-government-debt-almost-doubled-in-two-years

[2] Yrysbek Ulukbek uulu "Time to pay. Kyrgyzstan gives up every fourth som from the budget to repay debts", *Radio Azzatyk*, https://rus.azattyk.org/a/30831427.html

[3] Central Bank of Pakistan

exceeded 22%.[4] Recent data also indicate that for the first time in thirty years, EMDEs are now once again approaching this level: the default rate on debt is above 20%. Challenges are also present when public debt is predominantly external, since foreign creditors are able to escape the financial crackdowns of domestic economies with greater ease. Then, when revenue streams are unstable and corruption prevails, governments will resort to desperate measures- such as printing money or raising taxes- in order to balance their books. In such cases, governments may be more prone to default on their debts since they are willing to compromise their sovereignty for financial stability.

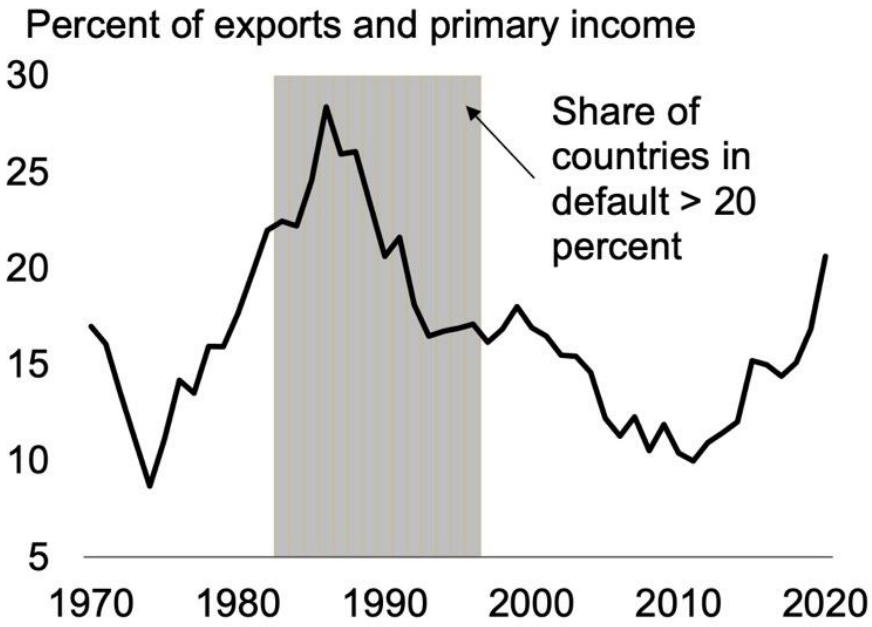

Figure 1: EMDEs: Average total External debt service. (Source: International Debt Statistics)

There are a number of factors contributing to rising public debt, including a negative current account balance, public spending, inflation, interest rate and debt stock.[5] All of these factors lead to government deficits, which then push governments towards resorting to non-sustainable ways to fund public expenditures, including borrowing. To be within the ambit of public debt, it has a significant effect on overall fiscal policy and bears a burden on the economic health of the country. For example, the expenses of the Kyrgyz Republic went up to approximately $ 787 million in 2020, of which $189,9 million were used to pay public debt. This amount is equivalent to

[4] M. Ayhan Kose et al. “Developing Economies Debt After the Pandemic”
[5] Soares, Carla Patrícia Miranda. "The Determinants of Public Debt and Its Financing."

24.2% of the available money that went to debt repayment.[6] This huge amount of debt payment means distortion in public spending of the Kyrgyz Republic and overall an altercation in fiscal policy.

Trade Openness is a main factor which enables an economy's ability to repay its debts, because it may lead to increased sources of foreign currency, such as net exports and FDI. Access to the foreign market for developing countries product and services is deemed as a necessary tool to lower the foreign debt while running trade surpluses. Restrictions on foreign market access may hamper indebted countries efforts to gain necessary foreign currency to pay off external debts and to avoid recourse to risky borrowing.[7] For these reasons, it is essential to emphasize the relationship between the trade openness and the external debt in low income and lower middle-income countries to secure sustainable resolutions for the external debt.

There are two contrary arguments regarding the link between trade openness and foreign debt. The first argument suggests a negative relationship between trade openness and external debt. This is because trade openness generally increases productivity, exports, and economic growth, which in turn increases the stock of foreign exchange reserves, resulting in increased service of foreign debt, thus decreasing the amount of external debt. The second argument suggests a positive relationship between trade openness and the external debt. The relationship is mainly positive because trade liberalization policies requires reduction and removal of trade tariffs to boost export and import between countries and blocs.[8] Since trade taxes are an important source of income for low and lower-middle income countries, a reduction in trade tax revenue would lead to fiscal gaps which must be filled by increased borrowing. In a similar vein, the positive relationship between trade openness and external debt is based on the fact that these countries heavily depend on the commodity exports. The case is related to debt issue in two ways. Firstly, the global commodity prices are falling due to the competitive global market due to globalization. Secondly, Commodity prices are subject to large fluctuation due to external shocks, which adds to uncertainty about a nation's revenue streams.[9]

[6] Ibid.
[7] Brock, William E. "Trade and Debt: The Vital Linkage." 1037–57
[8] Zafar et al. "Impact of trade liberalization on external debt burden" 1-17
[9] Ibid

The COVID-19 pandemic is another topic of significance in recent years as the impact was profound on overall economic setting. It's also a further contributing factor in some of the poorer and lower-middle-income countries challenging debt situations, and it is not a sole cause for the country's debt crises. Even after extraordinary spending and borrowing from the coronavirus pandemic are over, the nation's debt is likely to keep growing, perhaps nearly double that of the economy, due to existing laws, programs, and promises.[10] Even if borrowing is subsequently brought down quickly to pre-crisis levels, such an inflated debt level will take many decades of careful management. Even if, as expected, borrowing falls relatively quickly back to the levels it was at prior to the COVID crisis, record amounts of borrowing undertaken would add significantly to the stock of net public debt. As initial recovery from COVID-19 gives way to a new normal, the balance between benefits and costs from debt accumulation becomes increasingly tilted in favor of costs. COVID-19 has left behind a legacy of record-high borrowing, and has altered the balance between benefits and costs of government debt accumulation.[11]

The relationship between trade openness and external debt is much more complicated and is subject to more scrutiny. Therefore, this research project is aimed to evaluate the impact of trade openness on government debt. Thereafter, ways through which COVID 19 and trade openness aggravates the government debt. The main research question is "What Effect does trade openness have on external debt in countries with commodity export and service export?" And sub-questions are: Does Trade openness effect external debt positively in countries where trade is more oriented toward Commodity exports? Does Trade Openness effect external debt negatively in countries where trade is more oriented toward Service exports? And lastly whether Covid-19 aggravates the effect on the external debt?

There is a significant body of literature on the relationship between trade openness and external debt. Many studies have found that trade openness can have a positive impact on external debt levels, as it can lead to increased exports and economic growth, which can in turn lead to an improvement in a country's balance of payments and a reduction in external debt.

[10] Scott Reeves et al,. "Covid-19 Pandemic Sends National Debt to Highest Level Since WWII"
[11] Kose et al,. "Navigating the Debt Legacy of the Pandemic"

However, A key observation highlighted by the literature reviews is that there is a significant gap in the literature on the relationship between trade openness and external debt for countries that are dependent on service-sector exports compared to countries that are dependent on commodity exports. While there is a robust body of literature on the relationship between trade openness and external, there is much less research into whether openness to trade has similar effects for countries that are dependent on service-sector exports as for countries that are dependent on commodity exports.

One reason for this gap in the literature may be that the effects of trade openness on external debt levels for service-sector dependent countries are more complex and nuanced than for commodity-dependent countries. The service sector is often more diverse and multifaceted than the commodity sector, which may make it more difficult to generalize about the effects of trade openness on external debt levels in this type of economy. In addition, the COVID-19 pandemic has had a significant impact on low and lower-middle income countries, many of which are dependent on service-sector exports. This has further highlighted the need for more research on the effects of trade openness on external debt levels in these types of economies, as the pandemic has had a disproportionate impact on these countries and has the potential to significantly alter their economic trajectory. Overall, understanding the effects of trade openness on external debt levels in countries dependent on service-sector exports and commodity-service exports is an important area of research, as it can provide valuable insights into the economic development and stability of these countries.

This gap in empirical literature along with the impact of COVID-19 in low and lower-middle income countries was the main driver of the motivation to start this research. This article will provide empirical analyses on the impact of trade openness and COVID-19 on foreign debt of low and lower-middle-income countries using annual data for 2010 to 2020 using VIF test, Skewness/Kurtosis tests to establish normality, and Fixed and Random Effect methodology.

CHAPTER 2:

Literature Review:

There are multitudes of quantitative and qualitative research and reports that have investigated the effect of political stability and trade openness along with other variables on government debt.

The causal effect of trade openness and external debt have been supported by many empirical literatures. In his paper, Sèna Kimm Gnangnon (2020) empirically examines the relationship between trade openness and government debt. He begins by reviewing the existing literature on this topic, which generally supports the idea that trade openness can have a positive impact on external debt. Gnangnon discusses several mechanisms by which trade openness can affect external debt levels. One of these mechanisms is through its impact on inflation volatility. Gnangnon cites research that suggests that trade openness can help reduce inflation volatility, which in turn can lead to less instability in government debt levels.

However, Gnangnon also notes that trade openness can lead to a country becoming more vulnerable to external shocks, which can result in greater output variability.[12] In this specific instance, trade openness is associated with higher government borrowing, due to greater instability of government spending. Gnangnon also discusses the potential role of other factors, such as government policies and institutions, in shaping the relationship between trade openness and government debt. He cites research that suggests that countries with strong institutions and effective policies may be better able to leverage the benefits of trade openness and reduce their debt levels. Overall, Gnangnon's literature review suggests that the relationship between trade openness and government debt is complex and multifaceted, and that there are both positive and negative mechanisms by which trade openness can affect government debt levels. Yet, the preponderance of evidence supports the idea that trade openness can have a positive impact on government debt. Also, Zakaria investigated the effect of trade openness and government debt in Pakistan applying GMM methodology and estimating different models spanning the period between 1972 and 2010. Outcomes from his analytical techniques confirms that increasing trade openness leads to increased external debt in Pakistan economy.[13]

[12] Sèna Kimm Gnangnon, “Tax Reform and Public Debt Instability in Developing Countries” 54–67.
[13] Muhammad Zakaria, “Interlinkage between openness and foreign debt in Pakistan” 161 - 170

There is a debate in the literature on the impact of trade openness on external debt. On one hand, some studies have found a negative relationship between trade openness and debt, suggesting that trade openness can lead to increased economic growth, productivity, and exports, which in turn can improve a country's balance of payments and reduce government debt. For example, Lane and Milesi-Ferretti (2000) argue that trade liberalization can have a positive impact on government debt and debt servicing, as it tends to increase economic growth, productivity, and exports. This relationship has been supported by empirical evidence, which suggests that trade openness can attract foreign direct investment and increase the accumulation of foreign exchange reserves, enabling countries to finance technology and improve their productivity.[14] On the other hand, there is also evidence to suggest that trade openness can have a negative impact on government debt, particularly for developing countries. This argument suggests that trade liberalization measures, such as tax reduction and the elimination of export tariffs, can lead to budget gaps that must be filled by increasing debt.[15] A recent study by the IMF on data from 125 countries found that high and middle-income countries were able to recover 35 to 55 percent of each dollar of tax revenue lost due to trade liberalization, while low and lower-middle-income countries were able to recover none.[16] This suggests that trade liberalization policies may even worsen tax revenue for the government, which can have a direct impact on fiscal balance. Overall, the literature on the impact of trade openness on government debt is mixed, with some studies suggesting a positive relationship and others a negative one. Further research is needed to more fully understand the complex relationship between these variables and to identify the factors that may mediate or moderate their relationship.

Moreover, one factor that has been identified as potentially influencing the relationship between trade openness and external debt is the dependence of countries on commodity exports. In particular, there is evidence to suggest that countries with high dependence on commodity exports may be more vulnerable to external shocks and may be more prone to increasing debt levels. This vulnerability is due to "commodity price boom-bust cycle." When commodity prices are high, countries with high dependence on commodity exports may see an influx of revenue and may be tempted

[14] Philip R. Lane, and Gian Maria Milesi-Ferretti. "External Capital Structure Theory and Evidence."
[15] Aldo Caliari, "The debt-trade connection in debt management initiatives" 101-122.
[16] Thomas Baunsgaard and Michael Keen, "Tax revenue and (or?) trade liberalization."

to increase their borrowing, either to finance current consumption or to invest in long-term projects. However, when commodity prices inevitably decline, these countries may find themselves in a difficult position, as they now have to service their debt with fewer resources. This can lead to a negative fiscal position, slower economic growth, and increased debt accumulation.[17] On the other hand, countries with high dependence on service exports may be less vulnerable to external shocks and may be less prone to increasing debt levels. This is because service exports are typically less susceptible to the commodity price boom-bust cycle, as they are not tied to physical goods that can be subject to fluctuating demand and prices. As a result, countries with high dependence on service exports may have more stable sources of revenue and may be better able to plan their budgets and manage their debt. It is worth noting that this is not to say that countries with high dependence on commodity exports are always more vulnerable to external shocks and prone to increasing debt levels, or that countries with high dependence on service exports are always less vulnerable and less prone to increasing debt levels. There are many other factors that can affect a country's external debt levels, such as the country's macroeconomic policies, its level of development, and its political and institutional environment. However, dividing countries into these two broad categories based on their dependence on commodity or service exports can provide valuable insights into the ways in which trade openness and dependence on specific types of exports may affect external debt levels.

Looking further, the governments may resort to financing government expenditure through debt for so many reasons like political, institutional and structural variables. The government bids to increase its political performance through debt financing which results in a debt accumulation. There is a positive correlation between government political performance and the government debt. So, the level of political stability can affect the size of the debt. Indeed, Lewis and W. Snider (1990) are the supporters of the argument that political performance does have influence on the size of the debt. They examined the links between the political performance of governments, External debt service, and Domestic Violence in a cross-sectional pooled time series of over 35 third World countries for the period of (1974-86). Their findings indicate a positive relationship between political performance and external debt across countries. In their opinion, higher political instability indirectly increases the frequency of people

[17] Zafar et al. “Impact of trade liberalization on external debt burden” 1-17

demonstrations, political strikes, and uprisings while the government tries to adjust the external debt which would further lead to domestic political violence. However, there is no direct effect from political stability that leads to political violence for all the concerned countries. The study further argues that many third-world countries are excessively in debt because the revenue extraction and public resources have led to excessive political manipulation of macroeconomic policy which later contributed to many of the structural imbalance resorting to extensive foreign borrowing.[18] So political variable such as political stability will be added to the study of increasing government debt due to political performance.

Apart from trade openness and political variables, other variables such as real GDP growth, investment, government expenditure, population growth, unemployment, and age dependency will be added to the study incorporated from a study by Vighneswara Swamy. In his study several additional macroeconomic variables were included in the analysis of the factors influencing external debt in sovereign countries. These variables included real GDP growth, investment, government expenditure, population growth, unemployment, and age dependency. Using an annual dataset of macroeconomic data on 252 countries from 1980-2009, the study sought to identify the key determinants of government debt in sovereign countries and to examine the relative importance of these variables. The estimations were carried out using the GMM method of fixed period effects with IV estimation for panel data. The conclusion of the study infers the causation for the government from its macroeconomic determinants: real GDP growth, trade openness, Investment, final consumption expenditure, population growth, unemployment to debt, trade openness, gross fixed capital formation, and age dependency.[19] The study found that all of the included variables had a statistically significant effect on government debt, although the magnitude of the effect varied. For example, the study found that real GDP growth had a negative effect on government debt, meaning that countries with higher GDP growth tended to have lower levels of debt. This is likely due to the fact that strong economic growth can generate higher levels of government revenue, which can help to reduce the need for borrowing. On the other hand, variables such as investment, government expenditure, and population

[18] Lewis Snider "The Political Performance of Governments, External Debt Service, and Domestic Political Violence." 403–22.
[19] Vighneswara Swamy, "Government Debt and Its Macroeconomic Determinants", Munich Personal RePEc Archive

growth had a positive effect on government debt, meaning that countries with higher levels of these variables tended to have higher levels of debt. This is likely due to the fact that these variables can increase the demand for borrowing, as they may require additional financing to be sustained. Also, The paper concludes that the government debt is a function of income level and political governance. It also infers that there are no significant differences in terms of impact between developed countries and developing countries. However, it does not explain why some governments have higher levels of government debt than others.

The main paper for the analysis is written by Dawood et al. The paper by Dawood et al. is a valuable contribution to the understanding of the determinants of external debt in Asian developing and transitioning countries. It provides a detailed and systematic analysis of the factors that influence external debt in these countries and the way in which they interact. Using a panel data approach and the Generalized Method of Moments (GMM) estimator, the paper investigates the determinants of external debt in 32 Asian countries over the period 1995-2019. The results of the estimation suggest that exchange rate, trade, and government expenditure have a positive effect on external debt, while economic growth and investment have a negative effect on external debt.[20] The use of panel data and the GMM estimator are appropriate choices for this type of analysis, as they allow for the consideration of both cross-sectional and time-series variation in the data. The panel data approach allows for the inclusion of multiple countries and multiple time periods in the analysis, which can provide a more comprehensive and robust assessment of the factors influencing external debt. The GMM estimator is a flexible and efficient method for estimating panel data models, and has been widely used in the literature on external debt and other economic issues. The method though still requires further analysis to be fit with the paper.

Important to mention that, The COVID-19 pandemic has had a significant impact on government debt around the world, leading to an increase in debt in both advanced and developing economies. According to recent estimates, global public debt stood at a five-decade high of 97% GDP in 2020, while among emerging markets and developing economies (EMDEs), it was at a three-decade high of 63% GDP. This marks the largest one-year increase in world public debt ever recorded. The increase in

[20] Muhammad Dawood, Samuel Tawiah Baidoo, and Syed Mehmood Shah, "An Empirical Investigation into the Determinants of External Debt in Asian Developing and Transitioning Economies," *Development Studies Research* 8, no. 1 (January 2021): pp. 253-263

government debt is due in part to the measures taken by governments to respond to the economic impacts of the pandemic, such as stimulus spending and borrowing to finance pandemic-related expenses. As the initial COVID-19 recovery gives way to the new normal, the benefit-cost trade-off for accumulating debt is increasingly tipped in favor of costs. This is due to the legacy of record-high borrowing left behind by the pandemic, as well as the changes in the balance between benefits and costs of government debt accumulation brought about by the pandemic.[21] Given the significant impact of COVID-19 on government debt, it is important to study this issue in order to understand the implications of the pandemic for fiscal policy and to identify strategies for promoting sustainable fiscal management in the post-pandemic world. This can involve examining the factors that have contributed to the increase in government debt, the implications of high levels of debt for economic growth and development, and the ways in which governments can manage their debt in a responsible and sustainable manner. Such research can provide valuable insights for policymakers and stakeholders seeking to address the challenges posed by the legacy of COVID-19 on government debt.

Moreover, the COVID-19 pandemic has had a significant impact on the global economy, leading to an economic contraction in 2020 and driving an estimated 100 million people to extreme poverty. This impact has been particularly pronounced in underprivileged countries around the world. In addition to the human toll of the pandemic, it has also had significant economic consequences, including an increase in public debt. In advanced economies, public debt as a percentage of GDP has increased by 16 percentage points to 120%, while in developing countries, it has increased by 9 percentage points to 63%. The increased public debt may pose a challenge for countries in the long term, as they will need to find ways to service this debt while also managing the ongoing impacts of the pandemic.[22]

To provide some relief to countries struggling to service their debt as a result of the economic downturn caused by the pandemic, an initiative was launched that suspended $12.9 billion of debt-service payments for participating countries from May 2020 to December 2021. While this initiative has provided some temporary relief, it is likely that the long-term effects of the pandemic on external debt will continue to be

[21] Kose et al,. "Navigating the Debt Legacy of the Pandemic"

[22] Daniel Runde, Frank Kelly, and Romina Bandura Bandura, "The Next Wave Is Not a COVID-19 Wave: Debt Sustainability in Developing Countries," The Next Wave Is Not a Covid-19 Wave: Debt Sustainability in Developing Countries

felt for some time. Further research is needed to understand the full extent of the impact of COVID-19 on external debt and to identify effective strategies for addressing this issue. The increase in fiscal policy in response to the pandemic has added to already high levels of global economic indebtedness, highlighting the need for careful and strategic management of public debt in the aftermath of major disasters.

According to research by Rachel Yuting Fan and colleagues (2022), in developing countries, government borrowing tends to increase in order to sustain economic recovery during and following major disasters like COVID-19. The funding needs of these countries have significantly increased in recent years, as evidenced by the increase in debt accumulation over the 2010-2020 period. While developing countries have been relatively moderate in their use of fiscal policy compared to advanced economies, overall public debt levels, including debt held in foreign currency, have continued to increase through 2020 and are likely to continue to do so in 2021. While needed, such an increase in fiscal policy has added to already high levels of global economic indebtedness.[23]

COVID-19 and the Coming Debt Crisis, a report released by UNICEF, in 2019, 25 countries around the world, most of which are already struggling with poverty and hardship, devoted a higher share of their total public spending to servicing their debts than they did on education, health, and social protection combined. These countries, including Chad, The Gambia, Haiti, and South Sudan, spent at least $3 on debt service for every $1 spent on basic social services. The COVID-19 pandemic has exacerbated this situation, as the global economic downturn caused by the pandemic led to the biggest one-year increase in world public debt ever.[24]

The disproportionate impact of the pandemic on underprivileged countries and the resulting increase in public debt have significant implications for these countries' ability to provide essential services to their citizens. The high levels of debt service relative to spending on basic social services may hinder these countries' ability to invest in the education, health, and social protection of their citizens, potentially exacerbating existing challenges and contributing to a vicious cycle of poverty and debt. Further research is needed to understand the full extent of the impact of COVID-19 on external debt and to identify effective strategies for addressing this issue.

[23] RACHEL YUTING FAN, DANIEL LEDERMAN, and CLAUDIO ROJAS, "On Calamities, Debt, and Growth in Developing Countries," World Bank Blogs, accessed October 5, 2022,
[24] M. Ayhan Kose et al., "Developing Economy Debt after the Pandemic," CEPR, November 3, 2021,

Theoretical Framework:

The debt overhang theory which was propounded by Howard (1972) provides a better explanation of the theoretical basis of the government debt studies. A debt overhang is when an entity (or a government) takes on debt to such a level that they carry too much debt to fund future projects. Debt overhang refers to debt loads that are so large the government cannot take on more debt to fund future projects. A debt overhang is when all revenues are used to repay existing debt rather than fund new investment projects, thus affecting macroeconomic stability and making a default much more likely. A debt overhang serves to deter continued investment, since any revenues generated from new projects would be paid off against existing debt held by the country, leaving the country with little ability to attempt to climb its way out of the hole.[25]

Furthermore, Keynesian theorists argue that one way of stimulating economic growth is by pumping more money into the economy, and that can be done through borrowing, as long as expected revenues do not meet public spending. This is because government spending funded by borrowing has a "crowding-in" effect, producing a positive multiplier effect on a nation's output or income.[26] While this may be the case, but rising budget deficits and debt-financed spending lead to higher public spending, which expands aggregate demand for both domestically produced commodities and imported goods, further deteriorating trade balances. Also, a way for government to gain revenue is through net exports and taxes which also increase foreign exchange reserves of the country. Since, trade openness requires countries to adopt certain measures of lower tariffs or no tariffs, this will lead to lower tax revenues and thus higher fiscal deficits. Furthermore, Keynesian theory implies the effect of a "crowding out" that is, public borrowing lowers funds available for private investment and distorts economic cycle, thereby making a country not only inept at paying its debts, but also eager for more debt. Eventually two main relationships have been established, broadly speaking, in accordance with existing economic theories, between trade and debt. The correlation could either follow the Keynesian hypothesis (positive), or debt overhang hypothesis (negative).

From the literature review and the theoretical framework, the following hypothesis was developed and will be tested:

[25] CFI team "Debt Overhang"
[26] Elmendorf and Mankiw, "Government Debt"

- Trade openness has a positive and significant effect on external debt in countries where trade is more oriented toward Commodity exports
- Trade openness has a negative and significant effect on external debt in in countries where trade is more oriented toward service exports.

Model:

The thesis seeks to identify the impact of trade openness on government debt across a panel of 72 low to lower-middle-income countries. Several economic indicators were considered for their effect on the national debt, considering the literature. In particular, sixteen indicators were considered in order to demonstrate the effect on government debt. External Debt as % GDP is used as a dependent variable for measuring Government Debt. The variables Budget as a percentage of GDP, Inflation, Unemployment rate, Real Interest rate, Corruption Perception Index, Foreign Direct Investment (FDI), Trade Openness, Economic growth, Gross capital formation, Remittances, and dependency ratio are considered as independent variables. The variables are described as below:

- **External Debt (ExtDebt**): Total external debt is debt owed to non-residents repayable in currency, goods, or services. Total external debt is the sum of public, publicly guaranteed, and private nonguaranteed long-term debt, use of IMF credit, and short-term debt. (theglobaleconomy.com)
- **Budget % of GDP (GovExp):** The percentage of government expenditure over total GDP. (theglobaleconomy.com)
- **Dependency Ratio (DEP):** shows the ratio of dependent population over employed population. It is usually measured as the population less than 15 years + Population more than 60 years/Total Employed Population. (theglobaleconomy.com)
- **Inflation rate (Inflation):** The rate of change in Consumer Price Index (Data World Bank)
- **Unemployment Rate (Unemp):** share of the labor force that is without work but available for and seeking employment. (theglobaleconomy.com)

- **Real Interest rate (IR):** Interest rates on bank credit to the private sector. Lending rate is the bank rate that usually meets the short- and medium-term financing needs of the private sector adjusted to Inflation. (theglobaleconomy.com)
- **Corruption Perception Index (CPI):** is an indicator of perceptions of public sector corruption, on a scale from 0 to100. A coefficient of zero indicates the country is highly corrupt, while coefficient closer to 100 means the country is clean from corruption. (theglobaleconomy.com)
- **Foreign Direct Investment (FDI):** net inflows of investment to acquire a lasting management interest (Data World Bank)
- **Trade Openness (TadeOpp)**: Exports plus imports as percent of GDP (theglobaleconomy.com)
- **Economic growth (EcoGrowth):** The rate of change of real GDP (theglobaleconomy.com)
- **Gross Capital Formation (INV):** Capital Investment as percentage of GDP. (databank.worldbank.org)
- **Remittances (Rem):** personal transfers and compensation of employees. (World Economic Indicator)

The data were collected from several sources, such as TheGlobalEconomy.com, World Bank Data, and World Economic Indicators, as well as CEICData. In addition, it is hypothetically assumed based on literature review that dependent and independent variables are supposed to have positive and negative causal relationships. According to the literature reviews, variables such as government spending, inflation, political stability, investment, and interest rates have positive effects on government debt. Variables of Economic Growth, Foreign Direct Investment, Political Stability, Population Growth, and Foreign Aid affect Government Debt negatively. Trade openness though have positive effect on countries with higher commodity trade, while it has negative effect on service-oriented export. The latter implies that those countries with higher export of services tend to have lower and inverse relationship with External debt. The model used to estimate is the linear combination of all the independent variables and their correlations to the Government Debt, which is the dependent variable. The countries are then divided into two commodity export and service export

countries. The model for both of the countries would be same. The model is borrowed from a paper by Dawood, M., Baidoo, S. T., & Shah, S. M. It studies external debt drivers across a panel of 32 Asian developing countries over 1995-2019. The baseline model specification is as follows:

$$Debt_t = \alpha + \beta_0 GDPgrowth_{t-1} + \beta_1 CInv_t + \beta_2 BGDP_t + \beta_3 TO_t + \beta_4 INF_t + \beta_5 FDI_t + \beta_6 RIR_{it} + \varepsilon_t$$

The extended model has been developed by adding nine more variables to the baseline model and the lag of dependent variable has also been taken into consideration. The lag of government debt denotes that the debt piles from previous year does affect the debt formation in this year. The dynamic panel data model specification is as follows.

$Y_{it}=Y_{i,t-1} + \beta_j x_{it} + \mu_i + V_{it}$

Y is dependent variable, $Y_{i,t-1}$ is the lag of government debt, X includes all the explanatory variables, μ includes all the time invariant variables and V is the error term. The extended model is:

$$Debt_{it} = \alpha + \beta_0 EcoGrowth + \beta_1 Inv_{it} + \beta_2 Inflation_{it} + \beta_3 Unemp_{it} + \beta_4 TradeOpp_{it} + \beta_5 FDI_{it} + \beta_6 Rem_{it} + \beta_7 GovExp_{it} + \beta_8 CPI_{it} + \beta_9 RIR_{it} + \beta_{10} DEP_{it} + \varepsilon_{it}$$

Where, INV=Gross Capital Formation/GDP, Unemp=Unemployment Rate, FDI=Foreign Direct Investment, Rem=Remittances, GovExp=Government Spending/GDP, CPI=Corruption Perception Index, RIR= Real Interest Rate, DEP=Dependency ratio. ε indicates the white noise error term. β denotes the coefficient of the corresponding explanatory variable. The panel is consisting of 56 countries with commodity export and 16 countries with service-oriented export and each of the country is denoted with sub subscript "i" in the regression model. The subscript "t" indicates the time which is number of years which is eleven years from 2010-2020. The "α" is a constant term which means holding everything else constant how much will the government debt vary.

CHAPTER 3 :

Presentation of Collected Data:

This research includes dynamic panel data on public debt and its determinants for 72 low-income and low-middle-income countries. The list of countries was selected from the World Bank data classified as Low Income and Low Middle Income Countries. The data for the dynamic panel will examine the period from 2010 to 2020. There are in total 792 observations in the data set. The summary of the data is as follows:

Table 1: Descriptive statistics of dependent and independent variables

No	**Variables**	**N**	**Mean**	**Sd**	**Min**	**Max**
1	External Debt	759	44.14	34.30	.14	283.25
2	Economic Growth Rate	788	3.84	4.40	-36.4	20.72
3	Dependency Ratio	792	72.63	17.37	34.76	111.94
4	Trade Openness/GDP	732	72.98	39.17	.78	348
5	Government Spending/GDP	701	14.72	8.20	3.59	72.61
6	Investment	720	25.77	10.30	-.1	79.4
7	Corruption Perception Index	726	30.66	9.45	8	68
8	Inflation	751	7.07	23.53	-4.3	557.2
9	Unemployment rate	770	6.82	6.09	.14	28.39
10	Interest Rate	504	8.52	8.80	-23.14	52.44
11	Tax Revenue	417	14.39	5.36	2.98	38.08
12	Remittances	788	6.56	7.28	0	43.77
13	Globalization Index	718	51.73	8.76	32.81	74.96
14	Pop Growth	792	2.03	.93	-1.72	3.91
15	FDI	786	4.28	8.16	-37.17	103.34

Overall, there are 792 observations, however, some data were missing at a certain time, which caused a decrease in number of observations in descriptive data. Descriptive summary provides us with number of observations, average, standard

deviation, and the minimum and maximum values for variables. The dependent variable, external debt, shows mean 52.6, showing average government debt as a share of GDP for the selected countries. The lowest foreign debt among the low-income and lower-middle-income countries was 0.14 per cent, i.e., Myanmar, while the highest value of debt was 283.25 per cent for Mongolia. Trade openness is also very high in the region, averaging 72.98, and a highest value at 348 percent in Djibouti. At the same time, a median of CPI at 30.66 indicates that countries in the group are very corrupt. Details on other variables are given above.

Descriptive Analysis

The data has been segregated based on countries export characteristics. This is done primarily to understand the difference in impact between services export-oriented countries and goods export-oriented countries. The trade openness concept is dynamic, changing and growing constantly as new countries join the global trading process. Many believe that increasing global trade is beneficial for everyone involved. However, there are many debates about the pros and cons of trade openness on government debt and its policy responses. The first argument of this hypothesis suggests that there is a negative relationship between trade openness and external debt. In this way, it's similar to how a country's income affects its financial stability. If the country's income increases, its financial burden decreases- just as increasing trade openness decreases external debt. The second argument of the hypothesis suggests a positive relationship between trade openness and external debt. The ratio is mostly positive because these countries rely heavily on commodity exports. The case is connected to the debt issue in two ways. First, global commodity prices are falling as a result of globalization leading to intense competition in global markets. Second, commodity prices will fluctuate sharply due to external shocks, increasing the uncertainty of a country's source of income. Therefore, it's critical that any relationship between trade openness and external debt be understood in relation to how these factors affect each other. The two arguments presented as hypothesis are also evident from the data of presented countries in Figure 2.

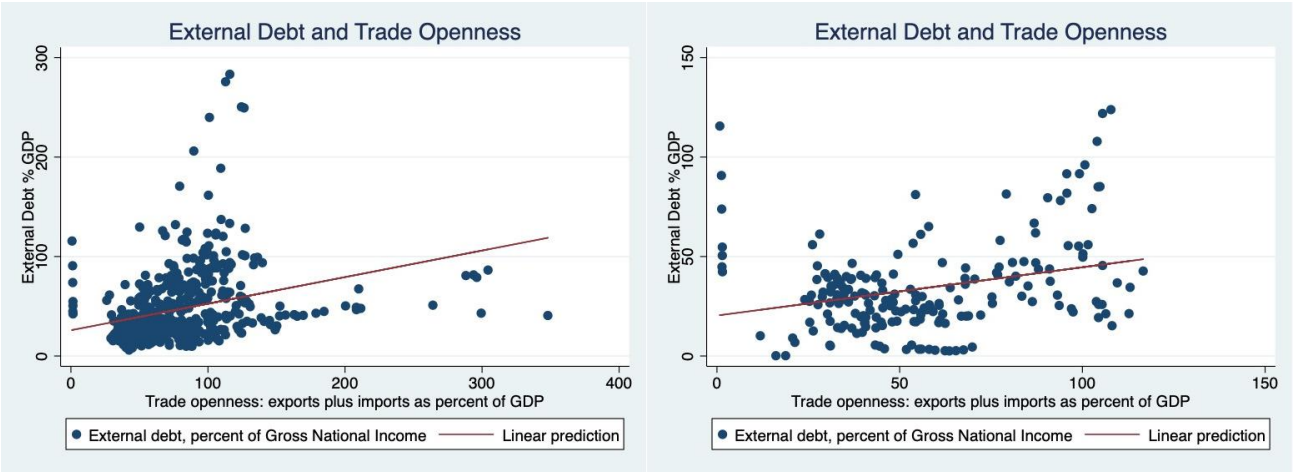

Figure 2: Scatterplot of External Debt and Trade Openness in Commodity Oriented and Service Oriented Countries

The figure 2.1 shows the scatter plot between External Debt and Trade Openness. The countries included in the data are from commodity-export-oriented countries. The countries are: Afghanistan, Angola, Bangladesh, Benin, Bhutan, Bolivia, Burkina Faso, Burundi, Cambodia, Cameroon, Cape Verde, Central African Republic, Chad, Comoros, Democratic Republic of the Congo, Djibouti, EL Salvador, Gambia, Guinea, Guinea-Bissau, Haiti, Honduras, Ivory Coast, Kiribati, Kyrgyzstan, Laos, Lesotho, Liberia, Madagascar, Malawi, Mali, Mauritania, Micronesia, Moldova, Mongolia, Mozambique, Nepal, Nicaragua, Niger, Palestine, Republic of the Congo, Rwanda, Sao Tome and Principe, Senegal, Sierra Leone, Solomon Islands, Sri Lanka, Sudan, Swaziland, Tajikistan, Togo, Uganda, Uzbekistan, Vietnam, Zambia, and Zimbabwe. The scatter plot suggests that as Trade Openness as a percentage of GDP increase so does the External Debt increase but by a lot. The data is more concentrated toward 100 Percent of GDP in commodity service-oriented countries with some outliers around 200 to 300 percent of GDP. The slope of linear prediction line is less steep than the service-oriented export countries.

While on the other hand, the graph depicts the scatter plot of External debt and trade openness for Service oriented countries. The countries are: Algeria, Burma, Egypt, Ethiopia, Ghana, India, Kenya, Morocco, Nigeria, Pakistan, Papua New Guinea, Philippines, Tanzania, Tunisia, Ukraine, and Vanuatu. These countries are not much indebted compared to the commodity export-oriented countries. The slope of linear prediction is also steeper compared to other countries. The data is clustered below 50% and with some outliers around 120 percent of GDP. Both of these graphs explain the

difference between the effect of trade openness on government debt in Service and Commodity oriented export countries.

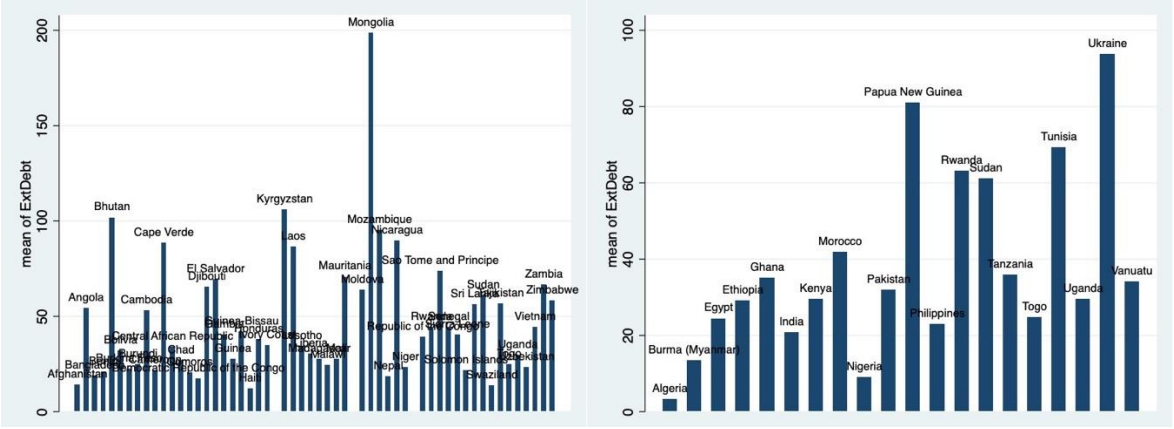

Figure 3: Mean of External Debt for Commodity Export and Service Export Countries

The data for segregated group of countries in terms of export characteristics also suggest a peak in External debt between 50% to 100 % of GDP in commodity export countries while it is between 20% to 50% of external debt as percentage of GDP. The highest debtor among commodity export countries is Mongolia. If we further analyzed the Mongolian Economy its debt crisis is caused by a combination of overly optimistic earnings forecasts based on unrealistic expectations of growth in mining sector revenues, unplanned spending and a host of small infrastructure projects with dubious economic development benefits.

Mongolia's economy primarily relies on exports from its resources, such as coal, gold, iron, copper, titanium and sodium chloride. Its dependence and confidence in commodity export to repay the debts and grow economy was the biggest mistake made by Mongolia making it one of the highly indebted country with an external debt of 200% of GDP. Mongolia is then followed by Kyrgyzstan, Bhutan, Cape Verde, Mozambique, Nicaragua as high debtors of the commodity export group of countries. Kyrgyzstan's is another big exporter of Exports The top exports of Kyrgyzstan are Gold ($1.86B), Precious Metal Ore ($122M), Dried Legumes ($66.8M), Refined Petroleum ($47.7M), and Raw Cotton ($27.1M). It is not surprising to see these countries among the highly indebted countries. There could be many factors behind the debt accumulation but a stable revenue stream from exports along with intact policies are the goals for these countries to reduce its debt accumulation.

Furthermore, if we recall the chart in Figure 1 and look at the historical average of total external debt service, we see that when there was elevated risk of government default associated with periods in which EMDEs foreign debt servicing exceeded 22% of exports and primary income. Figure 1 illustrated data for debt service of 123 EMDEs, with the shaded region shown a more than 20 % percent default by countries in periods where debt exceeded 22%. Now look at the latest data in the chart below, showing average external debt in 2020, with EMDE approaching these levels for the first time in three decades: most countries have default rates above the 20% figure.

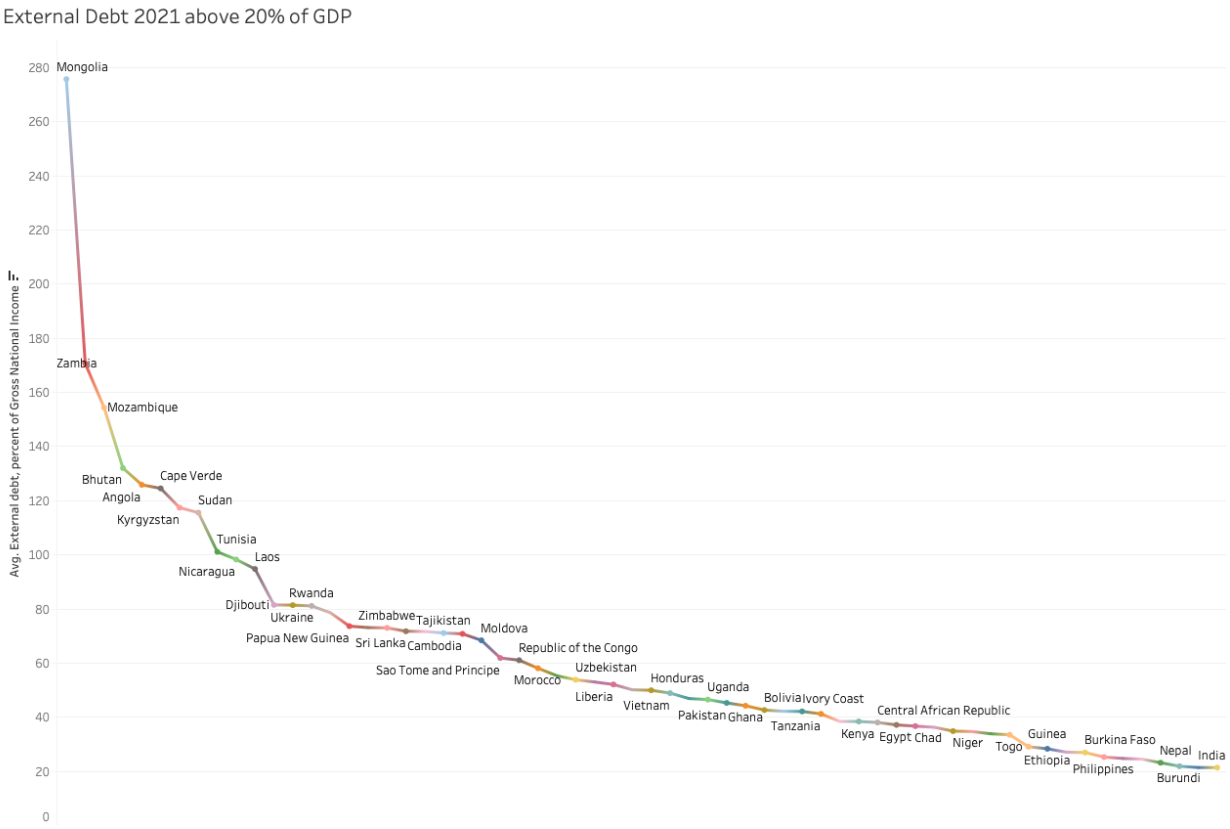

Figure 4: External Debt above 20% of GDP

The figure 4 shows the list of the countries whose average debt has risen above 20%. These countries respectively are Mongolia, Zambia, Mozambique, Bhutan, Cape Verde, Angola, Sudan, Kyrgyzstan, Tunisia, Laos, Nicaragua, Laos, Djibouti, Rwanda, Ukraine, Papua New Guinea, Zimbabwe, Sri Lanka, Tajikistan, Cambodia, Moldova, Sao Tome, Morocco, Republic of Congo, Uzbekistan, Liberia, Vietnam, Uganda, Pakistan, Ghana, Bolivia, Ivory Coast Tanzania, Central African Republic, Egypt, Chad, Niger, Guinea, Togo, Ethiopia, Burkina Faso, Philippines, Nepal, India and Burundi. Looking at the total debt accumulation by these countries in 2021, we can

conclude the situation to be alarming comparing it to the historical data and default rate. Therefore, these countries must be cognizant of the consequences of not paying their debts. These countries are already paying a big chunk of their government revenue for debt services obligation which is a huge distortion in overall fiscal and monetary policy of these governments. While their confidence in revenue from export of commodity goods seems bleak and dangerous if not taken seriously. In addition, not paying external debt makes it difficult for nations to grow economically. However, not paying external debt has similar consequences as paying off external debt- it limits a nation's growth potential. Interest rates on unpaid debts increase as time goes on; this causes the cost of borrowing money to rise and incentivizes governments to postpone repayment as long as possible. Ultimately, this drives up inflation and hinders economic growth.

Delaying or avoiding repayments on external debt hurts both creditor nations as well as debtor nations. Not paying external debt hampers trade between nations by driving up interest rates. This limits the ability of both debtor and creditor nations to make economic gains off trade. Failing to repay external debts drives up inflation in both developing and developed countries. This makes buying items expensive for both creditor and debtor nations, negatively affecting trade and economic development in both groups of countries. Delaying or avoiding paying external debt limits economic growth in emerging economies. However, ending repayments on external debts is equally problematic- it hurts both creditor and debtor nations. The only sensible course is to limit both types of loans while accounting for inflation and economic growth limits along with exports revenue management.

VIF Test:

Table 2: VIF test result

No	**Variable**	**VIF**	**1/VIF**
1	TO	2.31	0.432603
2	INV	1.71	0.584926
3	GovExp	1.68	0.596191
4	Rem	1.62	0.617804
5	DEP	1.60	0.625795
6	FDI	1.50	0.667891
7	Unemprate	1.50	0.668804

8	CPI	1.45	0.687680
9	EcoGrowth	1.15	0.866333
10	INF	1.12	0.896524
11	RIR	1.09	0.920773
	Mean VIF	1.52	

Interpretation:

Variance inflation factors start at 1 and go up. The decimal representation of VIF's numerical value provides a percentage estimate of how much each coefficient's variance—or standard error squared—is inflated.

- 1 denotes no correlation.
- Moderate correlation is defined as 1 to 5.
- More than 5 indicates a strong correlation.

It is unclear exactly how big a VIF must be to become problematic. What is known is that regression results will be less trustworthy as VIF rises. A VIF of greater than 10 often denotes significant correlation and is cause for concern. A more conservative level of 2.5 or higher is recommended by certain authors. In our case, all of the variables included in the model are well below 2.31 which denotes that the model is free of multicollinearity. Thus, there is no need to remove any of the explanatory variables.

Correlation:

	ExtDebt	**EcoGro~h**	**INV**	**INF**	**Unempr~e**	**TO**	**FDI**
ExtDebt	1.0000						
EcoGrowth	-0.1275*	1.0000					
INV	0.2578*	0.1354*	1.0000				
INF	0.0654	-0.1408*	-0.0658	1.0000			
Unemprate	0.0708	-0.2511*	0.0405	0.0257	1.0000		
TO	0.3565*	0.0429	0.1878*	-0.0668	0.3113*	1.0000	
FDI	0.1108*	0.1242*	0.3303*	-0.0128	-0.0167	0.3205*	1.0000
Rem	0.0944*	-0.0795*	-0.0302	-0.0255	0.1528*	0.1226*	0.0241
GovExp	0.1769*	-0.1389*	0.1113*	-0.0575	0.4793*	0.2612*	-0.0313
CPI	0.2335*	0.0064	0.2697*	-0.0953*	0.0492	0.1825*	-0.0002
RIR	0.0972*	-0.0205	0.0396	-0.0505	-0.1026*	0.0279	0.0604
DEP	-0.3188*	0.0491	-0.1885*	0.0426	-0.1192*	-0.3555*	0.0675

Interpretation:

Table indicates that the Pearson correlation between External Debt and Economic Growth, Investment, Inflation, Unemployment Rate, Trade openness, Foreign Direct Investment, Remittances, Government Expenditure, CPI, Real Interest Rate and Dependency Ratio is (Economic Growth (r=-0.1275, sig.<0.05), Investment(r=0.2578, sig.<0.05), Trade openness (r=0.3565, sig.<0.05), FDI(r=0.1108, sig.>0.05), Remittances (r=0.0944, sig.<0.05), Government Expenditure(r=0.1769, sig.>0.05), CPI (r=0.2335, sig.<0.05), RIR (r=0.0972, sig.<0.05) and for Dependency ratio(r=-0.3188, sig.<0.05) respectively which suggest a strong relationship between the dependent variable and independent variables and the significance value for all correlations is also below 0.05 which is 0.000<0.05 except for unemployment rate thus we conclude that based on these factors effect there exists a significant relationship between External Debt and explanatory variables.

Methodology:

The paper examines panel data for low and lower-middle income countries over the period 2010-2020. In consideration of the literature, the impact of Government expenditure as a percentage of GDP, Dependency Ratio, Inflation, Unemployment Rate, Interest Rate, Corruption Perception Index, Foreign Direct Investment (FDI), Trade Openness, Economic Growth, Gross Capital Formation, Political Stability, and Remittances has been considered on the government debt. The paper will use secondary data that are collected from various sources like TheGlobaleconomy.com, World Bank Data, and World Economic Indicators, and CEICData. There will specifically be two types of models, one for services exporting countries and another one for commodity exporting countries, but the same econometric model will be applied to all countries since they are all falling within low-middle-income countries. Overall it will be a mixed method study, with the quantitative analysis of the model and qualitative explanation of the COVID-19 effect on government debt.

For quantitative methodology, standard empirical methodologies assume that the OLS is biased. It presumes that there are omitted variables, such as political regimes, changes in policies, and various characteristics of a particular country, which are not considered in the model, thereby making OLS biased. Fixed effects and random effects

together with the GMM would be used along with the lag of dependent variables. The authors of the paper also performed a variance inflation factor (VIF) test to test the multicollinearity of the models. The result suggests no multicollinearity between variables. The more suitable estimate of a dynamic panel data model for this study will be using Fixed Effect. The Fixed Effect panel estimator offsets unobserved heterogeneity and time invariance. For qualitative estimation of Covid-19, case studies along with the data from public sources will be used to analyze its effect on debt.

The rational for using fixed effect in our methodology is that A fixed-effect model considers only a certain number of study participants in each analysis. It then calculates the results by using weighted averages. This method provides a stable framework for interpreting the data and making informed decisions. Researchers make informed decisions about which model to use based on the nature of their research question and the inherent variability in their data set. There are additional techniques and tools to decide on which model to use. We found that the fixed effect model was superior to random effects and mixed models with respect to the Akaike information criterion, Bayesian information criterion, and Schwarz's Bayesian Criterion. In addition, it had significant p-value value in Hausman test that indicates to the fixed effect model rather than random effects and mixed models. Thus, based on these criteria we concluded that a fixed effect model is appropriate for analyzing our data set. The result of Hausman test is provided below.

Test: Ho: difference in coefficients not systematic
chi2(12) = (b-B)'[(V_b-V_B)^(-1)](b-B)
= 40.19
Prob>chi2 = 0.0000
(V_b-V_B is not positive definite)

Table 3: Estimates table fe re, star stats(N)

Variable	**FE**	**RE**
EcoGrowth	-.99948851***	-1.1426297***
INV	-.33902093*	-.2573377
INF	-.02832171	.04083567
Unemprate	.13754868	-.58609778
TOinCommod~y	.24387354**	.34804918***
FDI	-.42983195**	-.45540747**
Rem	.83200822*	.38580491
GovExp	-.33874116	-.36320954

CPI	.27016429	.32702152
RIR	.07775806	.08912466
DEP	-.48665085*	-.61003842***
_cons	67.858962**	76.183631***
N	402	402

The Hausman test is a statistical method that determines if the fixed effect model or the random effects model fits the data better. The hausman statistic is computed in the following order: Hausman Test Statistic = (SSE Fixed Effect – SSE Random Effect) / SSTotal where, SSTotal = SUM (SSFixedEffect + SSRandomEffect)

The null hypothesis of this test states that there is no difference in variance between studies and within studies, implying that there are no differences in average treatment effect between groups. If the p-value associated with Hausman's test statistic is less than 0.05, it can be concluded that there are significant differences in the average treatment effect between groups. In our case, we discovered that p value 0.0000 indicates strong evidence against the homogeneity assumption, implying that fixed effects models, rather than random effects models, should be used to estimate panel estimates for continuous outcomes because heterogeneity exists among studies included in the meta-analysis. We also used Swilk to see if there was any heterogeneity (prob>z 0.000000 for all variables indicates significant heterogeneity). However, based on both of these tests, we found no evidence to support the presence of heterogeneity; thus, we decided to use the fixed effect method for pooling results from different trials into one study level estimate per outcome measure rather than using random effects models, which assume equal variance across all studies and allow only one common estimate per outcome measure. The estimates from Shapiro Wilk are provided below:

Table 4: Estimates from Shapiro Wilk for Heteroskedacticity

Variable	**Obs**	**W**	**V**	**z**	**Prob>z**
EcoGrowth	788	0.87762	62.139	10.125	0.00000
INV	720	0.94619	25.173	7.879	0.00000
INF	751	0.15247	411.960	14.733	0.00000
Unemprate	770	0.81804	90.473	11.036	0.00000
TOinService	732	0.93082	32.853	8.536	0.00000
FDI	786	0.49293	256.881	13.604	0.00000

Rem	788	0.80270	100.183	11.297	0.00000
GovExp	701	0.71842	128.572	11.849	0.00000
CPI	726	0.95350	21.920	7.544	0.00000
RIR	504	0.88900	37.608	8.722	0.00000
DEP	792	0.97126	14.663	6.586	0.00000

CHAPTER 4 :

Findings and Results Interpretation:

Recalling to the methodology section, a fixed effect has been used to examine the impact of the explanatory variables, as well as the interest variables, on external debt. Only significant and variable interests from the estimation results would be used for interpretation and better approaches to lowering the burden of external debt on the panel of 72 low and lower middle-income countries. The findings and coefficient signs for significant variables matched the expectations and literature reviews. The sign for trade openness changed in accordance with the country's trade properties; the variable is also one of the interest variables. Overall economic growth, investment, trade openness, FDI, remittances, and dependency ratio are all significant, while inflation and other variables such as Unemployment rate, Government Expenditure and real Interest rate are not significant

Based on the regression result in Table 2, each variable will be discussed in detail to better analyse the empirical results. Each variable's coefficient demonstrates a mathematical relationship between the independent and dependent variables. In other words, the coefficient depicts the impact of explanatory variables on external debt, implying that a percentage increase in the independent variable will have a positive or negative impact on government debt. The standard error is a statistical measure of the specific coefficient's standard deviation from zero. In the estimation, the "p" and "z" values show the statistical significance of each variable. The mathematical specification of the model is as follows, based on the Fixed effect model estimations.

$$Debt_{it} = 67.85896 - .9994885EcoGrowth_{it} - .3390209Inv_{it} - .0283217Inflation_{it} + .1375487Unemp_{it} + .2438735\ TO(Commodity)_{it} - .429832FDI_{it} + .8320082Rem_{it} - .3387412GovExp_{it} - .21 + .2701643CPI_{it} + .0777581RIR_{it} - .4866509DEP_{it} - 2.66 + \varepsilon_{it}$$

Table 5: Fixed Effect Estimation Results

ExtDebt	**Coef.**	**Std. Err.**	**P>|t|**	**[95% Conf.**	**Interval]**
EcoGrowth	-.9994885	.1847037	0.000	-1.362768	-.6362089
INV	-.3390209	.1483986	0.023	-.6308948	-.0471471
INF	-.0283217	.1884536	0.881	-.3989767	.3423333
Unemprate	.1375487	.6215812	0.825	-1.084992	1.360089

TOinCommodity	.2438735	.0748685	0.001	.0966203	.3911268
FDI	-.429832	.1635692	0.009	-.7515437	-.1081202
Rem	.8320082	.3635918	0.023	.1168872	1.547129
GovExp	-.3387412	.3519483	0.336	-1.030962	.3534792
CPI	.2701643	.1953757	0.168	-.1141053	.6544339
RIR	.0777581	.1330652	0.559	-.1839578	.339474
DEP	-.4866509	.241926	0.045	-.9624766	-.0108251
_cons	67.85896	22.1813	0.002	24.23226	111.4857

The next step is to determine the effect of external debt on trade openness in two categories of the country which are commodity export and Service Export oriented countries. We can do so by creating a reverse dummy variable that has values 1 and 0 depending on whether or not a country's service oriented or commodity-oriented country. The outcome indicates that countries with high levels of foreign debt are more likely to be commodity export-oriented than service exporters, which would make sense since it is countries with high levels of foreign debts that engage in investing huge amount of money in infrastructure that requires excessive funding that might be financed through external debts.

We may also want to check the sign of the coefficient for Trade Openness using interactive terms with other dummies such as Commodity Exporter Dummy, and Service Export Oriented Dummy. These dummies were used in order to see how different types of economies react differently when there is an increase in their level of trade openness. It appears from our data interpretation that commodity exporting countries tend to have higher levels of external debt than service export-oriented ones. This makes sense because developing economies tend to focus more on resource extraction rather than services exports which was mentioned previously. In contrast, service exporting countries tend to have lower external debt and with that being said countries with service export ten to have negative impact too implying an inverse correlation between trade openness and government debt. A quick policy response based on this analysis would be for developing nations who are heavily dependent on natural resources that they should try to diversify their economy into one that focuses more on services exports instead if they wish to reduce their chances at defaulting or becoming highly indebted during times where prices for commodities fall sharply.

Variable	**Coefficients FE TC**	**Coefficients FE TS**
EcoGrowth	-.99948851***	-.6017056**
INV	-.33902093*	-.01175346
INF	-.02832171	.10024839
Unemprate	.13754868	-1.9703814***
TO(Commodity)	.24387354**	
TO(Services)		-.20784923***
FDI	-.42983195**	-.00122247
Rem	.83200822*	4.9460997***
GovExp	-.33874116	-.65838149*
CPI	.27016429	-.22956157
RIR	.07775806	.05779295
DEP	-.48665085*	-.8016664***
_cons	67.858962**	94.991672***

Table 6 Trade Openness and External debt on countries with commodity exports and service import orientation

Economic Growth Rate:

The economic growth rate has a positive impact on external debt for both commodity and service export countries. This means that when a country's economic growth rate increases as a percentage of GDP, it will lead to a decrease of -.99 in external debt. This relationship is supported by the P-value of 0.000, which is less than 0.05, indicating that the variable is highly significant even at a 99% confidence interval. The increase in external debt makes it difficult for a country to recover its money. For example, China accumulated a huge amount of external debt after its rapid economic growth. This made it hard for China to repay the loans and recover its money. In addition, interest rates on the loans are very high, which makes it even harder for countries to repay the debts. The relation between economic growth rate and government debt is better explained by the accelerator effect. The accelerator effect suggests that if there is a rise in consumer demand and economic output, firms get close to full capacity and tend to invest more to meet expected demand. So, overall increase in GDP improves the economic environment which makes society prosperous as businesses see profit rise which in return increase the tax revenue for the government to pay off the debt.

However, it is important to note that the relationship between economic growth and external debt is not always straightforward. In some cases, strong economic growth can actually lead to an increase in external debt, particularly for countries that rely heavily on commodity exports. This is because commodity prices are often volatile and can fluctuate significantly over time. If commodity prices are high, a country may experience a surge in revenue from exports, leading to strong economic growth. However, if commodity prices later drop, the country may struggle to generate sufficient revenue to pay off its foreign debts, leading to an increase in external debt.

On the other hand, countries that rely on service exports may experience a more stable relationship between economic growth and external debt. This is because service exports, such as tourism and financial services, tend to be less vulnerable to price fluctuations compared to commodity exports. As a result, countries that rely on service exports may be more able to sustain strong economic growth over time and use this growth to pay off their foreign debts.

There are a few key strategies that countries with high external debt can use to reduce their debt burden and improve their economic growth prospects.

One key strategy is to focus on increasing domestic economic growth through free market policies. By promoting competition and entrepreneurship, governments can encourage businesses to invest and expand, leading to increased economic activity and revenue. This increased revenue can then be used to finance government projects and pay off foreign debts. Another important strategy is to diversify export markets. By expanding into new markets, countries can reduce their reliance on any one particular commodity or service, reducing their vulnerability to price fluctuations. This can help countries to sustain strong economic growth and improve their ability to pay off their foreign debts. It is also important for countries with high external debt to maintain strong financial management practices. This can include carefully monitoring the level of external debt and taking steps to reduce it when necessary. Governments can also negotiate more favorable terms on their loans, such as lower interest rates, to make it easier to pay off their debts. Finally, countries with high external debt can consider seeking assistance from international organizations or other donor countries. This can include financial assistance in the form of grants or loans, as well as technical assistance to help countries implement effective economic policies and improve their overall economic growth prospects.

Overall, the economic growth rate has a positive impact on external debt for both commodity and service export countries. By focusing on increasing economic growth, diversifying export markets, and implementing strong financial management practices, countries can reduce their external debt and improve their economic prospects. With the right strategies and support, it is possible for countries to overcome high levels of external debt and achieve long-term economic prosperity.

Investment:

Investment in infrastructure and other economic development projects can be a powerful tool for reducing a country's external debt and strengthening its economy. The coefficient of the variable suggests that a 1% increase in trade investment decreases the debt by -.34 the variable is highly significant at the p-value of 0.023 which is less than 0.005. The sign of the coefficient is consistent with the expectation and the literature reviews from papers. This is because investment in infrastructure can lead to increased government revenue and a stronger economy, which can help pay off debts.

However, it is important to be mindful of the sources of funding for these investments, as they can sometimes lead to overspending and an increase in debt. One way that countries can fund investment projects is through government financing, such as tax revenue or borrowing from international financial institutions. However, relying too heavily on government financing can lead to overspending and an increase in external debt. Private sector financing, such as loans from banks or partnerships with private companies, can also be a useful tool for financing investment projects, but it can also come with risks.

Also, it is important for countries to consider the type of investment they are making. For example, countries that rely heavily on commodity exports, such as oil or minerals, may benefit from investing in infrastructure related to their primary export industry. This could include investments in transportation systems to facilitate the export of commodities, or in storage and processing facilities to improve the quality of the exported products. On the other hand, countries that rely more on service exports may benefit from investing in different types of infrastructure. This could include investments in telecommunications systems or information technology infrastructure, which can help a country improve its ability to provide services to other countries. This could include things like software development, consulting, or financial services.

Regardless of the type of investment, it is important for countries to carefully consider their investment decisions and ensure that they are making investments that will truly benefit the economy and help reduce external debt. This may require careful analysis of the country's economic strengths and weaknesses, as well as an understanding of the global economic environment in which the country is operating. In addition to considering the type of investment, it is also important for countries to be mindful of the potential risks associated with relying too heavily on either commodity or service exports. For example, countries that rely heavily on commodity exports may be vulnerable to fluctuations in global commodity prices, which can impact their ability to pay off debts. Similarly, countries that rely on service exports may be vulnerable to changes in global demand for those services.

Overall, it is important for countries to carefully consider the balance between investment, external debt, and export reliance in order to achieve sustainable economic growth and development. By investing in the right types of infrastructure and diversifying their export industries, countries can reduce their debt levels and build a strong foundation for long-term prosperity.

Trade Openness:

The trade openness is positively correlated with the external debt. The coefficient of the variable suggests that a 1% increase in trade openness increases the debt by .24 percent of GDP if the country is commodity export country. the variable is highly significant at the p-value of 0.001 which is less than 0.05.and 0.01. While the effect of Trade Openness is positive for commodity exporting countries, the effect on Service exporting country is negative. A percentage increase in Trade Openness decreases the External debt by -.21 percent of GDP and the variable is also highly significant even at 1%. The sign of the coefficients are consistent with the expectation and the literature reviews from papers and the hypothesis. The hypothesis was that the effect of Trade openness is positive on government debt in commodity exporting countries while it is negative for Service Exporting Countries. The reason is that the trade openness does make the low and lower-middle income countries prone to exogenous effects of the international market and the expansion makes the country invest more to meet the internal and external demands. The higher investment requires more funds to be borrowed to carry out the finances.

Additionally, when the country is already indebted, there is also pressure from creditors countries on debtor countries to boost exports so they can increase their foreign currencies. There are also more strings attached when it comes to borrowing money from international organizations like IMF that forces the country to make drastic changes in its economy. For instance, the most common conditions are:

- Reducing government spending on social programs such as education, health care, and pensions.
- Deregulating or privatizing industries like telecommunications and transportation
- Eliminating tariffs on imports from creditor countries.

These policies often result in a higher rate of inflation than before because imported goods cost less than local products that were previously protected by high tariffs. Also, when governments cut back on their spending for social programs it reduces demand for domestic commodities produced by local businesses which may go out of business if they cannot compete with cheap imports from creditor countries. This leads to more unemployment as well as lower wages due to increased competition among workers seeking jobs at lower pay rates since there is a surplus of labor (unemployed people). Ultimately, causing commodity exporting countries to be more indebted than service exporting nations. The expectations from the hypothesis have been met by the estimation results. So, it is indeed necessary for commodity exporting countries to diversify their trade and come up with policies to limit the negative impact of Trade on debt accumulation.

Foreign Direct Investment:

The FDI is negatively correlated with external debt. The coefficient of the variable suggests that a 1% increase in trade openness is correlated with a -.43% decrease in external debt as a percentage of GDP. This relationship is highly significant, with a p-value of 0.009 at a 99% confidence interval. This indicates that there is a strong and statistically significant relationship between trade openness and external debt. Foreign direct investment (FDI) plays a key role in this relationship, as it transfers capital, labor, and management skills from the source country to the host country. FDI can have a

number of positive effects on external debt, including the creation of direct and indirect jobs, increased economic growth, and improved trade positions. For example, FDI can create direct jobs in the host country, as seen in the example of Toyota's plant in India, which created 100,000 direct jobs for Indians. Indirect jobs are also created due to increased economic growth, as more economic opportunities are created for people to earn money. This can help to boost both economic growth and employment, which can ultimately reduce external debt.

FDI can also reduce a country's foreign debt by transferring wealth from the source country to the host country. This can provide the host country with additional financial resources, reducing the need to borrow money from abroad. Additionally, FDI can increase foreign currency reserves and GDP growth, both of which can help to reduce external debt. As a result, countries with high levels of FDI are typically less prone to debt crises. FDI can also improve a country's trade position, as it creates new industries that export goods to other countries. This can increase foreign currency reserves, helping the country to better service its debt and ultimately reducing external debt. A country with a strong trade position has a favorable balance of trade, and can increase exports while reducing imports.

However, it is important to also consider the negative effects of FDI on both commodity exporting and service exporting countries. In commodity exporting countries, FDI can contribute to the resource curse, as the extraction and export of natural resources can lead to lower economic growth, higher levels of corruption and conflict, and a reliance on commodity exports, which are often subject to volatile price fluctuations. This can ultimately result in a decrease in foreign currency reserves and an increase in external debt. In service exporting countries, FDI can also have negative effects on external debt if it leads to the outsourcing of jobs to the host country. This can result in a decrease in domestic employment and wages, and an increase in income inequality. Additionally, if the host country lacks strong regulations and protections for workers, FDI can lead to exploitation and abuse of labor, with negative consequences for the host country's economy and an increase in external debt.

Overall, while FDI can have positive effects on external debt, it is important for countries to carefully consider the potential negative consequences and take steps to mitigate them. This can include implementing regulations and protections for workers, ensuring that the local economy benefits from FDI, and diversifying the economy to reduce reliance on commodity exports or service sector outsourcing. By taking these

measures, countries can better leverage the benefits of FDI while minimizing the potential negative effects on external debt.

Remittances:

The relationship between remittances and external debt is complex, with both positive and negative effects depending on the specific context of the country in question. On one hand, remittances can be positively correlated with external debt, as the coefficient of the variable suggests that a 1% increase in trade openness is associated with a .83% increase in debt. This relationship is highly significant, with a p-value of 0.023 at a 99% confidence interval.

One potential explanation for this relationship is that remittances may crowd out domestic savings, reducing incentives to save and hindering the long-term growth prospects of a developing country. Additionally, remittances may crowd out domestic investment, reducing incentives to invest in the country of origin and further undermining growth prospects.

However, it is important to note that the relationship between remittances and external debt is not necessarily straightforward. A World Bank study found that remittance recipients are more likely to remain poor in the long term than non-remittance recipients, with a pattern of "initial benefit followed by a period of decline into poverty, and eventual recovery."27 This suggests that while remittances can help people maintain a certain standard of living, they may not necessarily lead to economic growth or development. A study by the Overseas Development Institute (ODI) also found that remittances are not a panacea for development, with no evidence to suggest that they promote human capital formation or economic growth in developing countries. In fact, some studies have shown negative impacts on growth and poverty reduction when remittance inflows exceed 5% of GDP.

In commodity exporting countries, the positive effects of remittances on external debt may be limited. This is because commodity exports are often subject to volatile price fluctuations, and reliance on these exports may result in a decrease in foreign currency reserves and an increase in external debt. In service exporting

27 "Remittances Increase GDP: The Potential for Differential Impacts Across Countries," World Bank Blogs: PeopleMove, accessed January 8, 2023, https://blogs.worldbank.org/peoplemove/remittances-increase-gdp-potential-differential-impacts-across-countries.

countries, the positive effects of remittances on external debt may be more pronounced. Service sector outsourcing can lead to an increase in foreign currency reserves, which can help to reduce external debt. However, it is important for countries to carefully consider the potential negative consequences of relying on remittances, such as reduced incentives to save and invest, and to take steps to mitigate these effects.

Overall, the relationship between remittances and external debt is complex and context-dependent. While remittances can have positive effects on external debt in some cases, they can also have negative consequences and should be carefully managed in order to maximize their benefits and minimize their potential negative impacts.

Dependency Ratio:

The Dependency Ratio is positively correlated with external debt. The coefficient of the variable suggests that a 1% increase in trade openness increases the debt by -.49 percent. the variable is significant at a 95% confidence interval at the p-value of 0.045. The hypothetical explanation for the variation could be that most of the people have migrated and working outside the country due to rigid economic conditions which is true for most of the countries taken in the panel which would help the economy to grow indirectly by increasing consumption in the domestic market.

Additionally, the blood, sweat, and tears of active citizens might have been also contributing factors to the economy through work and paying higher taxes. This is because many works in dangerous conditions or put their lives on the line every day at work and work hard to provide for their families; giving them food, shelter, and everything else they need to live well. In addition, hardworking families spend their money on goods and services, increasing the economy's overall size. All of this work benefits the country by allowing people to enjoy a better standard of living. The increased income due to the high dependency burden of active citizens leads to more consumer spending on goods and services. All of this benefits the economy in general and specific businesses in particular.

Inactive citizens contribute to the economy too by consuming goods and services. Consuming goods and services increase demand in the economy, creating jobs and increasing the standard of living for everyone. Furthermore, consumption also creates jobs through processes like manufacturing and agriculture. Furthermore, businesses expand and contract based on how much money people spend on goods and services.

Every time someone spends money, that boosts the economy in that area. Considering all these factors, the overall effect is positive on the economy which in return decreases the external debt as the economy is taxing more but in return is not able to provide public services to the domestic resident's expectations.

COVID-19:

To be within the ambit of COVID-19 effect on External Debt and Trade. It's important to mention that, COVID was the most devastating pandemics ever recorded, causing massive damage to global economies and cities alike especially developing nations. The consequences are so severe that they can potentially lead to civil unrest, political instability and even social collapse worldwide.[28] It was estimated that developing countries would require around $100 billion in foreign exchange reserves to deal with the economic crisis caused by COVID. These funds would have to be borrowed from other countries or international organizations because they were not available. This created a serious problem for many developing countries, particularly those that rely heavily on commodity exports. COVID had a wide-ranging impact, including the financial sector, agriculture, and manufacturing. The crisis also resulted in a significant increase in global unemployment and poverty.

Government revenues also decreased due to higher unemployment rates among workers who lost their jobs because they couldn't afford medical care or because they were no longer working due to illness or disability that was caused by COVID infection. additionally, there was the possibility that people were not able to fulfill their employment requirements if some employers decided not to hire them for the fear of infection. Trade also decreased due to the fact that countries were importing more food and medical supplies, which increased the prices of these goods. This led to a reduction in demand for exports from affected countries. All these factors combined from unemployment to trade have had an exorbitant effect on government revenue thus inclining governments to accumulate more debt to overcome fiscal spending and fight the pandemic. The effect of COVID-19 couldn't be shown through the data collected for this study as there were many missing values for 2021 and 2022 data thereby the results could have been biased. The effect could be seen in the graph below using a

[28] The World Health Organization

trend line and forecasting for the average External Debt if the country is a Commodity Exporting country.

According to the International Monetary Fund (IMF), the COVID-19 pandemic has had a significant impact on particularly those countries that are heavily reliant on commodity exports or tourism. Many of these countries have seen a decline in export revenues which led to a reduction in foreign exchange earnings and an increase in external debt as a result of the pandemic. In commodity export-oriented low and lower middle-income countries, the decline in demand for and prices of commodities such as oil, copper, and iron ore has had a negative impact on the economies of these countries. For example, countries such as Angola, Mongolia, and Zambia which are heavily reliant on commodity exports and tourism, have seen their external debt levels increase as a result of the pandemic. Similarly, service-oriented low and lower middle-income countries that rely on tourism have also been negatively impacted by the pandemic. These countries, such as Papua New Guinea's, Tunisia's, Morocco, and Sudan have seen a significant decline in the number of tourists, leading to a reduction in foreign exchange earnings and an increase in external debt.[29]

It is worth noting that the impact of the pandemic on external debt has not been uniform across all countries. Some countries have been able to mitigate the negative effects through various measures such as fiscal and monetary policy interventions, while others have been more vulnerable to the negative effects of the pandemic.

Here are examples of how the COVID-19 pandemic has affected external debt in a commodity export-oriented low and lower middle-income country:

- Angola: Angola is a commodity export-oriented low and lower middle-income country that relies heavily on oil exports. According to data from the World Bank, Angola's external debt as a percentage of GDP increased from 94.4% in 2019 to 105.4% in 2020. This was due to a decline in the price of oil, which is a key commodity export for Angola.[30]

[29] "The Impact of COVID-19 on Developing Countries: An Overview," International Monetary Fund, https://www.imf.org/en/Publications/WP/Issues/2020/06/30/The-Impact-of-COVID-19-on-Developing-Countries-An-Overview-49041.
[30] "The COVID-19 Crisis and Developing Countries: An Overview," World Bank, https://www.worldbank.org/en/topic/poverty/brief/covid-19-crisis-and-developing-countries-overview.

- Mongolia: Mongolia's external debt as a percentage of GDP increased from 77.7% in 2019 to 83.7% in 2020. This was due in part to a decline in the price of copper, which is a key commodity export for Mongolia, as well as a decline in the number of tourists due to the pandemic.[31]
- Zambia: Zambia's external debt as a percentage of GDP increased from 76.3% in 2019 to 82.3% in 2020. This was due in part to a decline in the price of copper, which is a key commodity export for Zambia, as well as a decline in the number of tourists due to the pandemic.[32]

Examples of how the COVID-19 pandemic has affected external debt in a service-oriented low and lower middle-income country:

- According to data from the World Bank, Papua New Guinea's external debt as a percentage of GDP increased from 29.4% in 2019 to 33.2% in 2020. This was due in part to a decline in the price of oil, which is a key commodity export for Papua New Guinea, as well as a decline in the number of tourists due to the pandemic.[33]
- Tunisia: Tunisia's external debt as a percentage of GDP increased from 53.9% in 2019 to 56.7% in 2020. This was due in part to a decline in the number of tourists due to the pandemic.[34]
- Morocco: Morocco's external debt as a percentage of GDP increased from 41.7% in 2019 to 44.9% in 2020. This was due in part to a decline in the number of tourists due to the pandemic, as well as a decline in exports.[35]
- Sudan: Sudan's external debt as a percentage of GDP increased from 201.4% in 2019 to 204.6% in 2020. This was due in part to a decline in the price of oil, which is a key commodity export for Sudan, as well as a decline in the number of tourists due to the pandemic.[36]

[31] Ibid
[32] Ibid
[33] Ibid
[34] Ibid
[35] Ibid
[36] Ibid

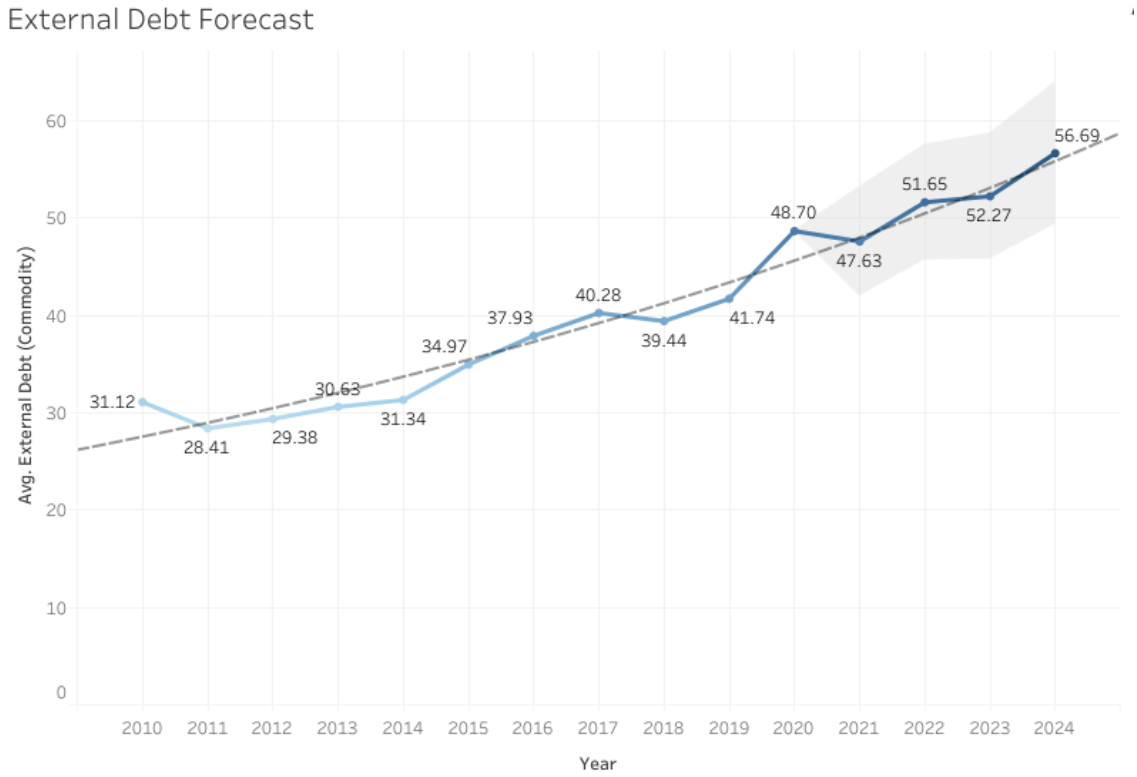

Figure 5: External Debt Forecast for Low and Lower-Middle Income Countries

Interpretation:

The COVID-19 pandemic has had a severe impact on the external debt of developing nations. According to the estimates provided in figure 5, the average external debt of emerging market and developing economies (EMDEs) has increased to approximately 56% of GDP as a result of the pandemic. This represents an increase of around 47.63% of GDP on average, compared to pre-pandemic levels. The trend line and forecasting for the average external debt of EMDEs show a steep upward slope in the aftermath of the pandemic. It is projected that the average external debt will increase by 51.65% in 2022 and 52.27% in 2023. These projections paint a bleak picture for the future of external debt in low and lower middle-income countries.

There are several factors that contribute to this trend of increasing external debt in EMDEs. One key factor is the economic recession caused by the pandemic, which has led to a decline in economic growth and trade. This has reduced the ability of developing nations to generate revenue and pay off their debts, leading to an accumulation of external debt. Another factor that has contributed to the increase in external debt is the use of fiscal and monetary measures by governments to mitigate the economic impact of the pandemic. These measures, such as increased government

spending and lower interest rates, have helped to stimulate economic activity and provide relief to individuals and businesses affected by the pandemic. However, they have also led to an increase in government borrowing, which has contributed to the overall increase in external debt. The COVID-19 pandemic has also disrupted global supply chains and disrupted trade, which has had a negative impact on the export-dependent economies of many developing nations. This has reduced the ability of these countries to generate foreign exchange, further exacerbating the problem of external debt.

The increasing trend in external debt in EMDEs is a cause for concern, as it may limit the ability of these countries to fund essential investments and development projects. It may also increase the risk of financial distress and debt default, which could have severe consequences for the economies and citizens of these nations. To address this problem, it will be important for developing nations to adopt policies that promote economic growth and development. This may include measures to diversify their economies, promote trade and investment, and improve their business environment. It will also be important for these countries to work with international organizations and creditors to negotiate more favorable terms on their external debt, and to implement fiscal and monetary policies that are sustainable in the long-term.

CHAPTER 5 :

Conclusion:

In conclusion, this study sought to address the main research question of "What effect does trade openness have on external debt in countries with commodity export and service export?" and the sub-questions of "Does trade openness effect external debt positively in countries where trade is more oriented toward commodity exports?" and "Does trade openness effect external debt negatively in countries where trade is more oriented toward service exports?" and "Whether COVID-19 aggravates the effect on the external debt?". By analyzing a panel of 72 low- and lower-middle-income countries over the period from 2010-2020, this study aims to fill a gap in the empirical literature on the effects of trade openness on external debt in different types of export-dependent countries. The methodologies employed in this study included the use of ordinary least squares to conduct a variance inflation factor (VIF) test in order to ensure that the data was free of multicollinearity. To address the endogeneity of the regressor, the fixed effect estimator was employed. Fixed effects regression helps to address the problem of heteroskedasticity by controlling for unmeasured confounding variables that may be correlated with the error term, which can lead to more accurate estimates of the coefficients of the model.

The regression results indicated that economic growth, investment, trade openness, foreign direct investment, remittances, and dependency ratio all have a significant impact on external debt. The direction of the relationship between these variables and external debt is consistent with expectations and previous literature, with positive relationships found between Trade openness in commodity export countries, remittances and external debt, and negative relationships found between economic growth, Investment, FDI, trade openness in service export countries, and dependency ratio and external debt. In contrast, variables such as inflation, unemployment rate, government expenditure, and real interest rate were not found to be significant in this analysis. Moreover, the results of the analysis suggest that countries with high levels of external debt are more likely to be commodity export-oriented rather than service export-oriented. This implies that developing nations who rely heavily on natural resources may be at greater risk of default or high levels of external debt during times of declining commodity prices. Policymakers in these countries may want to consider ways to diversify their economy towards services exports in order to reduce this risk.

In addition to these main findings, the study also found that COVID-19 has exacerbated the effects of trade openness on external debt, particularly in low- and lower-middle-income countries. This means that the negative impacts of the COVID-19 pandemic on government debt have been exacerbated in countries where trade openness has a positive or negative effect on external debt.

Overall, the results of this study provide valuable insights into the complex relationship between trade openness, government debt, and the impacts of COVID-19 on these dynamics. These findings have important implications for policymakers seeking to understand the trade-related determinants of external debt and to mitigate the negative effects of the COVID-19 pandemic on government debt.

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