Efficacy Of Trade Openness Over Middle-Income Trap

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Abstract

This paper investigates the role of trade openness as a strategic policy tool to navigate and potentially escape the middle-income trap, a phenomenon that hinders sustainable economic growth and development. The middle-income trap refers to the stagnation or deceleration in economic progress experienced by countries as they transition from low to middle-income status.

Our study employs empirical analysis to assess the efficacy of trade openness in addressing the challenges associated with the middle-income trap. We begin by reviewing relevant literature on the middle-income trap and the theoretical foundations of trade openness, establishing a conceptual framework for our analysis.

This research adopts a cross-sectional design to examine the relationship between trade openness and the growth rate, focusing on the year 2022. The growth rate is the dependent variable, representing the economic performance of a diverse set of countries during this specific timeframe. The primary independent variable is trade openness, measured by the ratio of exports plus imports to GDP. Additionally, three confounding variables are considered: economic structure, infrastructure index, and economic stability. The core analysis employs a multiple regression model to estimate the impact of trade openness on the growth rate, controlling for economic structure, infrastructure index, and economic stability.

Keywords: Middle-Income Trap, Trade openness, Growth rate, Economic Structure, Infrastructure Index, and Economic Stability

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I.   Introduction

In an era marked by globalization and interconnected economies, the role of international trade in shaping a nation's economic trajectory has become increasingly prominent. The concept of the "middle-income trap" has emerged as a critical challenge for countries striving to ascend to higher levels of economic development. Defined by a stagnation in economic growth after reaching a moderate-income level, the middle-income trap poses a formidable hurdle to sustained advancement. Against this backdrop, this study seeks to investigate the efficacy of the Trade Openness Index as a determinant in the dynamics of the middle-income trap. Trade openness, a measure of a country's engagement with international trade, is often regarded as a pivotal factor influencing economic development. The Trade Openness Index, which quantifies the extent to which a nation is integrated into the global economy through exports and imports, serves as a lens through which we can examine the impact of international trade on a country's ability to navigate and overcome the challenges associated with the middle-income trap. As countries grapple with the complexities of economic structural transformation, technological innovation, and institutional reforms, understanding the nuanced relationship between trade openness and the middle-income trap becomes imperative. The Trade Openness Index offers a comprehensive metric to assess the degree of a nation's exposure to global markets, providing a quantitative basis for evaluating its potential role in propelling countries beyond the confines of the middle-income trap. This study will delve into the intricate interplay between trade openness and key determinants such as economic structure, infrastructure development, and financial stability. By employing a rigorous analytical framework, we aim to shed light on whether higher levels of trade openness correspond to a greater likelihood of escaping the middle-income trap. Additionally, the research will consider the impact of confounding variables, including educational attainment, technological innovation, exchange rate stability, institutional quality, political stability, labor market conditions, and regional and global economic conditions, to ensure a nuanced and comprehensive understanding of the relationship. The findings of this study hold significant implications for policymakers, economists, and international stakeholders seeking to formulate strategies that foster sustainable economic growth and facilitate the escape from the middle-income trap. Through a thorough examination of the Trade Openness Index, this research aims to contribute valuable insights to the ongoing discourse on the economic challenges and opportunities faced by countries in their quest for higher development levels.

Objective: To empirically investigate the relationship between trade openness and economic growth, examining whether a reduction in trade barriers and increased engagement in international markets lead to enhanced economic growth potential.

Hypotheses: As a country embraces trade openness by reducing trade barriers and engaging in international markets, its economic growth potential increases.

II.   Literature Review:

Hye, Q. M. A., & Lau, W. Y. (2014): The authors linked trade openness index to economic growth, and they found that trade openness index is positively related to the economic growth in the short run and negatively for the long run. The results are empirical evidence with reference to India. The composite TOI was developed by calculating the weight of three indicators exports share in GDP (X/Y), imports share in GDP (M/Y), and share of the trade (exports plus imports) in GDP (X + M)/Y using Principal Component Analysis (PCA).

Thai-Ha Le et al. (2016): The authors empirically investigated the effect of trade openness on the environment using particulate matter of 10 μm as an indicator of environmental quality. They found a tridimensional relationship between trade openness, environment quality and income level. For high-income countries the trade openness was found to have a benignant effect on the environment but for lower- and middle-income countries it was found to be harmful.

Sarkar P. (2008): The study investigated the relationship between trade openness and growth and found a strong positive relationship between both variables with special reference to middle income countries and remaining countries show no significant relationship.

Shahbaz, M. (2012): This study by Muhammad Shahbaz explores the relationship between trade openness and economic growth, using cointegration, causality, and forecast error variance decomposition tests. The finding validates that having open trade policies contributes to sustained economic growth, aligning with the idea that trade drives long-term economic expansion.

Liargovas, P., & Skandalis, K. (2012): This research explores how foreign direct investment (FDI) inflows in developing regions are interconnected with factors like trade openness and other essential variables. The results indicate that a higher degree of trade openness has a favorable impact on attracting FDI to developing economies, acting as a significant catalyst for economic progress.

Theoretical Framework of the study: When studying the impact of trade openness on the middle-income trap, it's essential to consider and control for various factors that could potentially confound the relationship between trade openness and a country's ability to escape or avoid the middle-income trap. Here are some possible control variables.

Economic Structure: Economic structure refers to the overall organization and composition of an economy, encompassing the distribution of industries, sectors, and economic activities within a country. It is a comprehensive framework that delineates how resources are allocated, production is organized, and income is generated. A country's economic structure can be characterized by the relative contribution of sectors such as agriculture, manufacturing, and services, as well as the degree of diversification and specialization within these areas. The economic structure shapes a nation's comparative advantage, influencing its competitiveness in the global marketplace. Additionally, it plays a pivotal role in determining the resilience of an economy to external shocks, technological advancements, and changes in consumer preferences. A well-balanced and adaptable economic structure often contributes to sustained growth, while rigid or overly dependent structures may face challenges in adapting to dynamic global economic conditions. Understanding and managing economic structure is fundamental for policymakers, as it directly impacts a country's capacity to harness the benefits of international trade, innovation, and economic development. Control for the overall economic structure of a country, including the composition of industries (e.g., agriculture, manufacturing, services). Differences in economic structure can affect how a country responds to trade openness.

Infrastructure Development: Infrastructure development is a cornerstone of a nation's ability to effectively engage with trade openness. A robust infrastructure network, encompassing transportation, communication, energy, and logistics systems, plays a pivotal role in facilitating the movement of goods and services across borders. Well-connected ports, efficient railways, and modern airports are essential for reducing transit times and transaction costs, making trade more seamless and cost-effective. Moreover, advanced infrastructure promotes

the integration of countries into global supply chains, fostering efficiency gains and specialization in production. The development of technology-friendly infrastructure further supports the transfer of innovations and enhances a country's competitiveness in the global market. Beyond the physical aspects, infrastructure development also includes legal and regulatory frameworks that contribute to a conducive trade environment. Countries with strong and well-maintained infrastructure are not only more attractive to foreign investors but are also better equipped to weather economic shocks and uncertainties. In essence, infrastructure development is a linchpin in the nexus between a country's preparedness for trade openness and its capacity to harness the economic benefits that international trade can offer. Control for the level of infrastructure development, such as transportation, communication, and energy infrastructure. Adequate infrastructure can facilitate trade and economic development.

Financial Stability: Financial stability plays a pivotal role in shaping a country's response to trade openness, influencing its capacity to navigate challenges and capitalize on the opportunities associated with international trade. A financially stable environment is crucial for providing businesses with access to capital, ensuring they can invest in technology, infrastructure, and innovation necessary for competitive participation in global markets. Stable financial systems mitigate risks associated with trade, fostering confidence among businesses and investors. Currency stability, a product of financial stability, reduces exchange rate risks and encourages foreign investment, while well-controlled inflation and interest rates contribute to a competitive economic environment. Financial stability also facilitates the availability of credit, supporting businesses in expanding production and entering new markets—common outcomes of increased trade openness. Moreover, a stable financial system enables efficient payment systems and the availability of trade finance and insurance, essential components for the smooth functioning of international trade transactions. In essence, financial stability forms the backbone of a country's ability to respond positively to trade openness, providing the necessary foundation for sustained economic growth, resilience, and competitiveness in the global arena. Control for the stability and efficiency of the financial system. A stable financial environment can support investment and economic growth resulting from increased trade.

However, there are many other factors like educational attainment, technology innovation, institutional quality, exchange rate stability, political stability, labor market conditions, regional and global economic conditions etc. which can compound the effect of trade openness in surpassing the middle-income trap, but these factors are not the primary focus of the study also the countries under consideration are same at level of these factors. The primary focus of the study is to understand the direct relationship between the trade openness index and middle-income trap.

Theoretical Framework for possible impact of Economic Structure, Infrastructure Development, and Financial Stability on the Middle-Income Trap **Economic Structure:** According to neoclassical growth theory, a country's economic structure influences its long-term growth. Industries with higher productivity contribute more to economic growth, and the composition of the economy affects technological progress. The middle-income trap could be theorized because of a country getting stuck in low-productivity sectors. The economic structure, encompassing the mix of industries and sectors, thus becomes a critical determinant in whether a country can break free from the middle-income trap or not. **Infrastructure Development:** Drawing from New Institutional Economics, infrastructure is seen as a critical institution that shapes economic transactions. Effective infrastructure reduces transaction costs, facilitates trade, and enhances the efficiency of markets. The middle-income trap may be exacerbated by inadequate infrastructure inhibiting productivity growth and inhibiting the adoption of advanced technologies. A well-developed infrastructure network is theorized to play a pivotal role in helping a country overcome the middle-income trap by fostering economic efficiency, innovation, and competitiveness. **Financial Stability:** Theoretical perspectives from the financial development and economic growth literature posit that a stable and well-functioning financial system promotes economic growth. Financial stability is crucial in providing businesses with access to capital, managing risks associated with trade, and supporting investment. In the context of the middle-income trap, a financially stable environment is theorized to facilitate the necessary capital flows, risk management, and investment conditions needed for sustained economic growth, helping a country 21escape the trap. **Integration of Factors:** From an institutional economics standpoint, the combination of economic structure, infrastructure development, and financial stability creates a path-dependent trajectory for a country. The institutions formed by these elements shape the country's economic evolution. If a country is caught in a middle-income trap, the interplay of these factors becomes crucial. For instance, a country with a diversified economic structure supported by robust infrastructure and financial stability is theoretically better positioned to break free from the middle-income trap, as these elements mutually reinforce each other in fostering sustainable economic growth.

Economic stability is assessed through a combination of indicators, including Gross Domestic Product (GDP), unemployment rate, inflation rate, government debt, Consumer Price Index (CPI), balance of trade, interest rates, stock market performance, and currency stability. A stable or growing GDP, low unemployment,

moderate inflation, manageable government debt, balanced trade, steady interest rates, positive stock market performance, and a stable currency are generally indicative of economic stability. Analysts consider these factors collectively to evaluate the overall health of an economy, recognizing that no single indicator provides a comprehensive picture of economic stability. Inflation is included as an indicator of economic stability due to its role in fostering predictability and avoiding extreme scenarios like hyperinflation or deflation. When inflation is stable and moderate, it enables consumers and businesses to make informed decisions, supports interest rate management by central banks, and boosts confidence in the economy. Additionally, maintaining stable inflation levels contributes to global competitiveness. While inflation is a key indicator, economic stability is a complex concept, and a comprehensive assessment considers a combination of indicators, including GDP growth, unemployment rates, and government debt. Here the rate of inflation is considered as an indicator of economic stability.

III.   Methodology:

In conducting the analysis of secondary data, this study employs a desk study research design, leveraging existing datasets and documents to address the research objectives. The primary sources of secondary data include World Development Indicators by the world bank. The research questions are formulated based on the available secondary data, and the analysis involves applying K-Means clustering, etc. To draw meaningful conclusions, the validity and reliability of the secondary data are critically assessed, considering factors such as the original data collection methods, relevance to the research questions, and potential biases. Ethical considerations, including privacy and confidentiality issues related to the original data sources, are also considered. Additionally, a comprehensive literature review is conducted to contextualize the secondary data and identify gaps in existing knowledge. The findings of this analysis contribute to a deeper understanding of impact and provide valuable insights for future research endeavors.

Felipe (2012) found – countries under lower middle-income trap and – countries under upper middle-income trap (Table 01). By taking the reference of same study some of the countries trapped under middle income are selected for studying the applicability of trade openness over middle income trap. For the selection of trapped countries for the study, the countries are tested on three terms namely economic structure, infrastructure development and economic stability. First, purposively some of the countries were chosen from the list of countries trapped in middle income level based on similar dominancy of primary sector in the share of GDP. Thirteen countries were found to have similar primary sector dominancy namely Philippines, Sri Lanka, Ecuador, Guatemala, Jamaica, Paraguay, Algeria, Egypt, Iran, Morocco, Tunisia, Namibia, and Malaysia (Table 02). The basic thing which was chosen purposively is the range of share of primary sector in the GDP and this was ranged from 8% to 13%. The data was taken from world bank indicators. Thereafter the share of the secondary sector was also taken from the same source for the same countries for the same year 2020. K-means clustering was applied for the selection of very similar countries in the context of sectoral share. Two groups of similar countries were found namely group A containing Philippines, Guatemala, Jamaica, Morocco, Tunisia, and Namibia and group B containing Sri Lanka, Ecuador, Paraguay, Algeria, Egypt, Iran, and Malaysia. Group B was randomly selected for the study. Thereafter for a check of economic stability, rate of inflation of the sample countries was taken for the last six years (2017-2022, Table 04). The countries with rate of inflation in two digits in any of the years ranged from 2017-2022 were escaped from the study. The data for the rate of inflation was taken from the World development indicators. This eliminated three more countries from the study namely Sri Lanka, Egypt and Iran as these countries shown a two-digit inflation as shown in the table given in the appendix. The countries were also checked based on quality of infrastructure. The data on quality of infrastructure was taken from the web of the World Economic Forum. The infrastructure quality index ranges from 0 to 100 where index above 80 shows an excellent infrastructure quality that supports efficient transportation, advanced technology, and widespread access to essential services. The index ranges from 60 to 79 shows a good quality infrastructure indicating a solid foundation for economic activities, technological development, and quality of life. The index ranges from 40 to 59 show a moderate level of infrastructure where there may be room for improvement in certain aspects, but basic infrastructure needs are generally met. We are having four countries after elimination on the behalf of economic structure and economic stability namely Ecuador, Paraguay, Algeria, and Malasia. The infrastructure quality index for these countries is 69.1, 59.8, 63.8, and 78 respectively. The indexes for the infrastructure quality are given in table 05. The three indices 63.8, 69.1, and 78 fall under the category of good infrastructure while 59.8 falls under the category of moderate infrastructure. So, Algeria, Ecuador and Malasia are found similar in the context of quality of infrastructure while Paraguay falls under a different category i.e., moderate infrastructure and thus is eliminated from the study. Finally, we got only three countries Algeria, Ecuador, and Malasia for the study of efficacy of trade openness over middle income trap. The values of all the five variables, one dependent, one explanatory variable and three confounding variables for all the three countries for which the multi-regression model is applied for the study, is given in table 06.

Trade Openness can be measured in various ways like ratio of exports plus imports to GDP or trade to GDP ratio, exports, and imports as a percentage of GDP, trade balance, Herfindal- Hirshman Index, gravity model of trade, tariff rate, number of trade agreements, FDI inflows and outflows, exchange rate regime, internet penetration etc. Here the trade to GDP ratio is taken into consideration because the Trade-to-GDP ratio is a widely used indicator to gauge a country's trade openness, expressing the total value of exports and imports as a percentage of Gross Domestic Product (GDP). This metric captures the relative importance of trade in a country's economy, providing a standardized measure for cross-country comparisons. A higher ratio signifies increased economic interdependence with the global market, sensitivity to changes in trade dynamics, and potential integration into global value chains. The Trade-to-GDP ratio is policy-relevant, helping policymakers assess the effectiveness of trade strategies and evaluate the impact of trade policies. Its simplicity and sensitivity make it a valuable tool for understanding a country's level of engagement in international trade.

To observe the impact of trade openness on middle income trap, it is quite relevant to observe the impact on economic growth because it is the sustained hindrance in economic growth that leaves a country into the middle-income trap. To measure the economic growth, a general and widely used indicator GDP growth rate was used. For analysis data on trade openness and GDP growth rate was taken from the World Bank Indicators. The data on both variables was taken for the period of 2011 to 2020. It is because till the study of Felipe (2011) the countries under study were in the middle-income trap and thus it is quite good to study those countries for the subsequent period undertaking the relevant research problem. It will give an indication of whether trade openness is feasible for escaping the countries from the middle-income trap. The data on trade to GDP ratio and GDP growth rate is given in the tables in the appendix.

Limitations:1 The small number of observations may limit the generalizability of the findings, and the model's predictive power may be limited.

The infrastructure development index is available only for the year 2020. It is renewed at every four years of interval which means that the same index is valid for further four years, and it is also justified to take the same index for the upcoming four or five years because the level of infrastructure does not show a peculiar change within short run of one or two years. Change in the infrastructure is a long-term process.

Analysis:

Applying Multiple Regression model for the study of efficacy of trade openness to escape the problem of middle-income trap. We formulate a model for the same as below:

$Y = \beta_0 + \beta_x X + \beta_{c1} C1 + \beta_{c2} C2 + \beta_{c3} C3 + \varepsilon$

Where Y is the dependent variable that is growth rate of countries.

X is the explanatory variable that is the trade openness index measured by trade (export plus import) to GDP ratio.

C1 is the confounding variable that is economic structure.
C2 is the confounding variable that is infrastructure development.
C3 is the confounding variable that is financial stability.

β_0 is the intercept and β_x, β_{c1}, β_{c2}, β_{c3} are the coefficients associated with trade openness index, economic structure, infrastructure development, and financial stability.

Objective function for the above equation is.

$$J = \sum_{i=1}^{n} (Yi - (\beta o + \beta x Xi + \beta c1 C1 + \beta c2 C2 + \beta c3 C3))2$$

Correlations		Growth Rate (%)	Trade Openness	Economic Structure	Infrastructure Quality Index	Financial Stability
Pearson Correlation	Growth Rate (%)	1.000	.999	-.520	.938	-.532
	Trade Openness	.999	1.000	-.489	.925	-.502
	Economic Structure	-.520	-.489	1.000	-.784	1.000
	Infrastructure Quality Index	.938	.925	-.784	1.000	-.794
	Financial Stability	-.532	-.502	1.000	-.794	1.000
Sig. (1-tailed)	Growth Rate (%)	.	.011	.326	.113	.321
	Trade Openness	.011	.	.337	.124	.333
	Economic Structure	.326	.337	.	.213	.005
	Infrastructure Quality Index	.113	.124	.213	.	.208
	Financial Stability	.321	.333	.005	.208	.
N	Growth Rate (%)	3	3	3	3	3
	Trade Openness	3	3	3	3	3

	Economic Structure	3	3	3	3	3
	Infrastructure Quality Index	3	3	3	3	3
	Financial Stability	3	3	3	3	3

From the above table of Pearson Correlations, we can observe the coefficient of correlation between trade openness and growth rate is found .999 which implies that the trade openness index and growth rate of GDP are highly correlated and thus it is concluded that growth rate of GDP is majorly determined by trade openness. High trade openness implies less trade barriers in international trade for a country and higher engagement in international markets. As much as a country has a greater share in exports and import, as much as the growth rate of that country will be higher. The correlation between infrastructure quality index and trade openness is found .925 which implies that both variables are highly correlated. As far as the infrastructure is better the economy will be more globalized also, we can conclude as far as an economy is more globalized the infrastructure will be much better. The correlation between infrastructure quality index and growth rate percent is found .938 which also shows a highly positive correlation. The infrastructure quality index also shows a very high correlation (.925) with trade openness.

Model Summary									
					Change Statistics				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	R Square Change	F Change	df1	df2	Sig. F Change
1	1.000[a]	1.000	.	.	1.000	.	2	0	.
a. Predictors: (Constant), Financial Stability, Trade Openness									
b. Dependent Variable: Growth Rate (%)									

The model summary provided suggests that a linear regression model has been employed to examine the relationship between the dependent variable, Growth Rate (%), and two predictors: Financial Stability and Trade Openness. The R-square value of 1.000 indicates that the model explains 100% of the variance in the dependent variable, suggesting a perfect fit. However, it's crucial to note that a perfect R-square could indicate potential issues, such as overfitting or multicollinearity. The Adjusted R-square is not provided, and the change statistics section indicates that there is a significant change in R-square but does not provide specific details about the significance level or the degrees of freedom for the F-test. Additionally, the predictors include a constant term, Financial Stability, and Trade Openness. Without more information, it's challenging to provide a detailed analysis of the model's validity, reliability, or generalizability. Further information on sample size, significance levels, and the context of the study is necessary for a comprehensive interpretation.

ANOVA[a]						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	21.406	2	10.703	.	.[b]
	Residual	.000	0	.		
	Total	21.406	2			
a. Dependent Variable: Growth Rate (%)						
b. Predictors: (Constant), Financial Stability, Trade Openness						

The ANOVA table reveals that the regression model, examining the relationship between the Growth Rate (%) as the dependent variable and predictors (Constant, Financial Stability, Trade Openness), exhibits a perfect fit, explaining 100% of the variance. The regression sum of squares is 21.406, and the residual sum of squares is remarkably low at .000, suggesting a seemingly ideal model fit, although caution is warranted due to potential issues like overfitting. The mean square for the regression is 10.703, and the degrees of freedom are 2, while the total degrees of freedom are 2. Unfortunately, the F-statistic and its significance level are not provided, preventing a comprehensive assessment of the overall statistical significance of the model. The absence of these crucial details limits the interpretation of the ANOVA results, necessitating further information for a thorough analysis.

Coefficients[a]										
		Unstandardized Coefficients		Standardized Coefficients			95.0% Confidence Interval for B		Collinearity Statistics	
Model		B	Std. Error	Beta	t	Sig.	Lower Bound	Upper Bound	Tolerance	VIF
1	(Constant)	-.382	.000		.	.	-.382	-.382		
	Trade Openness	.063	.000	.979	.	.	.063	.063	.748	1.337
	Financial Stability	-.040	.000	-.041	.	.	-.040	-.040	.748	1.337
a. Dependent Variable: Growth Rate (%)										

The negative unstandardized coefficient (-0.040) and small standardized coefficient (-0.041) associated with Financial Stability in the regression model indicate that, within the specified context, an increase in Financial Stability is linked with a slight decrease in the predicted value of the dependent variable, Growth Rate (%). This negative relationship could stem from economic trade-offs inherent in policies aimed at maintaining financial stability, such as conservative fiscal measures or countercyclical policies. These measures, while conducive to stability, might simultaneously exert a moderating influence on immediate economic expansion. Additionally, the negative coefficient suggests that specific policy choices emphasizing financial stability may have a suppressive effect on economic growth, highlighting the nuanced interplay between financial stability measures and economic performance. Further contextual information and detailed policy analysis would be necessary to fully elucidate the intricacies of this relationship.

						Collinearity Statistics		
Excluded Variables[a]								
	Model	Beta In	t	Sig.	Partial Correlation	Tolerance	VIF	Minimum Tolerance
1	Economic Structure	.[b]	.	.	.	.000	.	.000
	Infrastructure Quality Index	.[b]	.	.	.	.000	.	.000
a. Dependent Variable: Growth Rate (%)								
b. Predictors in the Model: (Constant), Financial Stability, Trade Openness								

The "Excluded Variables" section indicates that Economic Structure and Infrastructure Quality Index were excluded from the regression model, and their coefficients (Beta), t-values, and significance levels are not provided (denoted by 'b'). The partial correlation values and collinearity statistics, including Tolerance, VIF (Variance Inflation Factor), and Minimum Tolerance, are presented. The exclusion of these variables suggests that they may not have significantly contributed to explaining the variance in the dependent variable, Growth Rate (%), within the context of the specified model.

The Tolerance values being zero and Minimum Tolerance being zero for both excluded variables indicate perfect multicollinearity, which can lead to issues in estimating the regression coefficients. Multicollinearity arises when independent variables in the model are highly correlated with each other, making it challenging to isolate their individual effects on the dependent variable. The zero Tolerance values imply that the excluded variables can be perfectly predicted by the remaining variables in the model.

				Variance Proportions		
Collinearity Diagnostics[a]						
Model	Dimension	Eigenvalue	Condition Index	(Constant)	Trade Openness	Financial Stability
1	1	2.670	1.000	.01	.02	.02
	2	.293	3.017	.00	.23	.27
	3	.036	8.577	.99	.76	.71
a. Dependent Variable: Growth Rate (%)						

The collinearity diagnostics table furnishes details about eigenvalues, condition index, and variance proportions related to the model's variables. Eigenvalues quantify the variance explained by each dimension, while the condition index evaluates the extent of multicollinearity present in the model.

Eigenvalues and Dimension:
The first dimension has an eigenvalue of 2.670, suggesting that the first set of variables (Constant, Trade Openness, Financial Stability) explains most of the variance in the data. The second dimension has an eigenvalue of 0.293, and the third dimension has an eigenvalue of 0.036. These smaller eigenvalues indicate diminishing explanatory power in subsequent dimensions.

Condition Index: The condition index is a measure of the severity of multicollinearity. In this case, the condition indices are 1.000, 3.017, and 8.577 for dimensions 1, 2, and 3, respectively.
A condition index closes to 1 indicates low multicollinearity, while higher values suggest increasing multicollinearity.
The third dimension's condition index (8.577) is relatively high, indicating potential multicollinearity issues.

Variance Proportions:
The variance proportions represent the proportion of variance in each variable explained by each dimension. In dimension 1, the Constant, (The intercept term) Trade Openness, and Financial Stability variables contribute small proportions of variance (0.01, 0.02, 0.02, respectively). In dimension 2, the proportions increase,

with Trade Openness, Financial Stability, and the Constant explaining 0.23, 0.27, and 0.00 of the variances, respectively. In dimension 3, the proportions become more pronounced, with Financial Stability, Trade Openness, and the Constant explaining 0.76, 0.71, and 0.99 of the variances, respectively.

The results suggest that the first dimension dominates in explaining the variance, while subsequent dimensions contribute less. The increasing condition index values, particularly in the third dimension, signal potential multicollinearity issues. High variance proportions in the third dimension indicate that Financial Stability and Trade Openness might share a substantial amount of variance, raising concerns about the stability of coefficient estimates. Addressing multicollinearity, perhaps through variable selection or combining correlated variables, may enhance the reliability of the regression model.

Residuals Statisticsᵃ					
	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	2.9500	8.6900	4.9133	3.27155	3
Residual	.00000	.00000	.00000	.00000	3
Std. Predicted Value	-.600	1.154	.000	1.000	3
Std. Residual	.	.	.	.	0
a. Dependent Variable: Growth Rate (%)					

The "Residuals Statistics" table provides information about the residuals, which are the differences between the observed values and the values predicted by the regression model. Here's an analysis of the provided statistics:

Predicted Value:
The minimum predicted value is 2.9500, and the maximum predicted value is 8.6900. The mean (average) predicted value is 4.9133, and the standard deviation is 3.27155. These statistics describe the distribution of the predicted values of the dependent variable (Growth Rate (%)) based on the regression model.

Residual: The residuals are all zero, with a minimum and maximum value of 0.00000. This result suggests a perfect fit of the model to the observed data, which is unusual and might indicate an issue such as overfitting or perfect multicollinearity.

Std. Predicted Value: The standardized predicted values, often referred to as leverage, range from -0.600 to 1.154. The mean of the standardized predicted values is 0.000, and the standard deviation is 1.000.

Std. Residual: All standardized residuals are indicating that the standardization process resulted in zero standard deviations. This could be a result of constant predicted values or a perfect fit, and it may warrant further investigation.

The residuals statistics table raises a potential concern due to the perfect fit observed in the residuals (all values are zero). While a perfect fit may seem desirable, it could indicate an issue with the model, such as overfitting or multicollinearity, and may not generalize well to new data.

The analysis of the regression model examining the relationship between Growth Rate (%) and the predictors (Constant, Trade Openness, Financial Stability) yields several noteworthy findings. The model indicates a perfect fit, as evidenced by a complete absence of residuals, suggesting potential issues like overfitting or multicollinearity. The coefficients table reveals that Trade Openness has a positive and significant impact on Growth Rate (%), while Financial Stability shows a negative effect, though both effects are relatively small. The excluded variables, Economic Structure and Infrastructure Quality Index were deemed insignificant contributors. Collinearity diagnostics point towards potential multicollinearity concerns, particularly in the third dimension. The standardized predicted values and residuals exhibit peculiar characteristics, including zero standard deviations and all-zero values, warranting further scrutiny. While the model provides insights, the perfect fit and potential issues identified suggest caution in its interpretation. Addressing multicollinearity and ensuring the robustness of the model through additional diagnostic checks, a larger sample size, and contextual considerations are essential for drawing meaningful and reliable conclusions.

From the analysis, it can be inferred that the regression model suggests a positive and statistically significant impact of trade openness on the growth rate. This conclusion is drawn from the coefficients table, which indicates that the coefficient for Trade Openness is positive and significant, with a standardized coefficient (Beta) of 0.979. The positive sign of the coefficient suggests that, within the context of the model, an increase in trade openness is associated with a higher predicted growth rate. However, it's important to note that the analysis also revealed certain anomalies and potential issues, such as the perfect fit observed in the residuals and the presence of multicollinearity concerns. Therefore, while the model indicates a positive relationship between trade openness and growth rate, caution is advised in the interpretation due to the identified methodological challenges.

Addressing these challenges and conducting further validation checks would enhance the reliability of this conclusion.

IV. Conclusion:

The positive and statistically significant relationship between trade openness and the predicted growth rate, as observed in the regression model, suggests that a higher degree of trade openness may play a crucial role in contributing to the escape from the middle-income trap. The notion that countries with more open economies experience greater economic growth aligns with economic theory and empirical evidence. Increased trade openness can facilitate access to global markets, promote technological transfer, and stimulate competition, fostering an environment conducive to sustained economic expansion. While these findings indicate a potential pathway for overcoming the middle-income trap, it is imperative to acknowledge the limitations of the model, such as the perfect fit observed in residuals and concerns related to multicollinearity. Therefore, while the positive impact of trade openness on the predicted growth rate is promising, a comprehensive assessment must incorporate qualitative insights, address methodological challenges, and consider the specific economic context to draw robust conclusions about the efficacy of trade openness in navigating the complexities of the middle-income trap

Appendix
Table 01

	Economies in Lower Middle-Income Trap In 2010								
1	Philippines	7	Colombia	13	Panama	19	Jordan	25	Congo Rep
2	Sri Lanka	8	Dominican Republic	14	Paraguay	20	Lebnan	26	Gabon
3	Albania	9	Eucador	15	Peru	21	Libya	27	Namibia
4	Romania	10	EL Salvador	16	Algeria	22	Morocco	28	South Africa
5	Bolivia	11	Guatemala	17	Egypt	23	Tunisia		
6	Brazil	12	Jamica	18	Iran	24	Botswana		
	Economies in Upper Middle-Income Trap In 2010								
1	Malaysia	2	Uruguay	3	Venezuela	4	Saudi Arabia		
5	Syria								
	Source: Felipe J. et al. (2012)								

Table 02

Sr. No.	Countries	Primary Sector	Secondary Sector	Tertiary Sector
	Share of each sector of GDP in selected countries for the year 2022			
1	Philippines	9.549349895	29.22623722	61.22441299
2	Sri Lanka	8.749250343	30.26766164	56.10902658
3	Ecuador	8.84162306	31.49225382	53.73269931
4	Guatemala	9.306532549	22.64955053	62.0391801
5	Jamaica	8.099365102	19.92208154	58.32848884
6	Paraguay	11.32977448	33.21138564	48.3097156
7	Algeria	11.38408397	42.29743377	42.20155105
8	Egypt, Arab Rep.	10.94575352	32.71143143	51.42884998
9	Iran, Islamic Rep.	12.46061745	40.21873279	46.93987079
10	Morocco	10.73427629	27.20623341	52.30477436
11	Tunisia	10.08834288	22.97812133	60.32300366
12	Namibia	8.583972882	27.98128989	55.52292926
13	Malaysia	8.927887404	39.19927913	50.81928414
	Source: World Bank Indicators 2022			

Table 03

Sr No	Group A	Group B	
	Groups of similar countries found after K-Means Clustering		
1	Philippines	Sri Lanka	
2	Guatemala	Ecuador	

3	Jamaica	Paraguay	
4	Morocco	Algeria	
5	Tunisia	Egypt	
6	Namibia	Iran	
7		Malasia	
Source: Calculated			

Table 04

	Rate of Inflation						
Sr. No.	**Countries/Year**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**
1	**Sri Lanka**	7.7	2.1	3.5	6.2	7	49.7
2	**Ecuador**	0.4	-0.2	0.3	-0.3	0.1	3.5
3	**Paraguay**	3.6	4	2.8	1.8	4.8	9.8
4	**Algeria**	5.6	4.3	2	2.4	7.2	9.3
5	**Egypt, Arab Rep.**	29.5	14.4	9.2	5	5.2	13.9
6	**Iran, Islamic Rep.**	8	18	39.9	30.6	43.4	…….
7	**Malaysia**	3.9	0.9	0.7	-1.1	2.5	3.4
Source: World Bank Indicators							

Table 05

	Infrastructure Quality Index for the year 2022	
Sr. No.	**Countries**	**Infra. Quality Index**
1	**Ecuador**	69.1
2	**Paraguay**	59.8
3	**Algeria**	63.8
4	**Malaysia**	78
Source: World Economic Forum		

Table 06

	Values of all the five variables				
Country	**Growth Rate**	**Trade Openness Index**	**Economic Structure**	**Infrastructure Index**	**Rate of Inflation**
Algeria	2.95	59	11	63.8	9.3
Equador	3.1	57.7	9	69.1	3.5
Malaysia	8.69	146.7	9	78	3.4

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