



COLLEGE OF BUSINESS AND MANAGEMENT SCIENCES (COBAMS)

THE IMPACT OF TRADE OPENNESS ON ECONOMIC GROWTH IN EAST AFRICA

BY

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DECLARATION

I, **EMITTI AARON** do hereby declare that this research report entitled “The Impact of Trade Openness on Economic Growth in East Africa” is my original work, and that all the source of information used is acknowledged as per the normal academic arrangement. I also confirm that the work presented in this study has never been submitted for any other degree award at any other University.

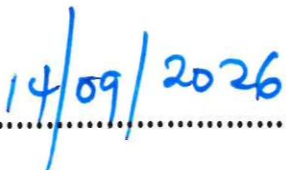
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APPROVAL

This is to certify that this research paper titled “The Impact of Trade Openness on Economic Growth in East Africa”, was done by Emitter Aaron under my supervision and it is approved for submission to the directorate of research and graduate training of Makerere University in partial fulfillment of the requirement for the award of Master Degree of Arts in Economic Policy and Planning.

SIGNATURE..........DATE..........
SSAJJABBI VINCENT (PhD)

DEDICATION

I dedicate this work to my Lord Jesus Christ for His guidance and strength throughout my academic journey. I also extend my heartfelt gratitude to my family for their unwavering support and encouragement. May God richly bless them.

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LIST OF ABBREVIATIONS AND ACRONYMS

ARDL	Autoregressive distributed lag
Asean-6	Indonesia, Malaysia, Thailand, Singapore, Philippines, and Vietnam
EAC	East African Community
ECOWAS	Economic Community of West African States
ELG	Export-led growth
EXP	Exports
FDI	Foreign Direct Investment
GDP	Gross Domestic Product
GMM	Generalized Method of Moments
IMF	International Monetary Fund
INF	Inflation
IR	Interest rate
LN_GDP	Natural log of Gross Domestic Product
NGOs	Non-Governmental Organizations
OER	Official Exchange rate
OLS	Ordinary Least Squares
SEE	South East European
SMEs	Small and Medium-sized Enterprises
SSA	Sun-Saharan Africa
TO	Trade Openness
UNCTAD	United Nations Conference on Trade and Development
VIF	Variance Inflation Factor
WDI	World Development Indicator database

ABSTRACT

This study examines the effect of trade openness on economic growth in the founding members of the East African Community Kenya, Tanzania, and Uganda over the period 2000–2023. Unlike previous studies, the study explicitly accounts for time-specific shocks and cross-sectional dependence, revealing that the growth effects of trade openness are conditional on structural and institutional constraints. Using secondary panel data on GDP, trade openness, interest rates, inflation, official exchange rates, and exports, the analysis employs descriptive statistics, pairwise correlation, unit root tests, and panel regressions (pooled, fixed, and random effects). The Hausman test identifies the fixed-effects model as the preferred specification, with Driscoll-Kraay standard errors addressing cross-sectional dependence and serial correlation. Results indicate that trade openness has a significant negative effect on GDP growth, potentially due to natural trade barriers, competition affecting domestic firms, and reliance on primary commodities. Exports, however, positively contribute to growth, while interest rates negatively affect it, and inflation and exchange rates are not significant. These findings underscore the importance of trade composition over aggregate openness and provide insights for policymakers aiming to design strategies that enhance sustainable economic growth in East Africa.

CHAPTER ONE

1.0 Introduction

This chapter presents the background of the study, problem statement, study objective, the specific objectives, significance and justification of the study, scope of the study, and the conceptual framework.

1.1 Background of the study

Over the past few decades, trade openness has been widely recognized as a major engine of global economic growth, promoting the flow of goods, services, capital, and technology across borders (Kumari et al., 2023; Ohnsorge & Quaglietti, 2023). In the context of globalization, countries that have liberalized their trade regimes and integrated more deeply into international markets have generally achieved higher productivity, industrial diversification, and technological advancement (Dao, 2014; Redding, 1999). For example, economies in East Asia and Europe that adopted outward-oriented trade strategies have sustained rapid growth and improved living standards through increased innovation and competitiveness (Ohnsorge & Quaglietti, 2023). The Washington Consensus of the 1990s reinforced this paradigm by recommending trade liberalization, privatization, and macroeconomic stabilization as key policies for accelerating growth in developing countries (Brueckner & Lederman, 2015; Dao, 2014). Empirical evidence further indicates that openness facilitates access to larger markets, encourages efficiency through competition, and attracts foreign direct investment (FDI), which enhances human capital and technology transfer (Kumari et al., 2023).

In Africa, trade liberalization gained prominence during the post-structural adjustment era, as many countries sought to enhance export competitiveness and reduce external imbalances (Vinod & Nash, 1991). Several studies suggest that trade openness positively influences growth in the region by stimulating investment, capital formation, and export diversification (Matthew & Adegboye, 2014). For instance, Brueckner and Lederman (2015), established that in Sub-Saharan Africa (SSA), a one-percentage-point increase in the trade-to-GDP ratio corresponds to a short-run growth increase of about 0.5%, and a long-run gain in GDP per capita of about 2%. Nevertheless, the effects of openness in Africa remain uneven. Some countries have benefited through industrial expansion and technological upgrading, while others continue to experience

weak growth, persistent trade deficits, and vulnerability to external shocks (Kali et al., 2007; Kim et al., 2011; Osuma & Nzimande, 2024). These mixed results have been attributed to structural differences, limited productive capacity, poor institutional quality, and overreliance on primary commodity exports (Matthew & Adegboye, 2014). Consequently, the question of whether trade openness uniformly promotes economic growth in Africa remains empirically inconclusive (Arabiyat et al., 2020).

Within this context, the East African region offers an interesting case for examining the trade-growth nexus. Since the revival of the East African Community (EAC) in 2000, trade liberalization has been central to the region's integration agenda (African Development Bank, 2024). The establishment of the EAC Customs Union in 2005 and the Common Market in 2010 aimed to enhance intra-regional trade and collective participation in global markets (African Development Bank, 2024; Jabuya et al., 2023). Consequently, Uganda, Kenya, and Tanzania, the founding EAC members, have implemented trade-related reforms, including tariff reductions, export promotion, and investment liberalization measures (IMF, 2025). These policies were designed to foster economic growth by improving market access, expanding production capacity, and encouraging specialization based on comparative advantage (Redding, 1999), however, despite these efforts, the growth outcomes have varied considerably among member states, suggesting that the link between openness and economic performance in East Africa may not be straightforward (Musila & Yiheyis, 2015; Suleiman & Suleiman, 2017).

Empirical studies on this subject in East Africa reveal a complex and divergent pattern of results. In Kenya, Musila and Yiheyis (2015) reported that aggregate trade openness positively influenced investment and growth, while trade-policy-induced openness had a negative and statistically significant effect, implying that the benefits of liberalization depend on policy design and sequencing. In Tanzania, a study covering 1981-2017 found a positive long-run relationship between trade openness and economic growth, though short-run causality was statistically insignificant (Yusuf & Omar, 2019). Similarly, Esaku (2021) found a positive and significant long-run effect of trade openness on Uganda's growth between 1983 and 2019, with imports and overall openness indices contributing more than exports. By contrast, Suleiman and Suleiman (2017) analyzed panel data from 1990-2015 and reported a negative but significant long-run relationship between trade openness and economic growth in EAC countries, with causality

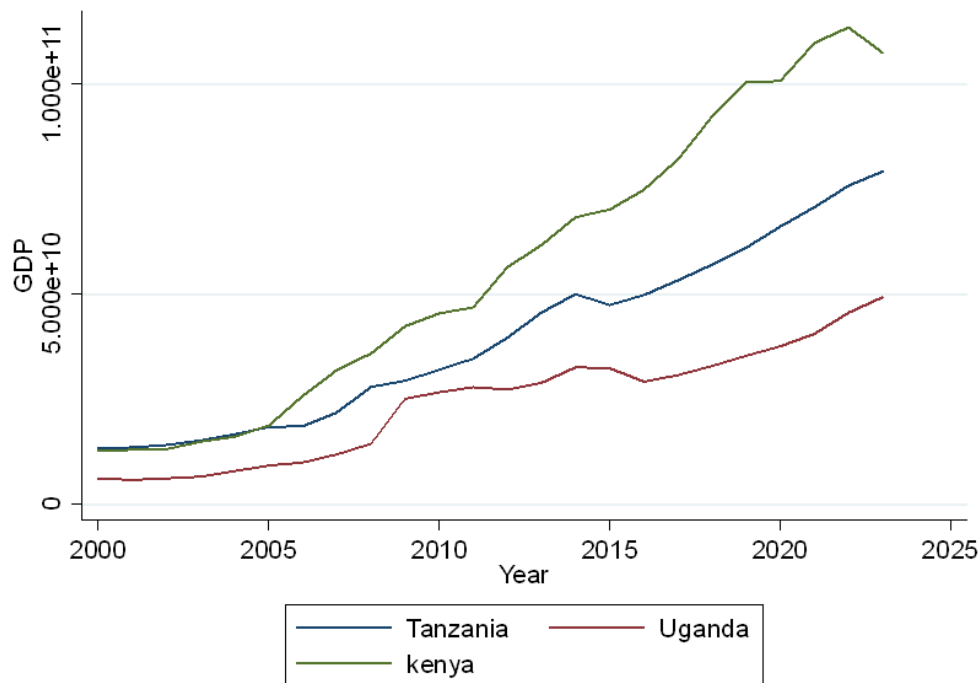
running from economic growth to trade openness. In a more recent study, Jabuya et al. (2023) established that agricultural trade openness exerts a positive long-run impact on growth in EAC economies, yet the strength of this relationship varies by country. These findings underline the persistent inconsistencies in the empirical literature, demonstrating that the openness-growth nexus in East Africa remains unresolved.

The variation in findings may be explained by methodological differences, including diverse measures of openness (e.g., trade-to-GDP ratio, export-import indexes, or composite openness indices), differences in sample periods, and the role of structural and institutional factors (Arabiyat et al., 2020; Matthew & Adegboye, 2014). Moreover, the EAC countries are heterogeneous. Kenya's export base is relatively diversified and industrialized, while Uganda and Tanzania rely more heavily on primary agricultural exports and natural resources (African Development Bank, 2024; IMF, 2025). These structural disparities influence how trade reforms translate into economic growth. Furthermore, although the region has made progress in integration, intra-regional trade remains low, accounting for less than 15% of total trade (African Development Bank, 2024). Persistent trade imbalances, infrastructural bottlenecks, and non-tariff barriers continue to constrain the realization of the full benefits of openness (IMF, 2025; Otieno Jabuya et al., 2023).

The period 2000-2023, which is the study period of this research paper, has also been characterized by several external shocks - including the global financial crisis, fluctuations in commodity prices, and the COVID-19 pandemic - all of which may have altered the trade-growth dynamics (Osuma & Nzimande, 2024). Consequently, while trade liberalization remains a central strategy for economic transformation in East Africa, the actual extent to which it has spurred sustainable growth in Uganda, Kenya, and Tanzania is still unclear. The inconclusiveness in empirical findings and the absence of updated evidence for the post-2000 period justify further investigation into this relationship.

This study, therefore, seeks to contribute to the ongoing debate by empirically analyzing the impact of trade openness on economic growth in Uganda, Kenya, and Tanzania over the period 2000-2023. By exploring this relationship, the study aims to generate evidence-based insights that can inform national and regional trade policy formulation and help bridge the current empirical and policy gaps regarding trade openness and economic performance in East Africa.

Figure 1: A visual comparison of GDP for the East African countries



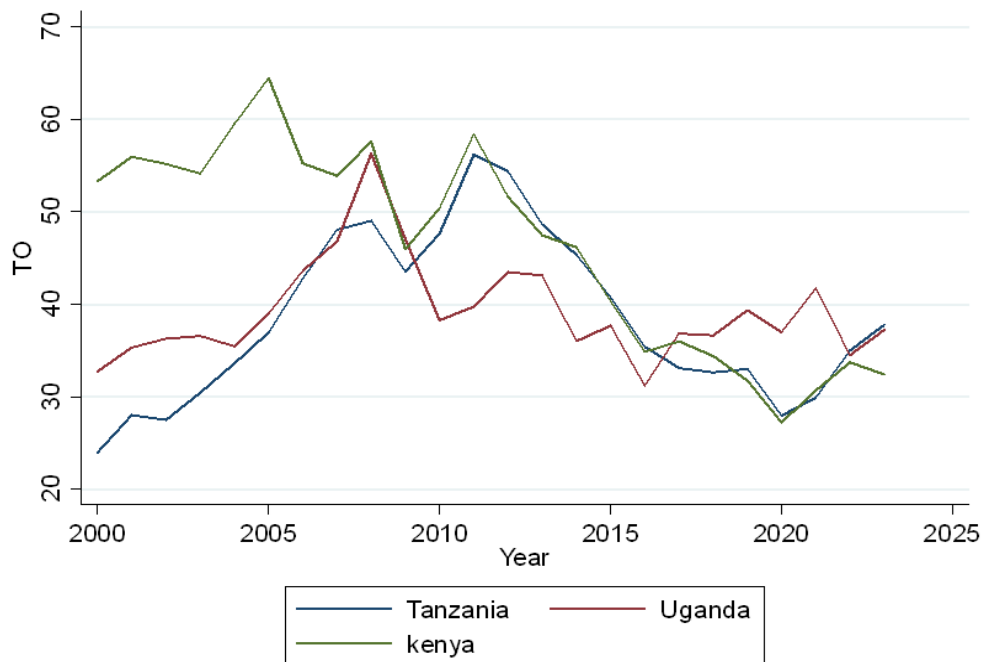
Source: Author's illustration based on WDI data

Figure 1 presents the GDP trends of Kenya, Tanzania, and Uganda over the study period. Kenya's GDP consistently surpasses that of Tanzania and Uganda, showing a sharp and sustained increase after 2005. This strong growth can be attributed to Kenya's more diversified economy, driven by an expanding services sector (especially finance, information communication technology, and tourism), improved infrastructure, and steady inflows of foreign direct investment (Khanna et al., 2016). In contrast, Tanzania's GDP shows a gradual but consistent upward trend. This is largely due to robust agricultural output, mining, and industrial expansion following economic reforms that promoted private sector participation (UNCTAD, 2021). Uganda's slower GDP growth can be linked to its heavy reliance on agriculture, limited industrialization, and intermittent political and infrastructural challenges that constrain productivity (World Bank, 2023).

These GDP trends imply widening economic disparities among the three economies, with Kenya maintaining regional dominance. The sustained growth in Kenya and Tanzania suggests stronger

economic resilience and better policy frameworks supporting industrialization and trade diversification (Seetanah & Rojid, 2011; Were, 2015). Uganda's comparatively modest growth highlights the need for enhanced investment in productive sectors, human capital, and value addition to catch up with its neighbors. Overall, the trends underscore the importance of structural transformation and policy consistency in fostering long-term economic growth in East Africa (Rodrik, 2018).

Figure 2: A visual comparison of trade openness for the East African countries



Source: Author's illustration based on WDI data

Figure 2 compares trade openness across Kenya, Tanzania, and Uganda, highlighting how their engagement in international trade has evolved over time. All three countries experienced rising trade openness between 2000 and 2010. This reflects regional integration efforts under the East African Community (EAC), trade liberalization policies, and reduced tariff barriers (Were, 2015). The peaks observed around 2005-2010 correspond with increased exports and imports following structural reforms and expanded access to global markets (Rodrik, 2018; Vinod & Nash, 1991). The decline in openness after 2010 can be linked to global economic slowdowns,

rising non-tariff barriers, and import substitution strategies adopted to promote local industries (Cerra, 2021).

As shown in Figures 1 and 2 above, there is a noticeable relationship between trade openness and GDP growth. Kenya's higher openness is associated with stronger GDP performance, reflecting how international trade can stimulate production, investment, and innovation (Seetanah & Rojid, 2011). Tanzania's steady growth alongside moderate openness indicates that balanced trade policies can support sustainable expansion. Uganda's lower openness aligns with its slower GDP growth, suggesting that limited participation in international trade may constrain economic performance (Kumari et al., 2023; UNCTAD, 2021). Thus, trade openness and economic growth in East Africa are positively linked, but the strength of this linkage depends on each country's structural capacity, export diversification, and policy consistency (Rodrik, 2018).

1.2 Problem statement

Although trade openness is widely regarded as a catalyst for economic growth through improved competitiveness, market access, and investment inflows (Dao, 2014; Ohnsorge & Quaglietti, 2023), evidence on its actual impact remains inconsistent, particularly in developing regions. In Africa, some studies such as Brueckner and Lederman (2015) and Matthew and Adegboye (2014) show that openness stimulates growth, while others like Kim et al. (2011) and Kali et al. (2007) argue that it exposes economies to volatility and deindustrialization. These conflicting outcomes suggest that the benefits of openness depend on domestic economic structures, institutional quality, and complementary policies (Arabiyat et al., 2020).

In East Africa, the trade-growth relationship also remains empirically unsettled despite the implementation of regional frameworks such as the EAC Customs Union and Common Market (African Development Bank, 2024; Otieno Jabuya et al., 2023). While Musila and Yiheyis (2015) and Esaku (2021) reported positive effects of openness on growth in Kenya and Uganda, Suleiman and Suleiman (2017) found a negative but significant effect across EAC countries, and Jabuya et al. (2023) observed varying results in agricultural trade. These inconsistencies, coupled with limited recent evidence covering the past two decades marked by global shocks such as the 2008 financial crisis and COVID-19 pandemic (IMF, 2025), make it difficult for policymakers to determine whether trade liberalization has truly enhanced growth in the region. Hence, there is a

need to re-examine the impact of trade openness on economic growth in East Africa to provide updated insights that can guide effective trade and growth policies.

1.3 Objective of the study

The main objective of the study is to examine the impact of trade openness on economic growth in East Africa.

1.4 Specific objectives

Specifically, this study will attempt: -

- i) To examine the effect of trade openness on economic growth in East Africa.
- ii) To evaluate the influence of interest rates on economic growth in East Africa.
- iii) To assess the impact of inflation on economic growth in East Africa.
- iv) To analyze the effect of exchange rates on economic growth in East Africa.
- v) To investigate the contribution of exports to economic growth in East Africa.

1.5 Significance of the study

This study is significant to a range of stakeholders in East Africa. For policymakers, the findings provide evidence that can inform the development of trade policies aimed at promoting regional openness and economic growth. Government institutions may use the insights to improve trade infrastructure and reduce barriers that hinder cross-border flows. The business community can benefit by understanding how trade openness influences growth, enabling firms to explore opportunities in international markets and strengthen their competitiveness. Academics and researchers may also find value in the study, as it contributes to existing literature and offers a basis for future research in the region. Additionally, development partners, including international organizations and NGOs, can use the results to design programs that support trade facilitation and broader economic development efforts in East Africa.

1.6 Justification of the study

Conducting this study is essential due to the increasing importance of trade as a catalyst for economic growth in East Africa. As regional economies strive for sustainable development and integration into the global market, understanding the dynamics between trade openness and economic growth is critical. This study seeks to provide actionable insights and evidence-based recommendations to enhance trade policies, practices and help countries maximize growth. Ultimately, the study aspires to contribute to the formulation of strategies that foster economic

growth, improve regional competitiveness, and support sustainable development across East Africa.

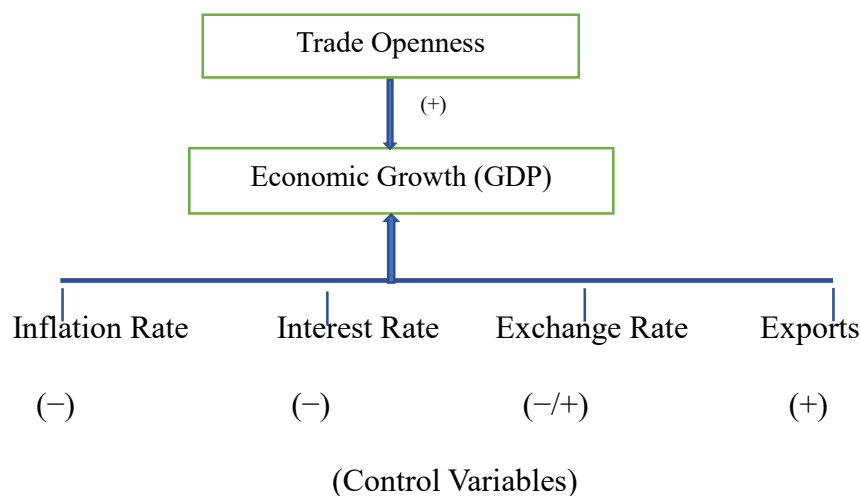
1.7 Scope of the study

This study investigates the impact of trade openness on economic growth within the founding members of the East African Community (EAC)-namely Kenya, Tanzania, and Uganda, over the period from 2000 to 2023. The focus on these three countries is informed by data availability, data consistency and historical comparability. Kenya, Tanzania, and Uganda were the original members of the EAC and have maintained longer, more stable economic and trade integration processes compared to later entrants such as Rwanda, Burundi, South Sudan, and the Democratic Republic of Congo, whose membership and data availability over the study period are limited or inconsistent. Panel data are sourced from the World Development Indicators (WDI) to examine the trade growth relationship.

1.8 Conceptual Framework

This study's conceptual framework illustrates the hypothesized relationship between trade openness and economic growth in East Africa. The dependent variable is economic growth, measured by GDP, while the main independent variable is trade openness, measured as the ratio of exports plus imports to GDP. Control variables which are real interest rate, inflation rate, exchange rate, and exports of goods and services capture macroeconomic factors that influence this relationship.

Figure 3: Schematic Representation of the Conceptual Framework



Source: Author's illustration

The expected signs of the variables are guided by economic theory and empirical evidence. Trade openness is anticipated to have a positive effect on economic growth by enhancing market access, competitiveness, and technology transfer (Seetanah & Rojid, 2011; Were, 2015). Inflation and real interest rates are expected to negatively influence growth, as high levels of either discourage investment and erode purchasing power (Fischer, 1993). The exchange rate effect is ambiguous, as currency depreciation can stimulate exports but may also trigger inflation depending on macroeconomic stability (Salvatore, 2019). Exports of goods and services are expected to positively affect economic growth by generating foreign exchange, expanding production capacity, and promoting technological advancement (Balassa, 1978; Ohnsorge & Quaglietti, 2023).

Although trade openness is theoretically expected to promote growth, empirical outcomes may diverge depending on structural conditions.

CHAPTER TWO

LITERATURE REVIEW

2.0 Introduction

This chapter reviews the theoretical and empirical literature on the relationship between trade openness and economic growth. It presents key trade theories that explain how openness influences productivity, specialization, and economic performance. The chapter also examines empirical findings from various countries and regions, highlighting both supportive and contradictory evidence on the trade-growth nexus.

2.1 Theoretical Literature Review

The Mercantilist Theory, developed between the 16th and 18th centuries, emphasized the accumulation of national wealth through trade surpluses. According to Salvatore (2019), mercantilists believed that a nation benefits from international trade only when it exports more than it imports, thereby accumulating precious metals such as gold and silver. To achieve this, governments have to impose import restrictions and encouraged exports through state regulations and incentives. Although mercantilism recognized the role of trade, it discouraged openness by promoting protectionism. In relation to this study, the mercantilist view provides a contrast, demonstrating that restrictive trade policies can hinder economic growth, while open trade policies promote productivity, competitiveness, and integration into global markets.

The Absolute Advantage Theory, introduced by Adam Smith in *The Wealth of Nations* (1776), challenged the mercantilist philosophy by arguing that countries benefit from trade when they specialize in the production of goods they can produce more efficiently than others. Through specialization and free trade, total global output increases, creating mutual gains for all trading nations (Smith, 1776). This theory directly supports the concept of trade openness in East Africa, as it implies that when countries such as Kenya, Tanzania, and Uganda specialize in sectors where they have an absolute advantage, such as agriculture or natural resources, they can increase efficiency, output, and overall economic growth through enhanced specialization and resource optimization.

Building on Smith's ideas, David Ricardo developed the Comparative Advantage Theory in 1821. Ricardo argued that even when one nation is less efficient than another in producing all

goods, both can still gain from trade if each specializes in goods where it has the lowest opportunity cost (Ricardo, 1821). This principle of relative efficiency forms the theoretical foundation of trade openness, as it suggests that liberalized trade allows nations to exploit their comparative strengths. For East African economies, this implies that trade openness enables them to focus on sectors where they are relatively more efficient, such as labor-intensive industries or agricultural exports, thus fostering growth through specialization, efficiency, and international competitiveness.

The Heckscher-Ohlin (H-O) Theory, developed in 1933, extended the classical theories by incorporating factor endowments as the basis of trade. According to this theory, a nation will export goods that intensively use its abundant and cheap production factors while importing goods that use its scarce and expensive factors (Ohlin, 1967). For instance, a labor-abundant country tends to export labor-intensive goods and import capital-intensive ones. This theory is particularly relevant to developing countries like those in East Africa, where labor is abundant and capital is scarce. Trade openness, therefore, allows these economies to export labor-intensive commodities like agricultural products and textiles leading to increased employment, income, and overall economic growth.

In the modern context, the Export-Led Growth (ELG) Hypothesis, which gained prominence in the 1970s and 1980s provides a framework linking export expansion to economic growth. The hypothesis posits that openness to international markets enhances productivity, fosters innovation, increases foreign exchange earnings, and stimulates industrialization (Balassa, 1978). The ELG model has been particularly influential in explaining the rapid growth of developing economies that pursue outward-oriented policies. For East African countries, this theory underscores how expanding exports through open trade policies can enhance GDP growth by improving competitiveness, attracting investment, and promoting economic diversification.

In summary, while early theories such as Mercantilism emphasized protectionism, later frameworks, from Smith's Absolute Advantage to the Export-Led Growth Hypothesis, support the view that openness to trade drives efficiency, specialization, and sustainable growth. The present study on the impact of trade openness on economic growth in East Africa is therefore grounded in these theoretical perspectives, which collectively explain how liberalized trade can enhance economic performance.

2.2 Empirical Literature Review

The relationship between trade openness and economic growth has been widely studied, and while many empirical studies suggest a positive association, the results are often mixed and inconclusive.

Numerous studies highlight the positive influence of trade openness on economic growth, for instance Hye et al. (2016) examine the long run relationship between trade openness and economic growth in China from 1975 to 2009. Utilizing the autoregressive distributed lag (ARDL) cointegration technique and rolling regression method, the study revealed that trade openness positively impacts economic growth in the long run and short run. Moreover, the study highlights the different measures of trade openness and show how they are positively related to economic growth. This underscores the importance of trade as a crucial factor driving China's economic growth success.

Keho (2017) investigate the role of trade openness on the economic growth of Cote d'Ivoire between 1965 and 2014 using the Autoregressive Distributed Lag bounds test and the Toda and Yamamoto Granger causality tests. The study finds that trade openness plays a dominant role in the economic growth of Cote d'Ivoire both in the short and long run. Furthermore, the study showed the strong complementary role of capital formation in promoting economic growth.

In South Africa, Malefane and Odhiambo (2018) explore the dynamic impact of trade openness and economic growth, employing the autoregressive distributed lag (ARDL) bounds test approach. Unlike some previous studies, the study uses four proxies of trade openness, with each proxy addressing a different aspect of trade openness. Their findings indicate that trade openness has a positive and significant impact on economic growth. This shows the importance of trade for economic growth.

Furthermore, Raghutla (2020) conducted a panel data analysis of the effect of trade openness on economic growth of five emerging market economies, covering the data period from 1993 to 2016. The empirical results confirm the long-run relationship among trade openness, economic growth, financial development, inflation, labor force, and technology. The findings suggested that trade openness plays a substantial role in promoting economic growth while also promoting economic development in these five emerging market economies.

In a study focused on South East European (SEE) countries, Fetahi-Vehapi et al.(2015), analyze the effects of openness to trade on economic growth using the GMM. The study utilized a 16-year panel data of 10 SEE countries over the period 1996 to 2012. The estimation results demonstrate that the positive effects of trade openness on economic growth are conditioned by the initial income per capita and other explanatory variables, otherwise there is not robust evidence between these two variables. Moreover, the trade openness is more beneficial to countries with higher level of initial income per capita.

Nguyen and Bui (2021) focuses on the Asean-6 countries (Indonesia, Malaysia, Thailand, Singapore, Philippines, and Vietnam) to show that there is a nonlinear impact of Trade Openness on Economic Growth. This is contrary to many other findings. Trade Openness is found to have two threshold values. Specifically, before the first threshold value, Trade Openness plays an important role in boosting Economic Growth. However, this impact level decreases gradually when Trade Openness exceeds this threshold value. In particular, when exceeding the second threshold value, the impact is still positive but has a relatively low value. This suggest that if Trade Openness increases to a high level (beyond the threshold value) without combining with other complementary policies, it will lead to low-efficiency economic growth.

Also, Karras (2003) explores the trade-growth nexus using two panel data sets: one of 56 countries covering the period 1951-1998, and another of 105 countries over 1960-1997. The findings show trade openness to be a positive, statistically significant, and economically sizable predictor of economic growth. This effect is robust across the two data sets used. This highlights the importance of reducing barriers to trade as a strategy of promoting economic growth.

Relatedly, Hadhek and Mrad (2015) examined the effect of trade openness on economic growth using a dynamic panel data model for a sample of 23 countries over the period 1990-2010. Their results stipulate a positive effect of trade liberalization on economic growth and meaningful connections between the institutional framework and economic growth. This means both trade openness and appropriate institutional framework are important for economic growth to be realized.

In their study, Huchet-Bourdon et al. (2018) , using regression models, analyzed the relationship between trade openness and economic growth. Their results reveal that countries exporting

higher quality products and new varieties grow more rapidly, suggesting that openness to trade positively impacts growth for countries which are specialized in high-quality products.

In addition, Oppong-Baah et al. (2022) carried out a study with the aim of determining the impacts of trade openness on economic growth in Ghana and Nigeria using panel data from 1998 to 2017. The study concludes that trade openness and real exchange rate positively and significantly impact economic growth. This implies that governments should implement measures and policies to manage the real exchange rate and trade effects to protect economic growth.

Khalid (2016), applied the ARDL model to examine the short and long run relationship between trade openness and economic growth in Turkey over the sample period 1960 – 2014. The results confirm co-integration among the series. Moreover, in the short run, trade openness promotes economic growth and in the long run this relationship is positive and statistically insignificant. This finding is crucial for policymakers in developing countries seeking to foster economic growth.

Finally, Ljirshar (2019), assesses the impact of trade openness on economic growth among ECOWAS countries using secondary data from 1975 to 2017. The results show that trade openness has positive effects on growth in ECOWAS countries. The study therefore highlights the need to improve cooperation among economic actors by using exports and imports so as to help SMEs in the region access international markets leading to economic growth.

Conversely, some other studies found a negative effect of trade openness on economic growth. For example, Musila and Yiheyis (2015), investigates the effects of trade openness on the level of investment and the rate of economic growth in Kenya using annual time series data. Trade openness is found to have negatively and significantly affected investment and the rate of economic growth. This suggests measures should be in place to control the effects of trade.

In his study, Sarkar (2008), examined the relationship between openness and growth. The time series study of individual country experiences shows that the majority of the countries covered in the sample including the East Asian countries experienced no positive long-term relationship between openness and growth during the 1961-2002 time period. Only the middle-income countries exhibited a positive long-term relationship. These findings reveal that the benefits of trade openness may vary depending on the level of income.

Pigka (2013) Utilizes a sample of 71 developing countries to show that trade liberalization has a positive and significant effect on economic growth. However, the study reveals that the case of Sub-Saharan Africa region appears to be different suggesting high natural barriers to trade and export dependence on primary commodities as factors that may explain why increased trade openness does not contribute to economic growth.

In the context of Lesotho, Melefane and Odhiambo (2021), using the autoregressive distributed lag (ARDL) bound testing approach conducts a time series analysis on the dynamic impact of trade openness on economic growth. The study employs four indicators of trade openness, which include three trade-based proxies and an index of trade openness. The empirical results show that trade openness has no significant impact on economic growth in both the short run and long run irrespective of which proxy of trade openness is used.

Zahongo (2018) used a dynamic growth model to investigate how trade openness affects economic growth in 42 countries in Sub-Saharan Africa and finds a positive effect of trade openness on economic growth up to some threshold above which trade openness causes growth decline. This implies that trade openness does not increase economic growth forever, but up to only a given threshold. Therefore, policy makers have to understand what kind of threshold is required for the positive relationship between trade openness and economic growth to stand.

Kim et al.(2012) empirically investigates the interactions among economic growth, financial development, and trade openness through simultaneous equation systems. The findings show that trade promotes economic growth in high-income, low-inflation, and nonagricultural countries but has a negative impact on growth in countries with the opposite attributes.

Lastly, Dufrenot et al.(2010) studied the relationship between trade openness and economic growth across 75 developing countries and found evidence that low-growth countries benefit more from trade openness than high-growth countries. This implies that this relationship also depends on the level of economic growth a given country has attained.

2.3 Chapter summary

This chapter reviewed the theoretical and empirical literature on the relationship between trade openness and economic growth. Empirical studies highlighted mixed results regarding the impact of trade openness on growth. Some studies, such as Keho (2017) and Malefane and Odhiambo

(2018), found that trade openness positively impacts growth credit, while others, like Musila and Yiheyis (2015), found negative results. Overall, the literature seemed to underscore the critical role of trade openness in shaping economic growth trajectories.

CHAPTER THREE

METHODOLOGY

3.0 Introduction

This chapter covers the data source, definition of variables, theoretical framework, model specification, pre-estimation tests, model estimation, and post-estimation tests as seen below.

3.1 Data source and definition of variables

This research employs annual balanced panel data encompassing three (3) countries within the East African Community (EAC) during the period spanning from 2000 to 2023. The group of countries included in this study consists of Kenya, Tanzania and Uganda. The data utilized in this study were obtained from the World Development Indicator database (WDI, 2024). The variables under investigation include Gross Domestic Product (Current US\$), Trade (% of GDP), Official exchange rate, Inflation, consumer price (annual %), Real interest rate (%) and Exports of goods and services (% of GDP). Since all the variables are in percentage, Gross Domestic Product (Current US\$) will be transformed to natural logarithms to ease the interpretation of the results.

Table 1: Summary of variables, their definitions and sources

Variables	Definition	Source	Expected sign
LN_GDP	Natural log of Gross Domestic Product (current US\$)	WDI	
TO	Trade Openness (%)	WDI	Positive (+)
IR	Real interest rate (%)	WDI	Negative (-)
INF	Inflation, consumer price (annual %)	WDI	Negative (-)
OER	Official Exchange rate (%)	WDI	Positive (+)
EXP	Exports of Goods and Services (% of GDP)	WDI	Positive (+)

Source: Author's compilation

3.2 Theoretical framework

The theoretical framework for this study is grounded in the theory of comparative advantage, which posits that countries can benefit from trade by specializing in the production of goods and services in which they have a relative efficiency advantage. This specialization allows countries to trade for other goods that they produce less efficiently, thereby enhancing overall economic welfare and promoting economic growth (Ricardo, 1821). In the context of East Africa, as

nations engage in trade, they can exploit their unique endowments and production capabilities, leading to a more efficient allocation of resources.

The comparative advantage theory offers a robust framework for understanding the mechanisms through which trade openness influences economic growth in East Africa. By specializing in their respective advantages, countries can enhance efficiency, stimulate investment, and promote sustainable growth. This study will build on this theoretical foundation to analyze the specific effects of trade openness on economic growth in the region, utilizing empirical data to support the findings.

While the theory of comparative advantage predicts welfare and growth gains from trade specialization, its outcomes are contingent on productive capacity, diversification, and institutional quality. In the absence of these conditions, trade openness may expose domestic economies to adverse competition and unfavorable trade structures. This study therefore treats comparative advantage as a conditional framework rather than an automatic outcome, allowing for both positive and negative growth effects of trade openness in East Africa.

3.3 Model specification

The model is outlined as follows:

$$Y_{it} = \alpha_i + \beta X_{it} + U_{it} \text{ for } i = 1, 2 \dots N; t = 1, 2 \dots T$$

Where i is the cross section individual dimension, t is the time dimension, Y_{it} is the dependent variable for entity i at time t , X_{it} is the vector of explanatory variables, β is the vector of parameters and α_i is the individual effect that varies across the difference countries but is time invariant. U_{it} is the error term that varies across countries and time.

To incorporate time-specific effects in the panel data model, the structure adjusts to include a term that captures these time effects. This is denoted as λ_t . This allows the model to account for factors that vary overtime but affect all entities in the same way, such as macroeconomic shocks, global economic trends or even policy changes that influences all cross-sectional units uniformly.

This is written as;

$$Y_{it} = \alpha_i + \lambda_t + \beta X_{it} + U_{it}$$

Now considering the variables, the equation can further be written as;

$$LN_GDP_{it} = \alpha_i + \lambda_t + \beta_1 TO_{it} + \beta_2 IR_{it} + \beta_3 INF_{it} + \beta_4 OER_{it} + \beta_5 EXP_{it} + U_{it}$$

Where:

LN_GDP_{it} = Economic growth measured by the natural log of GDP for entity i at time t .

α_i = Individual-specific fixed effects that capture unobserved characteristics of each entity (e.g., country).

λ_t = Time-specific fixed effects that capture common shocks or trends affecting all entities in a given time period.

TO_{it} = Trade openness for entity i at time t .

IR_{it} = Interest rate for entity i at time t .

INF_{it} = Inflation rate for entity i at time t .

OER_{it} = Official exchange rate for entity i at time t

EXP_{it} = Exports of goods and services for entity i at time t

$\beta_1, \beta_2, \beta_3, \beta_4$, and β_5 = Coefficients to be estimated for trade openness, interest rate, inflation rate, official exchange rate, and exports respectively.

U_{it} = Idiosyncratic error term

3.4 Estimation technique

3.4.1 Pre-estimation tests

The pre-estimation tests are crucial for understanding the data characteristics and ensuring the validity of the panel regression model. First, descriptive statistics will be computed to summarize the main features of each variable, providing insight into central tendencies, variability, and potential outliers, which can affect model accuracy. Pairwise correlations will then be analyzed to check for the likelihood of multicollinearity. Finally, unit root tests (Im, Pesaran) will be conducted to verify the stationarity of the time-series variables.

3.4.2 Estimation

Three models will be estimated i.e. the pooled OLS, fixed effects and random effects models. Diagnostic tests will be conducted in order to determine the most suitable model for this study. The F-test will be employed to make a selection between the pooled ordinary least squares and fixed effect models, subsequently, the Hausman test will be employed to determine the most appropriate choice between fixed effect and random effect models. This will be followed by the test to check if time-fixed effects are needed.

3.4.3 Post-estimation tests

To evaluate the robustness of the selected model, post-estimation diagnostic tests will be performed to check for cross-sectional dependence, heteroskedasticity, and serial correlation. If these issues are detected within the chosen model, necessary adjustments have to be applied to ensure the results are both dependable and robust. Other post-estimation diagnostics like test for normality, test for omitted variable bias, and VIF to check for multicollinearity between the independent variables will then be completed.

CHAPTER FOUR

PRESENTATION OF RESULTS

4.0 Introduction

This chapter presents the results from the data analysis. It covers the summary statistics, the pairwise correlations, the unit root tests, the fixed effects model, and the diagnostic tests as follows;

4.1 Descriptive statistics

Table 2: Descriptive Statistics

Variables		Mean	Std. Dev.	Min	Max	Observations
LN_GDP	overall	24.1524	0.7705	22.4881	25.4544	N = 72
	between		0.4156	23.6989	24.5149	n = 3
	within		0.6906	22.9028	25.0919	T = 24
TO	overall	41.3101	9.4054	23.9891	64.4789	N = 72
	between		4.3229	38.4038	46.2779	n = 3
	within		8.7080	22.2685	59.5111	T = 24
IR	overall	9.0482	8.3648	-34.7434	22.9956	N = 64
	between		2.9605	6.9826	12.6061	n = 3
	within		8.0175	-38.3014	19.8781	T = 21.3333
INF	overall	7.0494	4.1916	-0.2875	26.2398	N = 72
	between		1.3698	6.0663	8.6140	n = 3
	within		4.0374	0.3967	24.6752	T = 24
OER	overall	1418.0200	1197.3830	67.3176	3727.0690	N = 70
	between		1270.2590	89.8709	2619.7530	n = 3
	within		558.3790	442.7424	2525.3360	T = 23.3333
EXP	overall	16.6065	4.2068	9.6404	28.5090	N = 72
	between		1.8742	14.6226	18.3473	n = 3
	within		3.9144	7.8996	26.7682	T = 24

Source: Author's computation

The results from table 2 show that the average value of the log of GDP is 24.152 while that of trade openness is 41.310. The values of the standard errors show a considerably low variations in

the dataset. The mean of all the variables falls within the minimum and maximum values indicating that variables are good measures of central tendency and that there are no outliers

4.2 Pairwise correlations

Table 3: Pairwise correlations

Variables	LN_GDP	TO	IR	INF	OER	EXP
LN_GDP	1					
TO	-0.1726	1				
IR	-0.2228	-0.2412	1			
INF	0.0129	0.5810*	-0.4561*	1		
OER	-0.1074	-0.3407*	0.2988*	-0.3049*	1	
EXP	-0.1453	0.9074*	-0.2451	0.4766*	-0.3244*	1

Source: Author's computation

The results reveal the correlations between several variables. Trade openness, interest rates, official exchange rate and exports are negatively correlated with GDP while interest rates and inflation are positively correlated with GDP. The correlations among the independent variables are all low except for the correlation between Exports and Trade openness (0.9074). O'Brien (2007) highlights that high correlation between predictors contributes to multicollinearity. Consequently, the VIF values will be obtained to check that the model is free from multicollinearity.

4.3 Unit root tests

Table 4: Unit root tests

	Level		1 st Difference		
	IM Pesaran		IM Pesaran		
Variables	t-statistic	p-value	t-statistic	p-value	Order
LN_GDP	0.6645	0.7468	-2.9050	0.0018	I(1)
TO	-0.3299	0.3707	-3.9226	0.0000	I(1)
IR	-2.6749	0.0037	-4.9084	0.0000	I(0)
INF	-2.6468	0.0041	-5.2824	0.0000	I(0)
OER	4.1151	1.0000	-2.5406	0.0055	I(1)
EXP	-0.6566	0.2557	-4.0184	0.0000	I(1)

Source: Author's computation

H0: All panels contain unit roots.

From table 4, results from Im-Pesaran-Shin unit-root test indicate that the non-stationary variables are LN_GDP, Trade Openness, Official Exchange rate and Exports while the stationary variables are Interest rates and Inflation rates. Each test was conducted with 3 panels over 24 periods. However, LN_GDP, Trade Openness, Official Exchange rate and Exports become stationary at first deference while Interest Rates and inflation are stationary at level. These results imply that the null hypothesis (H0) which states that all panels contain unit roots, is rejected. Instead, the alternative hypothesis (Ha), which states that some panels are stationary, is accepted for each of the variables. The p-values for all the variables ($p < 0.05$) strongly suggest that panels do not contain unit roots ensuring that statistical properties such as mean and variance are constant over time, leading to more reliable and robust results in panel data analysis.

4.4 Hausman test

Table 5: Hausman test

Test Type	Chi-square statistic	df	p-value
Hausman Test	277.87	5	0.00

Source: Author's computation

H0: Difference in coefficients not systematic

The test reveals that the fixed effects is a better model than the random effects as a result of the rejection of the null hypothesis.

4.4.1 Fixed effect model

Table 6: The Impact of trade openness on economic growth

Dependent variable: LN_GDP

Variables	Coefficient	Std. Error	t-Statistic	Prob.
TO	0.042913	0.018530	2.32	0.024
IR	-0.018403	0.007354	-2.50	0.015
INF	0.014154	0.016687	0.85	0.400
OER	0.001017	0.000117	8.68	0.000
EXP	-0.164960	0.038752	-4.26	0.000
C	23.87273	0.315926	75.56	0.000
R-Squared				

Within	0.6554
Between	0.9711
Overall	0.020
F(5,56)	21.300
Prob>F	0.000
F(2,56)	68.550
Prob>F	0.000

Source: Author's computation

From the fixed-effects (within) regression model, the analysis for 64 observations across 3 groups (countries) reveals the effect Trade Openness and other variables have on GDP. The within R-squared value is 0.655, indicating a high level of explained variance within the groups, while the between R-squared is 0.941, and the overall R-squared is 0.200. The F-statistic for the overall model is 21.300 with a p-value of 0.0000, suggesting that the model is highly significant. The results indicate that trade openness has a significant positive impact on GDP (coefficient = 0.042913, $p = 0.024$), implying that a percentage increase in trade openness leads to a 4.3 percent increase in GDP holding other factors constant. The Interest rate has a significant negative effect on GDP (coefficient = -0.018403, $p = 0.015$), suggesting that a percentage increase in the interest rate leads to 1.8 percent reduction in GDP. Inflation is found to have a non-significant positive impact on GDP (coefficient = 0.014154, $p = 0.400$). Official Exchange Rate, however, does show a significant positive effect on GDP (coefficient = 0.001017, $p = 0.000$), suggesting that a percentage increase in exchange rate does increase GDP by 0.1 percent *ceteris paribus*. Exports, on the other hand, have a significant negative effect on GDP in this model (coefficient = -0.164960, $p = 0.000$), indicating that a percentage increase in Exports reduces GDP by about 16 percent. The constant term is significantly positive (coefficient = 23.872773, $p = 0.000$), which could imply the presence of other factors affecting GDP not captured by the model.

The F-test $F(2, 56) = 68.550$, $p = 0.000$), confirms that the fixed effects are important and that there are significant differences between the countries.

4.4.2 Test for time fixed effects

Table 7: Test for time fixed effects

Test type	Test statistic	p-value
Time Fixed Effects	79.38	0.000

Source: Author's computation

H0: coefficients for the years are jointly equal to zero

Since the p-value is significant, we fail to accept the null that the coefficients for the years are jointly equal to zero. In this case, time fixed effects are needed.

4.4.3 Time fixed effects model

Table 8: The impact of trade openness on economic growth

Dependent variable: LN_GDP

Variables	Coefficient	Std. Error	t- Statistic	Prob.
TO	-0.027372	0.004400	-6.22	0.000
IR	-0.006716	0.001801	-3.73	0.001
INF	0.007388	0.004507	1.64	0.111
OER	0.000023	0.000047	-0.49	0.624
EXP	0.027431	0.009419	2.91	0.006

R-Squared

Within	0.994
Between	0.844
Overall	0.818
F(28,33)	191.470
Prob>F	0.000
F(2,33)	23.850
Prob>F	0.000

Source: Author's computation

From the time fixed-effects (within) regression model, the analysis for 64 observations across 3 groups (countries) reveals the effect Trade Openness and other variables have on GDP. The within R-squared value is 0.994, indicating a high level of explained variance within the groups, while the between R-squared is 0.844, and the overall R-squared is 0.818. The F-statistic for the overall model is 191.470 with a p-value of 0.0000, suggesting that the model is highly significant. The results indicate that trade openness has a significant negative impact on GDP (coefficient = -0.027372, p = 0.000), implying that a percentage increase in trade openness leads to a 2.7 percent decrease in GDP. The Interest rates also has a significant negative effect on GDP (coefficient = -0.006716, p = 0.001), suggesting that a percentage increase in the Interest rate leads to a 0.7 percent reduction in GDP. Inflation is found to have a non-significant positive impact on GDP (coefficient = 0.007388, p = 0.111), indicating inflation does not have a clear

impact on GDP in this model. Official Exchange Rate also show a non-significant positive effect on GDP (coefficient = 0.000023, $p = 0.624$), suggesting that exchange rate does not have a clear impact on GDP in this model. Exports, on the other hand, has a significant positive effect on GDP (coefficient = 0.027431, $p = 0.006$), indicating that a percentage increase in exports is associated with a 2.7 percent increase in GDP holding other factors constant.

4.5 Diagnostics test

4.5.1 Pesaran CD test

Table 9: Cross-sectional dependence test

Test type	Test statistic	p-value
Pesaran CD Test	-3.72	0.000

Source: Author's computation

H_0 : there is no cross-sectional dependence

Due to a significant p-value, we reject the null hypothesis and conclude that there is cross-sectional dependence.

4.5.2 Testing for Heteroskedasticity

Table 10: Test for Heteroskedasticity

Test type	Test statistic(chi2(3))	p-value
Modified Wald test groupwise heteroskedasticity	5.74	0.1248

Source: Author's computation

H_0 : there is homoskedasticity

The study fails to reject the null of homoskedasticity and conclude that the model is free from heteroskedasticity.

4.5.3 Testing for serial correlation

Table 11: test for Serial Correlation

Test type	Test statistic	p-value
Wooldridge test for autocorrelation in panel data	1522.529	0.0007

Source: Author's computation

H0: no first-order autocorrelation

We reject the null and conclude that there is serial correlation in the model.

4.6 Time-fixed effects model with Driscoll-Kraay standard errors

The diagnostic tests show the presence of cross-sectional dependence and serial correlation, therefore, the Driscoll-Kraay standard errors which accounts for cross sectional dependence, heteroskedasticity and serial correlation have been used to estimate the model. Previous studies such as Bangura and Saibu (2024) and Iqbal et al. (2019), Utilized this technique to address the serial correlation, heteroscedasticity, and cross-sectional dependency in fixed effect models. Shah et al. (2021) maintains that the Driscoll-Kraay estimator provides substantial, robust outcomes among the cross-sectional units while in the presence of cross-sectional dependence.

Table 12: The impact of trade openness on economic growth

Dependent variable: LN_GDP

Variables	Coefficient	Dris/Kraay Std. Error	t-Statistic	Prob.
TO	-0.027372	0.004691	-5.83	0.000
IR	-0.006716	0.002484	-2.70	0.013
INF	0.007388	0.005700	1.30	0.208
OER	0.000023	0.000052	-0.45	0.655
EXP	0.027431	0.009641	2.85	0.009
R-Squared				
Within	0.994			
F(28,23)	4139.510			
Prob>F	0.000			

Source: Author's computation

From the time fixed-effects (within) regression model, the analysis for 64 observations across 3 groups (countries) reveals the effect Trade Openness and other variables have on GDP. The within R-squared value is 0.994, indicating a high level of explained variance within the groups. The F-statistic for the overall model is 4139.510 with a p-value of 0.0000, suggesting that the model is highly significant. The results indicate that trade openness has a significant negative impact on GDP (coefficient = -0.027372, p = 0.000), implying that a percentage increase in trade openness leads to a 2.7 percent decrease in GDP. Some researchers have explained this negative

relationship by stating that, high natural barriers to trade, export dependence on primary commodities and poor overland infrastructures to distant large markets can explain why increased trade openness does not contribute to economic growth in sub Saharan African region (Pigka-Balanika, 2013). Others expressed that trade openness alone brings significant negative impact on growth performance in SSA. However, once the interaction between trade openness and institutions is allowed for, growth is found to be positively affected by openness (Akpan & Atan, 2016)

Interest rates also has a significant negative effect on GDP (coefficient = -0.006716, $p = 0.013$), suggesting that a percentage increase in the Interest rate leads to about 0.7 percent reduction in GDP holding other factors constant. This relationship has been confirmed by others like Suciany et al. (2024). Inflation is found to have a non-significant positive impact on GDP (coefficient = 0.007388, $p = 0.208$), indicating that inflation does not have a clear impact on GDP in this model. Official Exchange Rate also show a non-significant positive effect on GDP (coefficient = 0.000023, $p = 0.655$), suggesting that exchange rate does not have a clear impact on GDP in this model. Exports, on the other hand, has a significant positive effect on GDP (coefficient = 0.027431, $p = 0.009$), indicating that a percentage increase in exports is associated with a 2.7 percent increase in GDP holding other factors constant. Previous studies have also found similar effect for example Dritsaki and Stiakakis (2014).

4.7 Other diagnostics

4.7.1 Test for Normality

Table 13: Test for Normality

Test type	Chi2(2)	P-value
Skewness/kurtosis	1.31	0.5198

Source: Author's computation

H0: The residuals are normally distributed

We fail to reject the null and conclude that the residuals are normally distributed.

4.7.2 Test for Omitted variable bias

Table 14: Test for omitted variable

Test type	Test statistic	p-value
Ramsey RESET test	1.19	0.3206

Source: Author's computation

H0: Model has no omitted variable bias

Since the p-value is insignificant, we fail to reject the null and conclude that the model has no omitted variable bias.

4.7.3 VIF

Table 15: Variance Inflation factor

Variable	VIF
TO	7.31
EXP	6.27
INF	1.84
IR	1.36
OER	1.19

Source: Author's computation

Since the values of the Variance Inflation Factor are all less than 10, it suggests that the model is free from multicollinearity.

CHAPTER FIVE

5.0 Introduction

This chapter covers the research summary and conclusions, policy recommendations, the study limitations and areas of further studies as follows;

5.1 Summary and conclusion

The aim of this study was to establish the effect of trade openness on economic growth in East Africa over the period 2000 to 2023. The research employed secondary panel data comprising a sample of three East African countries, that is, Kenya, Tanzania and Uganda. Variables such as GDP (current US\$), Trade (% of GDP), Interest rates, Inflation, Official exchange rate and Exports of goods and services were used in the model. Pre-estimation analysis such as descriptive statistics, pairwise correlation, unit root tests were done followed by the model estimation which involved pooled effects, fixed effects, and random effects. The Hausman test revealed that fixed effects model is preferred with time-fixed effects needed. Diagnostics tests were conducted which indicated the presence of cross-sectional dependency and serial correlation in the model. Consequently, the research employed the time-fixed effect model with Driscoll and Kraay standard errors as a means to address the diagnostic issues that were identified.

The econometric results indicate that trade openness has a significant negative impact on economic growth in East Africa. This negative relationship can be attributed to factors like natural barriers to trade, increased competition that leads to reduced output by local firms and dependence on primary commodities among others.

Findings show Interest rates to reduce growth and this is statistically significant while inflation and exchange rate have no clear impact on economic growth in this model. On the other hand, Exports are observed to significantly increase economic growth.

5.2 Policy recommendations

Given the negative impact of aggregate trade openness and the positive role of exports, policymakers in East Africa should prioritize export-oriented trade strategies rather than pursuing indiscriminate liberalization. Policies should focus on enhancing the capacity of domestic firms to compete in regional and global markets and on promoting sectors with higher value-added

exports. Such an approach would allow the region to harness the growth benefits of trade while mitigating the adverse effects associated with unselective openness.

5.3 Limitations of the study

The study encountered limitations due to gaps in data availability, with missing values for certain variables across specific years and countries. This limitation may affect the robustness and reliability of the findings.

The study focuses specifically on three East African countries, where structural economic characteristics, institutional frameworks, and policy environments differ from other regions. As a result, the findings may not be generalizable to other regions with different economic conditions.

5.4 Areas of further studies

Future studies should consider expanding the scope of the panel data by increasing the number of entities included in the analysis.

Future studies should also consider investigating the effects of trade openness at the sectoral level e.g., agriculture, manufacturing, services. This would provide insights into which sectors benefit most from trade and which might be negatively impacted. This approach would allow policymakers to design targeted interventions for sectors that are either more vulnerable or have higher growth potential within the context of increased trade openness.

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Appendix

Pooled OLS results

Variables	Coefficient	Std. Error	t	Prob.
TO	-0.023	0.026	-0.870	0.385
IR	-0.016	0.013	-1.210	0.233
INF	0.023	0.030	0.760	0.450
OER	0.000	0.000	-1.870	0.066
EXP	-0.007	0.055	-0.130	0.897
C	25.380	0.518	49.030	0.000
R-Squared	0.145			
Adj R-Squared	0.071			
F(5,58)	1.960			
Prob>F	0.098			

Source: owner's computation

Random effects results

Variables	Coefficient	Std. Error	z	Prob.
TO	-0.023	0.026	-0.870	0.382
IR	-0.016	0.013	-1.210	0.228
INF	0.023	0.030	0.760	0.447
OER	0.000	0.000	-1.870	0.067
EXP	-0.007	0.055	-0.130	0.896
C	25.380	0.518	49.030	0.000
R-Squared				
within	0.023			
Between	1.000			
overall	0.145			
wald chi2(5)	9.810			
Prob>chi2	0.081			

Source: owner's computation