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COLLEGE OF BUSINESS AND ECONOMICS

DEPARTMENT OF ECONOMICS

A Thesis submitted to the Department of Economics in partial fulfillment of the requirement for the award of MSc degree in Financial Economics.

The Effects of Financial Development and Trade Openness on Economic Growth: Evidence from Sub-Saharan African Countries.

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Advisor: Fantu Guta (PhD)

June, 2024
Addis Ababa, Ethiopia.

Declaration

I the undersigned declared that this thesis, entitled 'The Effects of Financial Development and Trade Openness on Economic Growth: Evidence from Sub-Saharan African Countries' is the result of my own effort under the supervision of my advisor Fantu Guta (PhD). A Thesis submitted to the Department of Economics of Addis Ababa University in partial fulfillment of the requirement for the award of MSc degree in Financial Economics. This paper has not been presented as a thesis in any other institution to be the best of my knowledge.

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Date; 30/07/24

This is to certify that the above declaration made by the candidate is correct to the best of my knowledge.

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Acronyms and Abbreviations

ARDL: Autoregressive Distributed lag

CAR: Central African Republic

CCEMG: Common Correlated Effects Mean Group

EAC: East Africa Countries

EU: European Union

IMF: International Monetary Fund

MG: Mean Group

OLS: Ordinary Least Square

PMG: Pooled Mean Group

PPP: Purchasing Power Parity

SADC: Southern Africa Development Cooperation

SSA: Sub Sahara Africa

SURE: Seemingly Unrelated Regression Estimator

VAR: Vector Autoregression

VECM: Vector Error Correction Model

Abstract

For a panel of 21 SSA nations, this study looks at the impacts of financial development and trade openness on economic growth from 2005 to 2018 using balanced data and there is no data for some countries between 2019 and 2022 on some variables. Opposite to most existing studies, the analysis makes use of random effect model that is more efficient as it captures both the within and the between variation of the data and heterogeneity across countries. The panel analysis's findings forwarded that economic growth benefits from trade openness and financial development and the presence of long-term relationships is demonstrated using cointegration test. Unemployment, FDI and inflation are used as control variables. Unemployment and inflation have showed the negative relationship with economic growth which is in accordance with the existing economic theory whereas strong justification has presented for the negative relationship between FDI and economic growth.

The results also show that expanding domestic loans to the private sector and the number of commercial bank branches are important channels via which financial development supports economic expansion. Granger causality tests demonstrate the causal relationship between economic growth and trade openness and between economic growth and financial development. The results have showed important policy ramifications for trade openness, financial development, and economic expansion in SSA nations.

CHAPTER ONE

INTRODUCTION

1.1. Background of the study

Muhammad et al. (2012) sated that two essential components of every economic system are the growth of the financial sector and foreign commerce. The financial industry provides a vast array of services to the government, corporate, and consumer sectors, all of which support economic expansion. Exporting their knowledge and expertise in financial services to other nations should allow nations with excellent financial sectors to fully profit from this. Exports and imports from around the world are essential to economic expansion. A country must import in order to increase its base of production and satisfy excess domestic demand and export commerce is essential in order to raise foreign exchange.

According to Tekilu and Jemal (2019), Economic expansion and financial development are intertwined. Improved capital accumulation, effective resource allocation, and increased technological capacity are all results of financial institutions' those are essential components of economic progress. Johannes (2011) and Dagmawi (2013), as cited in Fozia (2018) stated that a highly grew and smoothly operating financial sector is necessary for effective financial services and the seamless flow of economic activity.

According to International Monetary Fund World Economic Outlook (2023), with $53,478 per person, North America has the highest continental GDP per capita globally in terms of both GDP Nominal and PPP and Africa has the lowest (2.7%) including share of SSA which is less than the global average and hence SSA is the poorest region in the world. When we look at nominal GDP only, Asia has the highest share (36.8%) whereas Africa shares lowest with US$ 420.5 billion (2.4%) including share of SSA.

Jennifer (2017) discovered that SSA exports doubled rising by 92% to $53.5 billion between 2005 and 2014 and imports increased 147% to $122.8 billion which is 2.5 times the level they were in 2005. Although trade volume in SSA has increased significantly in recent years, SSA still only makes up 1.8% of world trade volume. Similarly, Evita (2016) found that Africa contributes slightly to global trade with SSA making up just only 1.7% compared to other

regions in the globe and SSA has the highest percentage of its inhabitants living in poverty, with almost 50% of its people earning less than $1.25 per day.

Looking at the current state of commerce in SSA, Amin (2021) said that while economic connections between the United States and the European Union have been declining, China has emerged as a significant commercial partner for SSA over the past 20 years. EU's and the US's shares of SSA's total trade fell respectively, from 30.3 to 22.3 percent and from 15.5 to 5.6 percent while China stake climbed from 4 percent in 2001 to 25.6 percent in 2020.

According to a World Bank report from 2023, SSA is a diversified region. By fully utilizing its people and resources, the continent can lead the way in development because it has a wealth of natural resources, the largest free trade area in the world, and 1.2 billion people as its market. Nonetheless, the area has a number of development-related obstacles. In 2023, there would still be 462 million people in the region who are extremely poor. Climate shocks are set to compound fragility, and factors like as the COVID-19 epidemic, decreased governmental support and policy uncertainty, rising conflict and violence, or worsening security situations in several nations across the region, exert a dampening effect on economic activity.

Furthermore, according to IMF (2022), SSA's growth is expected to be more than one percentage point slower than that of 2021, mostly as a result of the global slowdown, tighter financial conditions, fluctuating commodity prices, a sharp increase in global inflation, and a series of related shocks. In 2023, the growth rates in East Africa and West Africa were 1.8% and 3.3%, respectively, while SSA's economic success continues to be hindered by below-average performance.

All nations, including those in Sub-Saharan Africa, stand to gain from having an open trade policy and an effective, well-regulated, and competitive financial sector. As such, this paper has focused on the empirical investigation of impacts of financial development and trade openness on economic growth in SSA member countries.

1.2 Statement of the problem

International trade and a well-developed financial sector are widely seen as key drivers of economic growth. However, due to various research methodologies and country-specific characteristics, the available literature offers us inconclusive conclusions. For instance, Karl (2021) studied the Central African Republic (CAR) over period 1980-2020 employing VECM and showed that trade openness has a negative and significant impact on the economic growth in the long run. These findings did not explore a causal relationship between these two factors taking into account financial development and it is narrow as it is the study of only one country. The current paper has contributed by exploring the relationship between economic growth and trade openness by taking into consideration financial development and it is wide as it is studied the SSA countries on the three variables.

Because of a number of factors, including the use of different estimating approaches and proxies for financial development and trade openness metrics, the conclusions of the existing studies are inconsistent. Despite much research on the subject, the empirical data is inconclusive. As an example, Gries et al (2009) as cited in Yaya (2017) elaborated that for SSA countries the evidence is mixed. According to an analysis of 16 Sub-Saharan African nations, economic growth leads to trade openness in Ethiopia, Gabon, Kenya, Mauritius, Senegal, Sierra Leone, and Togo and there is a feedback causal link in Cameroon, Cote d'Ivoire, Nigeria, and Rwanda. In contrast, Burundi, Ghana, Madagascar, South Africa, and the Gambia showed no evidence of a direct association between trade and growth. This paper added empirically to the current discussion regarding the relationship between trade openness, financial development, and economic growth in Sub-Saharan African nations.

The results of earlier research regarding the type and direction of the causality between financial development, economic growth, and trade openness have been inconsistent. As evidence, Tekin (2012) and Asfaw (2014) as cited in Yaya (2017) found an opposite result on trade to economic growth relationship. Trade openness and real per capita GDP do not significantly correlate according to research done on 27 least developed African nations and in a study of 47 SSA countries on the contrary openness to trade stimulates economic growth. Hence there is a need to conduct additional research to get clear findings on trade to economic growth relationship of

SSA countries and including financial development effect on the trade and economic growth is left unfilled.

There has been a dearth of recent research on the trade-growth-financial development relationship in tandem, despite studies on the financial development trade relationship, financial development growth relationship, and trade-growth relationship based on a particular country or group of countries having been conducted over the last few decades. It is particularly rare for SSA Countries and there is no recent research on the topic in the region. For instance, Alexandra (2013) found evidence for this in SSA utilizing data for 22 countries from 1960 to 2009 and a contemporary time series methodology and discovered unidirectional relationships between financial development and indicators of actual activity only and which is not more recent (data of 1960 to 2009). As a result, this paper filled such gap accessing all the three variables jointly and using more recent data (from 2005 to 2018).

Pam (2017) used a dynamic growth model with data from 42 SSA countries to examine the relationship between trade openness and economic growth in emerging nations spanning the years 1980 to 2012 and employing the Pooled Mean Group estimation technique. Even though this paper is good as it covers wide economies (42 Sub-Saharan African countries), it studied the bivariate relationship between trade openness and economic growth (only two variables) and so finding the evidence on financial development- trade openness - economic growth left gap. Similarly, Ashenafi (2021) covering 44 SSA countries over the period 1990–2018 utilizing the generalized method of moments showed that the expansion of the financial sector might encourage the expansion of the agriculture and service sectors.. Even though this paper has no problem of coverage it is limited only to the relationship of growth and financial development and another shortcoming is that it is limited to some sectors. Hence the study that incorporates many countries supported by well-developed method is worthy to pursue. Therefore, this paper has dealt with the relationship between financial development, international trade and economic growth in case of SSA for the recent period

Although researches are done in the area of the association between financial development and, economic growth and trade openness both in advanced and developing countries, the papers have some shortcomings on using the appropriate model. Hence, this paper filled another research gap

(uncovered area of research previously) on methodology perspectives by using Panel model of random effect estimator which is most efficient.

Furthermore, while economists acknowledge the connection between trade openness, economic growth, and financial development, they disagree on the direction of causality. To put it another way, it is unclear if trade openness causes both financial development and economic growth, or if financial development causes economic growth and trade. The relationship between the three has also not been well explored. As a result, this current paper has provided further evidence on the possible relationship between the three variables in the context of the SSA countries with their causality analysis and to do so it used Panel model and applied cointegration test and examined the long run relationship between the variables.

1.3 Objective of the study

1.3.1 General objective of the study

The primary objective of this study is to examine how trade openness and financial development affect economic growth in SSA nations and to investigate their long run relationship.

1.3.2 Specific objective of the study.

The specific objectives of the study include:

- To get updated information of the variables.
- To examine the causality among the variables under the study.

1.4. Research Questions

- What are factors that can affect economic growth of SSA countries?
- What is the current evidence on the relationship between economic growth and trade openness and between economic growth and financial development for SSA countries?
- How can we get conclusive and clear results regarding the effects of the variables under study?

1.5. Hypotheses of the Study

The researcher established the following testable hypotheses in order to fulfill the study's general purpose.

A] Financial development, trade openness, and economic growth have a long-term relationship and causality exists between them for SSA nations.

B] No Financial development, trade openness, and economic growth have a long-term relationship and no causality exists between them for SSA nations.

1.6 Significance of the study

The paper's contribution is that by using the Panel model technique, empirical findings enhanced the existing literature with relation to SSA countries. The study advised SSA countries' policymakers to choose the right course of action in terms of trade, financial development, and economic expansion.

1.7 Scope of the study.

The study covered the evidence of SSA countries on economic growth, financial development and trade effects. The topics of economic growth, financial development and trade are so complex and multifaceted making it research areas to be too broad and diversified which could call for multidisciplinary approach of research undertakings. However, this study concerned only the evidence on causality and relationship between economic growth and financial development and between economic growth and trade.

1.8 Limitations of the study

Like any other research, the study is limited in time and other infrastructural resources. This includes hardship and shortage of finance.

1.9 Organization of the study

The paper contains five chapters. The first chapter discusses introduction part which includes background of the study, statement of the problem, objective of the study, research questions, hypotheses of the Study, significance of the study and scope and limitation of the study. Chapter two contains literature review of the study (theoretical and empirical literature). Chapter three

has discussed methodology and estimation technique. The next chapter, chapter four has presented estimation result and analysis of data by both descriptive and econometric methods. The last chapter concluded the paper by presenting conclusion (summary) and recommendation (policy implication) of the study.

CHAPTER TWO

THE REVIEW OF THEORETICAL AND EMPRICAL LITERATURE

2.1. Conceptual Framework

Financial progress and financial openness are not the same things, yet they are connected concepts. A financial system frequently opens up to foreign money and gets more tightly connected with other financial systems as it grows and becomes more sophisticated. As demonstrated by the People's Republic of China [PRC], a nation can prosper financially even while keeping a comparatively closed financial system.

Nhan (2021) clarified that several paths for economic development are made possible by the relationship between trade openness and financial development. Trade openness has a number of benefits for economic growth, including raising a nation's degree of specialization and fostering innovation and technological advancement. Improved trade openings have the potential to spur economic growth if they stimulate financial development, with finance driving growth through the allocation and accumulation channels.

Although literatures assume connections between trade liberalization and economic growth as well as between finance and growth, Muhsin (2013) noted that multi-cause relationships between international trade, financial development, and economic growth have recently garnered attention.

2.2. Measures of Growth, Trade Openness and Financial Development.

2.2.1. Measures /Indicators of Economic Growth

According to the World Bank (2019), indices of economic growth encompass macroeconomic performance, such as GDP, consumption, investment, and international commerce, as well as stability, which includes central government budgets, prices, the money supply, and the balance of payments. Sean (2022) stated that scholars employ a variety of techniques to monitor economic progress. The gross domestic product (GDP) is the well-known.

2.2.2. Measures /Indicators of Trade Openness.

According to Edward (1988), the trade intensity ratio which is calculated by dividing exports + imports by GDP is the fundamental indicator of trade openness.

2.2.3. Measures /Indicators of Financial Development.

To verify the robustness of the findings, a few widely used financial development measures are included in this study. Indicator of financial development used by Gregorio and Guidotti (1995) was the ratio of bank loans to the private sector to nominal GDP and Demetriades and Hussein (1996) claimed that deducting currency outside banks from M2 and taking that ratio to GDP can act as a measure or a proxy of financial development. According to World Bank (2012), an accurate assessment of financial growth is essential to evaluating the state of the financial sector and comprehending how financial development affects both economic growth and the decrease of poverty.

In actuality, though, financial progress is a broad notion with many facets, making measurement challenging, the majority of empirical research to date has been conducted using standard quantitative indicators that are accessible over lengthy time series across a wide range of nations. Among the well-known metrics are the ratios of financial institutions' assets to GDP, liquid liabilities to GDP, deposits to GDP, broad money, and domestic credit to the private sector. However, as a nation's financial sector encompasses a wide range of financial markets, products, and institutions, these measurements are approximations and do not fully account for all facets of financial development.

World Bank global financial progress database (2022) had devised a conceptual 4x2 framework to track financial progress worldwide that is both thorough and reasonably simple. This paradigm finds four sets of proxy variables—financial depth, access, efficiency, and stability—that describe a healthy financial system. The financial market and financial institutions, which make up the two main parts of the financial sector, are then measured along these four parameters

Table 2.1 Measures /Indicators of Financial Development according to World Bank's Global Financial Development Database.

	Financial Institutions	Financial Markets
Depth	• Private Sector Credit to GDP • Financial Institutions' asset to GDP • M2 to GDP • Deposits to GDP • Gross value added of the financial sector to GDP	• Stock market capitalization and outstanding domestic private debt securities to GDP • Private Debt securities to GDP • Public Debt Securities to GDP • International Debt Securities to GDP • Stock Market Capitalization to GDP • Stocks traded to GDP
Access	• Accounts per thousand adults(commercial banks) • Branches per 100,000 adults (commercial banks) • % of people with a bank account (from user survey) • % of firms with line of credit (all firms) • % of firms with line of credit (small firms)	• Percent of market capitalization outside of top 10 largest companies • Percent of value traded outside of top 10 traded companies • Government bond yields (3 month and 10 years) • Ratio of domestic to total debt securities • Ratio of private to total debt securities (domestic) • Ratio of new corporate bond issues to GDP
Efficiency	• Net interest margin • Lending-deposits spread • Non-interest income to total income • Overhead costs (% of total assets) • Profitability (return on assets, return on equity) • Boone indicator (or Herfindahl or H-statistics)	• Turnover ratio for stock market • Price synchronicity (co-movement) • Private information trading • Price impact • Liquidity/transaction costs • Quoted bid-ask spread for government bonds • Turnover of bonds (private, public) on securities exchange • Settlement efficiency
Stability	• Z-score • Capital adequacy ratios • Asset quality ratios • Liquidity ratios • Others (net foreign exchange position to capital etc)	• Volatility (standard deviation / average) of stock price index, sovereign bond index • Skewness of the index (stock price, sovereign bond) • Vulnerability to earnings manipulation • Price/earnings ratio • Duration • Ratio of short-term to total bonds (domestic, int'l) • Correlation with major bond returns (German, US)

2.3. Theoretical Literature

A multitude of mechanisms are proposed by the theoretical perspective about the nexus between finance and growth to explain how financial development drives economic growth. Theoretical economic literature has given significant attention to the relationships between trade openness and economic growth, as well as between financial development and economic growth. These relationships are the focus of intense discussion. One of the early pioneers, Schumpeter (1912), highlighted the significance of finance for growth. He said that there has been much discussion in the literature about the impact of the financial sector on economic growth.

The demand-following hypothesis, first put forth by Robinson in 1952, contends that economic expansion, not financial development, is what gives rise to the establishment and expansion of the financial sector. He maintained that financial institutions must exist in order to supply services that are necessary for economic growth when economic activity within an economy expands. Growth thus takes the lead, followed by finance. Patrick in 1966 presented two novel ideas that sparked a debate regarding whether growth follows finance or vice versa in terms of causality.

Romer (1990) notes that the connection between trade openness and economic growth is still up for debate in the literature. Renelt (1991) argues that financial development may be one of the causes of the growing likelihood of selecting more profitable investments and according to Hermes (1994), reasoning derived from endogenous growth theories presuppose that financial development fosters economic expansion.

In addition, Muhsin (2013) stated that trade liberalization and financial development could both be significant contributors to economic growth. Trade liberalization lowers manufacturing process inefficiencies, and financial growth makes it easier for savers and investors to transact. As a result, they have a tremendous deal of potential to impact emerging countries' economic progress in a good way. This research suggested supportive evidence about the effects of financial development and trade openness on economic growth by bringing more attention and further studies on SSA countries so that to find appropriate trade, finance and growth policy corrections.

2.4 Empirical Evidence.

Since the researcher has so many literature that touch all continents and different parts and regions of the world with detail emphasis on SSA countries on the relationship between financial development and economic growth and trade openness and economic growth at different years using different model and by the fact that these three big topics have huge economic concepts and hence it is better to present them as six sub topics as the following.

2.4.1 Relationship between the variables for group of countries or regions

When we look at tripartite relationship, Roberto et al. (2013) evaluated causality analysis in order to understand the relationships between financial development, economic growth, and trade openness in the Central American region and discovered that there is a causal relationship between three of them as well as Yaya (2020) employed a panel of 11 West Africans from 1985 to 2018 and applied the (CCEMG) estimator and (SURE) to handle heterogeneity and cross-sectional dependency and demonstrated that trade openness and financial development have a generally positive long- and short-term impact on real per capita GDP. Similarly, Kizito and Hooi (2017) for the years 1980–2014 examined the tripartite relationship between financial development, trade openness, and economic growth using an ARDL-bounds test on Ghana, Nigeria, and South Africa.

When we look only at financial development and economic growth, Abubakar (2011) examined three West African countries between 1996 and 2009 and stated the type and strength of the association between financial development and economic growth depends on the financial development proxy selected. In Cote d'Ivoire, domestic credit has a significant negative relationship with growth, whereas in Ghana and Nigeria, none of the financial development measures have a significant impact on growth. (Ahmet and Niyimba) 2019 using a cross-sectional time-series regression analysis have examined the effects of financial development and foreign direct investment (FDI) on economic growth in the East African Community (EAC) countries of Burundi, Kenya, Rwanda, Tanzania, and Uganda. They discovered that whereas FDI had a negative effect on economic development, domestic credit to the private sector—a proxy for financial development had a considerable and favorable influence in the EAC countries.

When we look at trade openness and economic growth, Victor (2019) investigates the connection between trade openness and economic growth among ECOWAS nations. He concludes that while trade openness has mixed short-term consequences, it has positive long-term effects for this region growth.

Moreover, different scholars found association between economic growth and trade openness, and economic growth and financial development on all continents and different regions of the world. For instance Gries et al. (2011) on 13 Latin American countries, Muhammad et al (2012) dealt with Australia, Merale et al (2014) on 10 South East European countries, Chi H. et.al (2021) for 6 leading ASEAN countries, Hanh (2010) dealt with 29 developing economies of Asia, (Ekanayake and Ranjini) 2021 on 138 developing countries, Jagadish (2018) on16 low-income African countries, Zaheer et al (2021) on 44 middle-income countries, (Suleiman and Aamer) 2006 on 5 Middle Eastern and North African (MENA) countries and Moyo (2018) on 11 (SADC) countries.

2.4.2. Positive relationship between trade and economic growth among individual countries

Yaya (2017) investigates the relationship between trade openness and economic growth for Cote d'Ivoire from 1965 to 2014 by using the Autoregressive Distributed Lag bounds test and a multivariate framework that includes capital stock, labor, and trade openness as regressors. He finds that trade openness has a positive impact on economic growth in both the short and long run and Salama et al. (2019) used the VECM to study Tanzania from 1981 to 2017 and found a similar long run positive link between trade openness and economic growth.

Ebrima (2017) studied Gambia from period 1965 to 2016 by conducting OLS regression and found that this nation's economy grew through trade. Similarly, Yehdhih (2020) Studied Mauritania over a period from 1986 to 2016 using data from World Bank and the Mauritanian national statistical office and applying the least squares (OLS) method and (VAR) found the same

2.4.3. Negative relationship between trade and economic growth among individual countries

(Getie and Haiyun) 2019 employed the Least Squares (2SLS) estimation technique and found the negative relation of trade on Ethiopia's total GDP and Rasoanomenjanahary (2022) used the Vector Error Correlation Model technique for the period 1993 to 2020 and depicted that trade openness has a negative effect on economic growth in Madagascar. Ashenafi (2021) studied Mozambique for the period between 1981 and 2017 and concluded that trade openness is not the reason behind economic growth. Economy of these three countries are growing negatively as a result of trade openness, which suggests that these nations have been importing more goods than their exports, resulting in a significant negative net trade balance.

2.4.4. Relationship between financial development and economic growth among individual countries.

Ahmed (2014) used the Johnson technique to co-integration to study Sudan from 1970 to 2012, Serge (2017) employed Auto Regressive Distributive Lag (ARDL) on Cameroon, Fantessi (2015) used the Autoregressive Distributed Lag (ARDL) to study Togo from 1981 to 2010, Alex et al. (2016) examined Zimbabwe from 1980 to 2013, Susan (2014) studied Kenya for the period 1980–2011, Ofori (2017) used ARDL to study Ghana from 1970 to 2013, Ayorinde (2013) examined Cape Verde from 1980 to 2011 using the VECM approach and they all discovered a positive relationship between financial development and economic growth.

Thomas (2021) has favored the supply leading hypothesis and the demand following hypothesis, to explain Rwanda's finance-growth association for the years 1980 to 2018. He stated that financial sector grow or innovate in response to increased demand for financial services and Christia (2020) investigates on Democratic Republic of the Congo (DRC) and supported the demand-following hypothesis whereas Amr (2012) supported the supply-leading hypothesis.

2.4.5. Tripartite relationship of variables among individual countries.

BigBen (2010) examines Botswana for the years 1980–2007 using cointegration approaches and concludes that financial development is aided by economic growth, and there is no evidence of a causal relationship between trade openness and economic growth. In the same year, he conducted research on the Benin Republic and discovered that trade openness is driven by economic expansion, which is supported by financial development.

Joshua (2020) found that financial development significantly affects real GDP in Nigeria whereas trade and its relationship with financial development have no discernible effects on the country's economic growth.

2.4.6 Impact of Control variables (unemployment, inflation and FDI) on economic growth.

According to Chimdesa (2024), Sub-Saharan Africa (SSA) is experiencing the fastest rate of population growth globally. Unemployment, on the other hand, is one of the main socioeconomic issues that almost every country in the world is currently facing and one that Sub-Saharan Africa (SSA) must actively combat.

Muhammad (2012) stated that one sort of foreign investment that is thought to be essential for providing the country with capital, jobs, knowledge, technology, skills, and abilities is foreign direct investment (FDI). FDI is viewed as a support system for nations with little investment capital. Through financial assistance, knowledge transfer, and technology dissemination, it is claimed that foreign direct investment (FDI) has accelerated the economic growth of the host nation (the FDI recipients). According to Tamar (2020), FDI is typically seen as a catalyst for economic expansion. However, the actual data is not entirely consistent, indicating that FDI and growth have a positive, neutral, or even negative relationship.

Khayroollo (2011) stated that two of the primary goals of macroeconomic policy are low inflation and strong, sustainable economic growth. According to Faraji (2013), the estimated equations' results showed that Tanzania's GDP and inflation had a negative relationship.

The results of empirical research on the relationships between trade and growth, finance and growth, are contradictory, ambiguous, and inconsistent. In light of the foregoing debate, it can be stated that financial development and economic growth relationships and, trade and economic growth relationships are significant subjects. As such, research is required for SSA nations using most recent data by utilizing the right econometric model and covering the greatest number of member countries and this paper has done it.

CHAPTER THREE

METHEDOLOGY AND ESTIMATION TECHNIQUE

3.1 Types of data and data source.

This study used secondary data, a panel data of 21 SSA countries obtained from the World Bank data indicators. The reason for why the researcher used only 21 countries is that because of he is interested in strongly balanced panel data and so all entities are observed across all times or all countries have data for all years. Baltagi (2004) as cited in Chi (2021) stated that compared to time series data, panel data is less prone to experience autocorrelation and multicollinearity.

3.2. Definition of the Variables.

Definition of Economic Growth

Economic growth, according to Max (2021), is the rise in the amount and caliber of economic commodities and services that a community generates.

Investopedia Team (2021) defined economic growth as the increase in the production of products and services over a certain time period in comparison to a previous period. The typical measure of aggregate economic growth is gross national product (GNP) or gross domestic product (GDP), even though other metrics are occasionally used as well.

Definition of Trade Openness

E/ESCWA/SDD(2012) characterized trade openness as the country's economy orientation, either inward or outward. Economies that significantly capitalize on opportunities for global trade are referred to as being outwards oriented. Economies that are internally oriented are those that miss or are unable to take advantage of opportunities to trade with other countries.

Definition of Financial Development

As stated by the World Bank (2012), the markets, organizations, instruments, and legal and regulatory structure that facilitate credit-based transactions comprise the financial industry. Reducing "costs" is the primary goal of the financial sector's development. As a result of the process of reducing the costs associated with collecting information, enforcing contracts, and completing transactions, financial contracts, markets, and intermediaries evolved and all of these are elements of financial development.

Table 3.1 Definition, theory intuition and expected Sign of proxy variables

Variable	Theory Intuition	Expected Sign
Log of GDP	The gross domestic product (GDP) measures the total amount of goods and services produced in an economy.	Dependent Variable
Log of BM	The World Bank classifies "broad money," which is a proxy for financial development, as depth dimensions. It is computed as the ratio of M2 less currency outside banks to GDP.	+
Log of DCPS	Domestic loan to the private sector is a stand-in for financial development, which is concerned with the distribution of financial resources exclusively available to the private sector. The World Bank classified this as a depth dimension.	+
Log of CBA	Included under Access aspects by world bank	+
UNE	The percentage of unemployed persons in the labor force is known as the unemployment rate. It is one of control variable in this investigation.	_
Log of TOP	Trade Openness is a proxy of trade which is calculated as exports plus imports divided by GDP.	+
Log of FDI	Foreign direct investment is one that indicates the goal of an investor from one country to acquire a long-term stake in a business owned by a resident of another economy..	+
Log of INF	According to IMF, inflation is the broad and continuous rise in in prices and is used in this study as a control variable.	_

3.3. Tests

3.3.1. Normality of the data

To ascertain whether the data is regularly distributed or skewed (either positively or negatively), a normality test is utilized. A normal distribution can be examined graphically or analytically using statistical tests. The sk test, the swilk test, and employing a histogram are the most popular analytical procedures for determining whether data are normally distributed. In this work, the values of kurtosis and skewedness were used.

3.3.2. Test for Multicollinearity

When two or more independent variables in a regression model have a strong correlation with one another, this is statistically referred to as multicollinearity and it can be checked using variance inflation factor (vif) as this study does which must be less than 10 for all variables under study in order for no occurrence of problem multicollinearity.

3.3.3.Test for Homoscedasticity

Heteroskedasticity is present when there is an unequal variance detected in the residuals. On the other hand, homoscedasticity is the state in which the variance of the residuals is constant and it can be checked using " hettest" stata command as this paper did and p-values must be significant which means it must be greater than 0.05 so that residuals to have equal variance and hence to be homoscedastic.

3.3.4. Testing for unit roots in panel data/Stationarity Test.

According to Sichei (2008), Panel unit root tests are comparable to time series analysis unit root tests, although they are not the same. Many research omitted the unit root test of the data, which is an essential step since without it, the results are not trustworthy and it also help to choose appropriate model that best fit the data. Testing for the stationarity of variables before running the cointegration and causality test is essential. A given series is termed as non-stationary if p-value becomes greater than 0.5. To choose the optimal lag length, examining the Akaike information criterion (AIC) is needed. This study has used the Levin, Lin Chu (LLC) stationarity test.

3.3.5. Cointegration Test

Recently, there has been a lot of focus, particularly in the empirical literature, on the use of this test for the existence of long-run correlations. This study used Pedroni's (2004) panel cointegration test, taking into account the panel data and the study period. The cointegration test was conducted among the variables of financial development, trade, economic growth, and control variables. Seven test statistics are provided by this test: four are within-dimension statistics, referred to as panel cointegration statistics: panel v-statistic, panel rho-statistic, panel PP-statistic (nonparametric), and panel ADF-statistic (parametric); the last three are between-dimension statistics, referred to as group mean panel cointegrating statistics: group rho-statistic, group PP-statistic (nonparametric), and group ADF-statistic (parametric).

3.3.6. Testing for Causality

Lopez (2017) explains that panel datasets with a large number of participants over a long period of time are becoming more accessible. One especially notable example is the growing availability of cross-country data over time. As a result, rather than micro panels with high N and small T, panel-data econometrics is increasingly emphasizing macro panels with large N and large T. In this situation, classical time-series econometrics problems like non-stationarity and non-causality also arise. Granger (2003) discusses how the typical panel causality test determines if one variable, say X_t causes another variable, sayY_t, somewhere in the panel. He also developed a methodology for analyzing the causal relationships of the case if X_t and Y_t, are two stationary series and even after past values of y have been incorporated into the model, if prior values of x are significant predictors of the current value of y, then x has a causal influence on y.

For all other purposes, this study has used Dumitrescu & Hurlin's (2012) Granger causality test. The Granger causality test is preferred over other test methods primarily because of its strong responsiveness to both small and large samples. In this paper, causation has checked after long-run parameters have estimated.

3.3.7. Hausman Test

The Hausman test was employed in the study to select between the random effect model (REM) and the fixed effect model (FEM). Which estimator fits the best model is determined by the Hausman specification test.

Green (2008) stated that the key distinction between random and fixed effects is whether the unobserved individual effect embodies elements that are correlated with the regressors in the model, not whether these effects are stochastic. (Stock and Watson) 2003 stated that any changes in the dependent variable must be caused by factors other than fixed characteristics if the unobserved variable does not vary over time.

According to Oscar (2007), fixed-effects can be used when examining the effects of variables that change over time or when it is evident that the regressors are impacted by the unique attributes of each entity or group. The fixed effect model solely examines relationships between predictor and result variables inside the study's entity, which is country in this study. The random effects model is used whenever there is reason to believe that individual characteristics have no effect on the regressors (uncorrelated).

It is advised to reject the null hypothesis, that is, to reject the random effect model and use the fixed effect model, if the p-value from the Hausman test is less than or equal to 5%. It is advised to adopt the null hypothesis, which is to reject the fixed effect model and employ the random effect model, if the p-value from the Hausman test is greater than 5%.

3.4. Methodology and Model Specification

Using a panel econometric model of random effect estimator, the links between financial development, trade openness, and economic growth were examined in this research. Since my data set includes a panel of 21 SSA countries covering the years 2005 to 2018, it has both time series and cross-sectional dimensions, making it the optimal model to utilize.

In addition, in practical world every country have their own unique characteristics and which Pooled OLS couldn’t assume and so is inappropriate model and the result of hausman test also showed as the fixed effect model is also inappropriate too.

Moreover, a more efficient estimator is the Random Effects (RE) estimator than fixed effect model as it captures both the within and the between variation of the data and this study has found random effect model as the most appropriate model after running huasman specification test and so it is the best methodology. Hence, the Random effect model is specified as the following based on Sarveshwar (2016) and Syed (2020):

$$logGDP_{it} = \beta_{0i} + \beta_1 logBM_{it} + \beta_2 logDCPS_{it} + \beta_3 logCBA_{it} + \beta_4 logTOP_{it} + \beta_5 UNE_{it} + \beta_6 logFDI_{it} + \beta_7 logINF_{it} + \mu_{it} \quad \ldots\ldots\ldots\ldots (1)$$

β_{0i} is changing or heterogeneous and it is the sum of some fixed and some random error part and so divided in to two parts as some constant beta plus some heterogeneous error part which is random and showed as the following:

$$\beta_{0i} = \beta_0 + \varepsilon_i \quad \ldots\ldots\ldots (2)$$

Here, we have two errors. One is individual specific and the other is the model specific as presented in the following equation 3.

$$logGDP_{it} = \beta_0 + \beta_1 logBM_{it} + \beta_2 logDCPS_{it} + \beta_3 logCBA_{it} + \beta_4 logTOP_{it} + \beta_5 UNE_{it} + \beta_6 logFDI_{it} + \beta_7 logINF_{it} + \varepsilon_i + \mu_{it} \quad \ldots\ldots (3)$$

Now we can put both errors together assuming both of them are random by representing it as "α_{it}" in the following last equation.

$$logGDP_{it} = \beta_0 + \beta_1 logBM_{it} + \beta_2 logDCPS_{it} + \beta_3 logCBA_{it} + \beta_4 logTOP_{it} + \beta_5 UNE_{it} + \beta_6 logFDI_{it} + \beta_7 logINF_{it} + \alpha_{it} \quad \ldots\ldots (4)$$

CHAPTER FOUR

RESULTS AND ANALYSIS

4.1 Descriptive Analysis

The study used data of 21 SSA countries, covering the period from 2005 to 2018 on eight variables log of GDP, log of BM, log of DCPS, log of CBA, log of TO, UNE, log of FDI and log of INF. As it is tiresome to go through each countries estimate result of all this variables for this much year, finding a single representative figure is needed. To do so calculating statistical summary such as mean, standard deviation, minimum value, maximum value, skewness and kurtosis is important.

Table 4.1 Statistical Summary table.

Variables	Obs	Mean	Std. Dev.	Min	Max	p1	p99	Skew.	Kurt.
lGDP	294	3.088	.25	.035	3.566	2.467	3.468	-7.437	84.252
lBM	294	3.351	.572	1.977	4.709	2.239	4.67	.628	2.873
lDCPS	294	2.854	.864	.468	4.959	.848	4.859	.407	3.364
lCBA	294	1.223	.976	-1.309	3.531	-1.022	3.52	.213	3.023
lTOP	294	6.49	.385	-.001	7.396	6.386	6.689	-16.33	276.682
UNE	294	6.721	5.912	.32	24.22	.532	23.99	1.242	3.565
lFDI	294	20.771	1.333	-.03	23.08	19.8	22.84	-12.854	203.268
lINF	294	2.738	.447	-.001	4.711	1.859	4.198	.051	10.665

The log value of some variables is still high because of they were converted to log after removing the negative sign from the highest negative number and adding this big value on all data under that variable so that they all become positive as negative numbers can't converted to Log and in that manner they forced to became high log value and to get significant and good estimate values too. The above table outlays the summary statistics for the variables. It reveals a disparity among the countries based on the results of the variables. Log of GDP averages 3.09 and varies from 0.035 to 3.57 and among financial development indicators log of DCPS varies

more relative to log of BM and log of CBA. When we look at log of TOP, it averages 6.49 and varies from -0.001 to 7.4 and so it averages and varies more than both log of GDP and log of all financial development indicators variables. Among Control variables FDI averages 20.8 which is highest of all and UNE varies than all variables used in this study. These maximum and minimum values of the variables suggest that there is a moderate gap in terms of log of GDP growth, log of trade openness, log of INF and all logs of financial development indicator variables and wide gap in terms of control variables as log of FDI and log of UNE varies more among countries in SSA. The characteristics of the data make it abundantly evident that the panel data analysis approach should be used for estimating the empirical model.

Table 4.2 Correlation Matrix

A look at the correlation matrix shows that log of GDP correlates negatively with all explanatory variables except for log of TOP.

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
(1) logGDP	1.000							
(2) logBM	-0.060	1.000						
(3) logDCPS	-0.025	0.882	1.000					
(4) logCBA	-0.010	0.873	0.865	1.000				
(5) logTOP	0.041	-0.041	-0.038	-0.055	1.000			
(6) UNE	-0.193	0.423	0.494	0.491	-0.115	1.000		
(7) logFDI	-0.063	0.122	0.185	0.164	0.009	0.217	1.000	
(8) logINF	-0.101	-0.058	-0.107	-0.004	0.017	0.195	0.148	1.000

As shown above, they are lower than 0.88 which is less than 1 and hence there is no problem of multicollinearity.

4.2 Some diagnostic tests and important assumption.

Some diagnostic tests and important assumption that must be checked before starting regression analysis of the data are described as the following.

Normality of the data

From the results of Table 4.1 presented above, the values of the skewness and kurtosis shows almost normal distribution of the data for all financial development indicators (log of DCPS, log of BM, log of CBA,) and similarly for UNE (control variables) as their value for Kurtosis is around 3. Whereas log of GDP, log of TOP, log of FDI and log of INF are not normally distributed and results from SPSS software by method of log transformation also similarly confirmed these results if someone interested to do so.

Table 4.3 Multicollinearity

Using variance inflation factor, we found the following values as presented in the below table.

Variables	VIF	1/VIF
logDCPS	6.05	.165
logBM	5.875	.17
logCBA	5.317	.188
UNE	1.509	.663
logINF	1.152	.868
logFDI	1.09	.917
logTOP	1.018	.982
Mean VIF	3.144	.

Since the value of the vif for all the variables are less than 10, there is no problem of Multicollinarity in the data and this is similar with what is found under descriptive analysis using correlation matrix.

Table 4.4 Homoscedasticity

Since p-value is equal to 0.0074 which is less than 0.05, there is hetroscadasticicty problem in the data.

White's test for Ho: homoskedasticity
against Ha: unrestricted heteroskedasticity
chi2(35) = 58.61
Prob > chi2 = 0.0074
Cameron & Trivedi's decomposition of IM-test

Source	chi2	df	p
Heteroskedasticity	58.610	35	0.007
Skewness	11.680	7	0.112
Kurtosis	1.230	1	0.268
Total	71.510	43	0.004

To solve this the researcher has used "*hettest,rhs fsta*t" sttata command and found the following:

Table 4.5 Breuch Pagan Test to remove problem of Heteroskedasticity

Breusch-Pagan / Cook-Weisberg test for heteroskedasticity
Ho: Constant variance
Variables: logBM logDCPS logCBA logTOP UNE logFDI logINF
F(7 , 286) = 1.77
Prob > F = 0.0932

Now p-value is equal to 0.09 which is greater than 0.05 and so it becomes homoscedasticity and so no problem of heteroscdacticity in our data now.

Table 4.6 Stationarity Test

The p-value is equal to 0.04 for employment which is significant at 5% and 0.00 which is even significant at 1% significance level for all other variables as presented in table 4.6 below and someone can get the details of the results for each variable at the appendix of this paper.

Results of Stationarity Test

Variables	P-value
logGDP	0.00
logBM	0.00
LogDCPS	0.00
logCBA	0.00
logTO	0.00
UNE	0.04
logFDI	0.00
logINF	0.00

We accept the alternative hypothesis of stationarity and reject the null hypothesis since all variables are stationary at level.

Table 4.7 Panel Cointegration Test

From the stata outputs presented in the below table, values for the last three tests (Modified Phillips-Perron t, Phillips-Perron t and Augmented Dickey-Fuller t) are all equal to 0.00 which is less than 0.05 or even significant at 1% and so we reject the null hypothesis that says no contegration and adopt the alternative hypothesis since all panels are cointegrated.

Pedroni test for cointegration

Ho: No cointegration	Number of	Panels = 21	
Ha: All panels are cointegrated	Number of	Periods = 13	
Cointegrating vector: Panel specific			
Panel means: Included	Kernel:	Bartlett	
Time trend: Not included	Lags:	2.00 (Newey-West)	
AR parameter: Panel specific	Augmented	lags:	1
	Statistic	p-value	
Modified Phillips-Perron t	7.2126	0.0000	
Phillips-Peron t	-7.9397	0.0000	
Agmented Dickey-Fuler t	-6.6935	0.0000	

Hence this result answered the paper's objective of examining the long run relationship between economic growth and financial development and economic growth and trade openness.

Panel causality analysis

Regression result of panel causality test is placed at the appendix part of this paper and the analysis is presented as the following based on Z-bar and Z-bar tilde p-values.

H0: Do not granger causes,

H1: Granger causes,

Only UNE cause log of GDP as the p-value of Z-bar and Z-bar tilde is equal to 0.0000 which is less than 0.05 and hence we accept the alternative hypothesis of Granger causality. The direction of causality is therefore from UNE to log of GDP. Except log of GDP and log of INF all other variables causes log of BM. Except log of BM and log of CBA all other variables do not granger causes log of DCPS.Only log of BM causes log of CBA whereas all other variables do not granger cause log of CBA. The direction of causality is therefore from log BM to log of CBA.

Except log of FDI and log of INF for which Z-bar and Z-bar tilde is insignificant all other variables causes UNE. Both log of GDP and UNE causes log of TOP whereas all other variables do not granger causes log of TOP. The positive causal relationship between Trade and GDP is confirmed as trade is one component of GDP in the national income accounting identity. Only UNE causes log of FDI whereas Z-bar and Z-bar tilde is insignificant for all of other variables. The direction of causality is therefore from UNE to log of FDI. All log of BM, log of CBA and UNE causes log of INF whereas the rest variables do not granger cause log of INF.

There is numerous unidirectional causality between the variables whereas there is only bidirectional causality between some of the variables such as between GDP and UNE, between log of BM and log of DCPS, between log of BM and log of CBA, between log of BM and UNE, between log of TOP and UNE.

As we assessed the causality between log of GDP, log of BM, log of DCPS, log of CBA, log of TO, UNE, log of FDI and log of IF, this paper has answered one of its specific objectives of determining the causal relationship between financial development trade openness and economic growth of SSA Countries.

Since we have done important tests, we can proceed to data regression and analysis using STATA 15.

4.3. Regression Analysis of Fixed and Random effects

4.3.1 Regression Analysis of Fixed effect.

The detail of regression result is placed at the appendix part of this paper. As we can see in the below table, the overall significance of the slope coefficients is given by F (7,266) =2.02 and estimated p-value is 0.053 indicating roughly the joint statistical significance of the slope coefficients at 5% level.

Table 4.8 Regression result of fixed effect estimator.

LogGDP	Coef.	St.Err.	t-value	p-value	[95% Conf	Interval]	Sig
LogBM	-.205	.133	-1.54	.125	-.467	.057	
LogDCPS	-.09	.087	-1.03	.305	-.262	.082	
LogCBA	.125	.061	2.06	.041	.005	.244	**
LogTOP	.017	.038	0.44	.66	- .058	.091	
UNE	-.038	.014	-2.78	.006	- .065	-.011	***
LogFDI	-.011	.012	-0.93	.354	-.034	.012	
LogINF	-.038	.042	-0.90	.37	-.122	.045	
Constant	4.359	.527	8.28	0	3.322	5.396	***

Mean dependent var	3.088	SD dependent var	0.250
R-squared	0.050	Number of obs	294
F-test	2.015	Prob > F	.003
Akaike crit. (AIC)	-18.939	Bayesian crit. (BIC)	10.530

*** *p<.01, ** p<.05, * p<.1, 0*

From this table one can see that log of BM has insignificant negative impact on log of GDP as its p-value (0.13) is greater than 0.05 and log of DCPS has similarly insignificant negative impact on log of GDP as its p-value (0.31) is greater than 0.05. Log of CBA has significant at 5% significance level and expected positive impact on log of GDP as its p-value (0.04) is less than to 0.05 and log of TOP has insignificant but expected positive impact on log of GDP as its p-value (0.66) is greater than 0.05 whereas UNE has significant (even at 1%significance level) and expected negative impact on log of GDP as its p-value (0.006). Log of FDI has insignificant negative impact on log of GDP and log of INF has also insignificant but expected negative impact on log of GDP. To sum up, log of UNE and log of CBA has significant impact on log of GDP whereas all other variables has insignificant impact on log of GDP.As one can see from table 4.10 presented on the next page under random effect model, log of BM has significant

negative impact on log of GDP as its p-value (0.06) is greater than 0.05, log of DCPS has insignificant and expected positive impact on log of GDP as its p-value (0.55) is greater than 0.05 and whereas log of CBA has significant at 10% significance level and expected positive impact on log of GDP and UNE has expected negative impact on log of GDP even at 1% significance level as its p-value is 0.005. Log of TOP has insignificant but expected positive impact on log of GDP and both log of FDI and log of INF has insignificant negative impact on log of GDP. In general, log of BM, log of CBA and UNE has significant impact on log of GDP whereas all other variables have insignificant impact on log of GDP.

Both the random effect model and the fixed effect model are analyzed. Which model is the most suitable?

4.3.2 Hausman Test for selection criteria

Results of hausman test for model specification is presented in the following table and the detail of the stata output is placed under appendix section of this paper.

Table 4.9.Hausman Specification Test

Hausman (1978) specification test	
	Coef.
Chi-square test value	9.927
P-value	.193

Table 8

Since Prob>chi2 = 0.19 which is greater than 0.05 or it is not statistically significant at 5% level, the Random Effect Model is most appropriate model and we accept the null hyphothesis that says the random effects are independent or not correlated and make analysis based on it.

4.3.3 Regression analysis of Random effect Model

A p-value of 0.037 presented in the below table indicates the joint statistical significance of the slope coefficients at 5% level.

Table 4.10.Regression results of random effect model.

LogGDP	Coef.	St.Err.	t-value	p-value	[95% Conf	Interval]	Sig
LogBM	-.134	.071	-1.88	.06	-.274	.005	*
LogDCPS	.029	.048	0.60	.546	-.065	.123	
LogCBA	.072	.039	1.84	.065	-.005	.148	*
LogTOP	.015	.037	0.41	.681	-.058	.088	
UNE	-.01	.004	-2.82	.005	-.017	-.003	***
LogFDI	-.007	.011	-0.60	.546	-.029	.015	
LogINF	-.028	.036	-0.79	.432	-.099	.043	
Constant	3.556	.382	9.31	0	2.807	4.305	***

Mean dependent var	3.088	SD dependent var	0.250
Overall r-squared	0.067	Number of obs	294
Chi-square	14.903	Prob > chi2	0.037
R-squared within	0.020	R-squared between	0.403

*** p<.01, ** p<.05, * p<.1

Log of BM exerts a significant negative effect on the growth of log of GDP at 10%. If all else stays the same the results show that, a one percent increase in log of BM decreases the growth rate of log of GDP by 0.13 percent in SSA countries. This might be because of money supply matters in determining inflation and inflation matters GDP and both of them show negative relationship with GDP in this paper. Economic theory has shown the existence of positive relationship between Broad Money (BM) and inflation and log of inflation has negative relationship with growth rate of log of GDP in this study and so in such way log of BM might negatively affect growth rate of log of GDP in SSA countries. Under the causality analysis of this paper itself, we found that log of BM causes log of inflation that has inverse relation with economic growth under this sub topic as we are going to discuss it below. This may implies that log of BM negatively affect Economic growth through log of Inflation. This result is confirmed by Okedigba (2023) and different schools of thought such as Classical economists, Keynesians and Monetarists.

From the above table, the expected positive correlation between GDP and the log of domestic lending to the private exists. These results imply that the higher gross domestic output in these nations is associated with the flow of credit to the private sector. If all else stays the same, a one percent rise in the log of Domestic credit to private sector (log DCPS) leads to a long-term 0.03 percent rise on GDP in SSA nations. Therefore, domestic lending to the private sector supports economic growth of SSA countries. This result is in line with Jagadish's (2018) findings and differs from those of Narayan (2013), (Ductor and Grechyna) 2015, (Grassa and Gazdar) 2014, and Mhadhbi (2014), as well as Gries et al. (2009), who discovered that financial development has little bearing on growth in Sub-Saharan Africa.

At the 5% level of significance, the number of commercial bank branches (log of CBA) is projected to have a positive and statistically significant impact on economic growth. The findings show a positive correlation between the growth rate of GDP and Commercial bank branches. Assuming no other changes, one percentage increase in Commercial bank branches is associated with 0.07 percent increase in growth of log of GDP for SSA countries. Hence, if SSA countries increase the number of commercial bank branches they can improve their GDP and so their economic growth and this positive impact of log of CBA is confirmed since it is presented as positive indicator of financial development by world bank even though other researchers has not used it.

It is also crucial to remember that trade openness (log of TOP) is predicted to give a favorable effect on economic expansion. Over an extended period, a 1 percentage point rise in openness contributes to a 0.02% increase in log GDP growth in SSA nations, holding all other factors equal. So we can say that trade positively affects economic growth of SSA countries and this finding is supported by classical economic theory of trade that states the development of trade exchange with international partners improves economic growth and also confirmed by the traditional Neoclassical exogenous growth model that states openness influences the amount of foreign knowledge spillovers, which in turn influences growth. Besides, this result is similar with the findings of Yaya (2020), Asfaw (2014), Zarra (2014), (Brueckner and Lederman) 2015, but it is at odds with the findings of Ngongang (2015), Polat (2015), Ulaşan (2015), Were (2015), and Vlastou (2010), who all stated that trade openness had a negative effect on economic growth.

Unemployment has the expected negative and statistically significant impact on economic growth at 5% level of significance. The result shows that in the long-run, keeping other things constant, 1 percentage increase in Unemployment leads to decrease in log of GDP by 0.01 percent in SSA countries. This is accordance with the existing theories that puts unemployment as the evil of GDP growth rate and so unemployment decreases economic growth. This negative association between unemployment and growth rate of GDP is similar with the Okun law that states the relationship between changes in the GDP and unemployment rates is inversely proportional. In addition, Keynesian theory also confirmed this by stating extended periods of elevated joblessness may result from insufficient overall demand which in turn decreases output and so depress economic growth.

Log of FDI has a negative impact on Log of GDP. The result shows that in the long-run, keeping other things constant, 1 percentage point increase in log of FDI leads to 0.007 decrease in growth of log of GDP. We recall that under the causality analysis of this study there is bidirectional causality between FDI and Inflation and there is negative relationship between inflation and GDP under this sub topic as discussed in the next paragraph. Hence we can conclude that the negative effect of FDI on economic growth is sourced from inflation. According to Salama (2021), this is most likely caused when countries invest capital formation funds in unproductive areas and having foreign investors who operate FDI than home investors and hence having insufficient foreign capital and technology transfers too. This result of negative and insignificant relationship between FDI and growth rate of GDP is also confirmed by different scholars such as Saqib (2013), Steve (2016) and Sindre (2011).

In addition, this negative and insignificant relationship between log of FDI and growth rate of log of GDP is supported by different scholars including Samuel (2022) who stated that low-income economies have higher rates of corruption and related activities because they have weaker regulatory frameworks and institutions, which impede foreign direct investment (FDI) and stifle economic development. These nations may also be unable to foster an environment that is conducive to attracting foreign investment because they lack effective laws and policies that guarantee the countries' benefits from FDI.

Moreover, (Maria and Ross) 2004 explained that theory puts ambiguous suggestions about the effects of FDI and discovered that FDI had a negative impact and hypothesized that this might be

because the countries had quickly expanded their use of tax incentives, subsidies, exemptions and other measures to attract FDI which can harm the growth of home country if done without detail study and we found this same thing here in the case of SSA countries.

The regression result also demonstrates the existence of a negative correlation between log of GDP and log of inflation. If all else stays the same, a one percent increase in the log of inflation results in a 0.03 percent long-term decline on growth. Persistent price increases can have a detrimental effect on the economic growth of Sub-Saharan African nations. This is because high prices translate into high production costs for investors and high prices for consumers due to low purchasing power which forces them to cut back on investment plans and consumption respectively. This reduction in investment plan causes reduction in production and this reduction in production in turn causes unemployment which in turn depresses economic growth.

In addition, as both consumption and Investment are component of GDP in the national income accounting identity and so their change causes the change in GDP. In addition, the classical "neutrality of money" confirmed this negative impact of inflation on economic growth by elaborating that inflation is a symptom of underlying economic problems that depress growth and Keynesian theory postulates stagflation which is resulted from high inflation and slows economic growth. Moreover, this negative effect of inflation on GDP has confirmed by Fantessi (2015) and (Agrawal and Baron) 2023.

The effect of domestic credit to private sector and commercial Bank branches those are presented by world bank under Depth and Access dimension respectively have analyzed and they were discovered to have a positive correlation with economic growth, leading us to draw the conclusion that financial development and economic growth are positively correlated. This can also confirmed by economic theory as cited in Zaher.etal (2022) that states financial development occurs through an organized financial system and it contributes to economic growth and economic efficiency. In addition, Schumpter (2012) elaborated that financial development is a key factor in producing strong economic growth and it drives innovation and provide capital through financial markets which in turn propel economic growth by diverting financial funds from unproductive to productive uses. We also made analysis on trade and found the expected positive relationship and we found the expected negative relationship of unemployment and inflation with GDP among control variables on SSA countries and this result is as expected and

confirmed by different economic theories as we did for all other variable. Thus, this paper has answered its objectives as it investigates the effects of and causality analysis of financial developments and trade openness with economic growth for SSA countries and it has tried to fill the observed literature gap if one can go through the overall contents of this paper.

CHAPTER FIVE

SUMMARY/ CONCLUSION AND RECOMMENDATIONS/ POLICY IMPLICTIONS

5.1 Summary/Conclusion

Economists have paid close attention to the connection between economic growth and financial development and economic growth and trade openness over the last several decades. However, the empirical evidence has not been satisfactory, especially in studies that have looked at the experience of SSA countries. These studies have shown conflicting results, in part because they have used different proxies' variables and different estimating approaches.

This study provides empirical support for the current discussion taking 21 SSA nations. The study employed the World Bank's depth and access dimensions—broad money, domestic loans to the private sector, and the number of commercial bank branches per 100,000 adults—as proxies for financial development. The study also used the ratio of total imports to exports to GDP as a proxy for trade openness and the annual GDP growth rate as a measure of economic growth.

Furthermore, control factors such as inflation, foreign direct investment, and unemployment were also added. The study assesses in the literature section, the relationship between economic growth and financial development and economic growth and trade openness with special emphasis and detail presentation on SSA countries. It also utilizes normality test, Multicollinearity, Homoscedasticity, panel unit root, Cointegration and Ganger causality tests, Hausman specification test and used strongly balanced panel data covering the period from 2005 to 2018. Contrary to the previous study, this study used Random Effects (RE) estimator which is more efficient.

The empirical results of the study showed that trade openness and financial development have a positive effect on economic growth, which is consistent with economic theory. Foreign direct investment which showed a negative influence on economic growth is satisfactorily justified. Inflation and unemployment among the control variables have a negative impact on growth which is in accordance with theory.

5.2. Recommendations/Policy Implications

The findings imply that free trade, commercial bank branches, and domestic credit are all significant channels via which trade openness and financial development influence economic growth. Hence, it is recommended that Countries of SSA should expand and modernize their banking sector and increase the number of commercial bank branches. They should also increase their export level to score surplus in balance of payment at foreign exchange market and only import capital goods that has future benefits and produce at home or follow import substitution for other unproductive goods and they should study on comparative advantage during their trade with foreigners and should reduce trade barriers and simplify procedures and controls. Trade policy should also promote investments in capital-intensive industries and the developments of human capital that can assimilate innovations from developed nations.

To quicken their economic progress, the nations in sub region ought to enact laws that support the expansion of the financial industry. The ineffective capital allocation of Africa's little financial systems is one factor impeding its growth and hence they have to support credit to private sector as this by default enables job creations which in turn reduce unemployment and to do so financial markets must be improved so that to allocate resources among the productive sectors in an efficient and effective manner which will support long-term economic growth. To control problem arise from money supply and inflation they should make adjustments on interest rate and use either contractionary or expansionary monetary policy based on internal economic conditions.

One particular policy recommendation on foreign direct investment is that these countries must create favorable regulation and regulatory institution or in order to draw in foreign investment they must create a supportive economic climate that drives economic development up by investing funds for capital formation in productive areas and providing sufficient transfers in terms of technology and capital from foreigners.

These countries should also be care full while they implement tax breaks, exemptions, subsidies and the like to accept FDI and reap economic growth from it as these measures might even exacerbates the economic depression if not studied deeply and carefully.

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Appendix: Results of Panel Granger Causality Test

```
. xtgcause logGDP logBM


Dumitrescu & Hurlin (2012) Granger non-causality test results:
------------------------------------------------------------
Lag order: 1
W-bar =          1.7379
Z-bar =          2.3909   (p-value = 0.0168)
Z-bar tilde =    1.0326   (p-value = 0.3018)
------------------------------------------------------------
H0: logBM does not Granger-cause logGDP.
H1: logBM does Granger-cause logGDP for at least one panel (CID).

.
. xtgcause logGDP logDCPS


Dumitrescu & Hurlin (2012) Granger non-causality test results:
------------------------------------------------------------
Lag order: 1
W-bar =          1.9295
Z-bar =          3.0120   (p-value = 0.0026)
Z-bar tilde =    1.4383   (p-value = 0.1504)
------------------------------------------------------------
H0: logDCPS does not Granger-cause logGDP.
H1: logDCPS does Granger-cause logGDP for at least one panel (CID).

.
. xtgcause logGDP logCBA


Dumitrescu & Hurlin (2012) Granger non-causality test results:
------------------------------------------------------------
Lag order: 1
W-bar =          1.8565
Z-bar =          2.7755   (p-value = 0.0055)
Z-bar tilde =    1.2838   (p-value = 0.1992)
------------------------------------------------------------
H0: logCBA does not Granger-cause logGDP.
H1: logCBA does Granger-cause logGDP for at least one panel (CID).

.
. xtgcause logGDP logTOP


Dumitrescu & Hurlin (2012) Granger non-causality test results:
------------------------------------------------------------
Lag order: 1
W-bar =          1.2952
Z-bar =          0.9565   (p-value = 0.3388)
Z-bar tilde =    0.0956   (p-value = 0.9238)
------------------------------------------------------------
H0: logTOP does not Granger-cause logGDP.
H1: logTOP does Granger-cause logGDP for at least one panel (CID).

.
. xtgcause logGDP UNE


Dumitrescu & Hurlin (2012) Granger non-causality test results:
------------------------------------------------------------
Lag order: 1
W-bar =          3.3612
Z-bar =          7.6512   (p-value = 0.0000)
Z-bar tilde =    4.4686   (p-value = 0.0000)
------------------------------------------------------------
H0: UNE does not Granger-cause logGDP.
H1: UNE does Granger-cause logGDP for at least one panel (CID).
```

```
. xtgcause logGDP logFDI


Dumitrescu & Hurlin (2012) Granger non-causality test results:
------------------------------------------------------------------
Lag order: 1
W-bar =          2.1648
Z-bar =          3.7743   (p-value = 0.0002)
Z-bar tilde =    1.9362   (p-value = 0.0528)
------------------------------------------------------------------
H0: logFDI does not Granger-cause logGDP.
H1: logFDI does Granger-cause logGDP for at least one panel (CID).

.
. xtgcause logGDP logINF


Dumitrescu & Hurlin (2012) Granger non-causality test results:
------------------------------------------------------------------
Lag order: 1
W-bar =          1.6253
Z-bar =          2.0261   (p-value = 0.0428)
Z-bar tilde =    0.7943   (p-value = 0.4270)
------------------------------------------------------------------
H0: logINF does not Granger-cause logGDP.
H1: logINF does Granger-cause logGDP for at least one panel (CID).

.
.
.
. xtgcause logBM logGDP


Dumitrescu & Hurlin (2012) Granger non-causality test results:
------------------------------------------------------------------
Lag order: 1
W-bar =          1.8517
Z-bar =          2.7597   (p-value = 0.0058)
Z-bar tilde =    1.2735   (p-value = 0.2028)
------------------------------------------------------------------
H0: logGDP does not Granger-cause logBM.
H1: logGDP does Granger-cause logBM for at least one panel (CID).

.
. xtgcause logBM logDCPS


Dumitrescu & Hurlin (2012) Granger non-causality test results:
------------------------------------------------------------------
Lag order: 1
W-bar =          2.9872
Z-bar =          6.4391   (p-value = 0.0000)
Z-bar tilde =    3.6769   (p-value = 0.0002)
------------------------------------------------------------------
H0: logDCPS does not Granger-cause logBM.
H1: logDCPS does Granger-cause logBM for at least one panel (CID).

.
. xtgcause logBM logCBA


Dumitrescu & Hurlin (2012) Granger non-causality test results:
------------------------------------------------------------------
Lag order: 1
W-bar =          3.5885
Z-bar =          8.3878   (p-value = 0.0000)
Z-bar tilde =    4.9498   (p-value = 0.0000)
------------------------------------------------------------------
H0: logCBA does not Granger-cause logBM.
H1: logCBA does Granger-cause logBM for at least one panel (CID).
```

```
. xtgcause logBM logTOP


Dumitrescu & Hurlin (2012) Granger non-causality test results:
------------------------------------------------------------
Lag order: 1
W-bar =          2.9411
Z-bar =          6.2898   (p-value = 0.0000)
Z-bar tilde =    3.5793   (p-value = 0.0003)
------------------------------------------------------------
H0: logTOP does not Granger-cause logBM.
H1: logTOP does Granger-cause logBM for at least one panel (CID).

.
. xtgcause logBM UNE


Dumitrescu & Hurlin (2012) Granger non-causality test results:
------------------------------------------------------------
Lag order: 1
W-bar =          2.3506
Z-bar =          4.3765   (p-value = 0.0000)
Z-bar tilde =    2.3295   (p-value = 0.0198)
------------------------------------------------------------
H0: UNE does not Granger-cause logBM.
H1: UNE does Granger-cause logBM for at least one panel (CID).

.
. xtgcause logBM logFDI


Dumitrescu & Hurlin (2012) Granger non-causality test results:
------------------------------------------------------------
Lag order: 1
W-bar =          2.3151
Z-bar =          4.2615   (p-value = 0.0000)
Z-bar tilde =    2.2545   (p-value = 0.0242)
------------------------------------------------------------
H0: logFDI does not Granger-cause logBM.
H1: logFDI does Granger-cause logBM for at least one panel (CID).

.
. xtgcause logBM logINF


Dumitrescu & Hurlin (2012) Granger non-causality test results:
------------------------------------------------------------
Lag order: 1
W-bar =          2.0487
Z-bar =          3.3982   (p-value = 0.0007)
Z-bar tilde =    1.6905   (p-value = 0.0909)
------------------------------------------------------------
H0: logINF does not Granger-cause logBM.
H1: logINF does Granger-cause logBM for at least one panel (CID).

.
.
.
. xtgcause logDCPS logGDP


Dumitrescu & Hurlin (2012) Granger non-causality test results:
------------------------------------------------------------
Lag order: 1
W-bar =          1.0930
Z-bar =          0.3013   (p-value = 0.7632)
Z-bar tilde =   -0.3323   (p-value = 0.7396)
------------------------------------------------------------
H0: logGDP does not Granger-cause logDCPS.
H1: logGDP does Granger-cause logDCPS for at least one panel (CID).
```

```
. xtgcause logDCPS logBM


Dumitrescu & Hurlin (2012) Granger non-causality test results:
------------------------------------------------------------
Lag order: 1
W-bar =          3.0986
Z-bar =          6.8003   (p-value = 0.0000)
Z-bar tilde =    3.9128   (p-value = 0.0001)
------------------------------------------------------------
H0: logBM does not Granger-cause logDCPS.
H1: logBM does Granger-cause logDCPS for at least one panel (CID).

.
. xtgcause logDCPS logCBA


Dumitrescu & Hurlin (2012) Granger non-causality test results:
------------------------------------------------------------
Lag order: 1
W-bar =          5.2820
Z-bar =         13.8752   (p-value = 0.0000)
Z-bar tilde =    8.5341   (p-value = 0.0000)
------------------------------------------------------------
H0: logCBA does not Granger-cause logDCPS.
H1: logCBA does Granger-cause logDCPS for at least one panel (CID).

.
. xtgcause logDCPS logTOP


Dumitrescu & Hurlin (2012) Granger non-causality test results:
------------------------------------------------------------
Lag order: 1
W-bar =          1.4570
Z-bar =          1.4809   (p-value = 0.1386)
Z-bar tilde =    0.4382   (p-value = 0.6613)
------------------------------------------------------------
H0: logTOP does not Granger-cause logDCPS.
H1: logTOP does Granger-cause logDCPS for at least one panel (CID).

.
. xtgcause logDCPS UNE


Dumitrescu & Hurlin (2012) Granger non-causality test results:
------------------------------------------------------------
Lag order: 1
W-bar =          2.1486
Z-bar =          3.7220   (p-value = 0.0002)
Z-bar tilde =    1.9021   (p-value = 0.0572)
------------------------------------------------------------
H0: UNE does not Granger-cause logDCPS.
H1: UNE does Granger-cause logDCPS for at least one panel (CID).

.
. xtgcause logDCPS logFDI


Dumitrescu & Hurlin (2012) Granger non-causality test results:
------------------------------------------------------------
Lag order: 1
W-bar =          1.7037
Z-bar =          2.2802   (p-value = 0.0226)
Z-bar tilde =    0.9602   (p-value = 0.3369)
------------------------------------------------------------
H0: logFDI does not Granger-cause logDCPS.
H1: logFDI does Granger-cause logDCPS for at least one panel (CID).
```

```
. xtgcause logDCPS logINF


Dumitrescu & Hurlin (2012) Granger non-causality test results:
------------------------------------------------------------
Lag order: 1
W-bar =          1.4210
Z-bar =          1.3641   (p-value = 0.1725)
Z-bar tilde =    0.3619   (p-value = 0.7174)
------------------------------------------------------------
H0: logINF does not Granger-cause logDCPS.
H1: logINF does Granger-cause logDCPS for at least one panel (CID).

.
.
.
. xtgcause logCBA logGDP


Dumitrescu & Hurlin (2012) Granger non-causality test results:
------------------------------------------------------------
Lag order: 1
W-bar =          0.7219
Z-bar =         -0.9012   (p-value = 0.3675)
Z-bar tilde =   -1.1178   (p-value = 0.2636)
------------------------------------------------------------
H0: logGDP does not Granger-cause logCBA.
H1: logGDP does Granger-cause logCBA for at least one panel (CID).

.
. xtgcause logCBA logBM


Dumitrescu & Hurlin (2012) Granger non-causality test results:
------------------------------------------------------------
Lag order: 1
W-bar =          3.2860
Z-bar =          7.4073   (p-value = 0.0000)
Z-bar tilde =    4.3093   (p-value = 0.0000)
------------------------------------------------------------
H0: logBM does not Granger-cause logCBA.
H1: logBM does Granger-cause logCBA for at least one panel (CID).

.
. xtgcause logCBA logDCPS


Dumitrescu & Hurlin (2012) Granger non-causality test results:
------------------------------------------------------------
Lag order: 1
W-bar =          1.5376
Z-bar =          1.7420   (p-value = 0.0815)
Z-bar tilde =    0.6087   (p-value = 0.5427)
------------------------------------------------------------
H0: logDCPS does not Granger-cause logCBA.
H1: logDCPS does Granger-cause logCBA for at least one panel (CID).

.
. xtgcause logCBA logTOP


Dumitrescu & Hurlin (2012) Granger non-causality test results:
------------------------------------------------------------
Lag order: 1
W-bar =          0.6391
Z-bar =         -1.1695   (p-value = 0.2422)
Z-bar tilde =   -1.2930   (p-value = 0.1960)
------------------------------------------------------------
H0: logTOP does not Granger-cause logCBA.
H1: logTOP does Granger-cause logCBA for at least one panel (CID).
```

```
. xtgcause logCBA UNE


Dumitrescu & Hurlin (2012) Granger non-causality test results:
------------------------------------------------------------
Lag order: 1
W-bar =          1.4031
Z-bar =          1.3060   (p-value = 0.1915)
Z-bar tilde =    0.3239   (p-value = 0.7460)
------------------------------------------------------------
H0: UNE does not Granger-cause logCBA.
H1: UNE does Granger-cause logCBA for at least one panel (CID).

.
. xtgcause logCBA logFDI


Dumitrescu & Hurlin (2012) Granger non-causality test results:
------------------------------------------------------------
Lag order: 1
W-bar =          1.6158
Z-bar =          1.9956   (p-value = 0.0460)
Z-bar tilde =    0.7743   (p-value = 0.4387)
------------------------------------------------------------
H0: logFDI does not Granger-cause logCBA.
H1: logFDI does Granger-cause logCBA for at least one panel (CID).

.
. xtgcause logCBA logINF


Dumitrescu & Hurlin (2012) Granger non-causality test results:
------------------------------------------------------------
Lag order: 1
W-bar =          1.9916
Z-bar =          3.2131   (p-value = 0.0013)
Z-bar tilde =    1.5697   (p-value = 0.1165)
------------------------------------------------------------
H0: logINF does not Granger-cause logCBA.
H1: logINF does Granger-cause logCBA for at least one panel (CID).

.
.
.
. xtgcause logTOP logGDP


Dumitrescu & Hurlin (2012) Granger non-causality test results:
------------------------------------------------------------
Lag order: 1
W-bar =          6.1056
Z-bar =         16.5442   (p-value = 0.0000)
Z-bar tilde =   10.2775   (p-value = 0.0000)
------------------------------------------------------------
H0: logGDP does not Granger-cause logTOP.
H1: logGDP does Granger-cause logTOP for at least one panel (CID).

.
. xtgcause logTOP logBM


Dumitrescu & Hurlin (2012) Granger non-causality test results:
------------------------------------------------------------
Lag order: 1
W-bar =          1.7149
Z-bar =          2.3167   (p-value = 0.0205)
Z-bar tilde =    0.9841   (p-value = 0.3251)
------------------------------------------------------------
H0: logBM does not Granger-cause logTOP.
H1: logBM does Granger-cause logTOP for at least one panel (CID).
```

```
. xtgcause logTOP logDCPS


Dumitrescu & Hurlin (2012) Granger non-causality test results:
------------------------------------------------------------
Lag order: 1
W-bar =          1.6359
Z-bar =          2.0606   (p-value = 0.0393)
Z-bar tilde =    0.8169   (p-value = 0.4140)
------------------------------------------------------------
H0: logDCPS does not Granger-cause logTOP.
H1: logDCPS does Granger-cause logTOP for at least one panel (CID).

.
. xtgcause logTOP logCBA


Dumitrescu & Hurlin (2012) Granger non-causality test results:
------------------------------------------------------------
Lag order: 1
W-bar =          2.0586
Z-bar =          3.4302   (p-value = 0.0006)
Z-bar tilde =    1.7114   (p-value = 0.0870)
------------------------------------------------------------
H0: logCBA does not Granger-cause logTOP.
H1: logCBA does Granger-cause logTOP for at least one panel (CID).

.
. xtgcause logTOP UNE


Dumitrescu & Hurlin (2012) Granger non-causality test results:
------------------------------------------------------------
Lag order: 1
W-bar =          2.1989
Z-bar =          3.8850   (p-value = 0.0001)
Z-bar tilde =    2.0085   (p-value = 0.0446)
------------------------------------------------------------
H0: UNE does not Granger-cause logTOP.
H1: UNE does Granger-cause logTOP for at least one panel (CID).

.
. xtgcause logTOP logFDI


Dumitrescu & Hurlin (2012) Granger non-causality test results:
------------------------------------------------------------
Lag order: 1
W-bar =          1.7002
Z-bar =          2.2688   (p-value = 0.0233)
Z-bar tilde =    0.9528   (p-value = 0.3407)
------------------------------------------------------------
H0: logFDI does not Granger-cause logTOP.
H1: logFDI does Granger-cause logTOP for at least one panel (CID).

.
. xtgcause logTOP logINF


Dumitrescu & Hurlin (2012) Granger non-causality test results:
------------------------------------------------------------
Lag order: 1
W-bar =          1.0692
Z-bar =          0.2241   (p-value = 0.8226)
Z-bar tilde =   -0.3827   (p-value = 0.7019)
------------------------------------------------------------
H0: logINF does not Granger-cause logTOP.
H1: logINF does Granger-cause logTOP for at least one panel (CID).
```

```
. xtgcause UNE logGDP


Dumitrescu & Hurlin (2012) Granger non-causality test results:
------------------------------------------------------------
Lag order: 1
W-bar =          4.5755
Z-bar =         11.5861   (p-value = 0.0000)
Z-bar tilde =    7.0389   (p-value = 0.0000)
------------------------------------------------------------
H0: logGDP does not Granger-cause UNE.
H1: logGDP does Granger-cause UNE for at least one panel (CID).

.
. xtgcause UNE logBM


Dumitrescu & Hurlin (2012) Granger non-causality test results:
------------------------------------------------------------
Lag order: 1
W-bar =          3.7335
Z-bar =          8.8575   (p-value = 0.0000)
Z-bar tilde =    5.2566   (p-value = 0.0000)
------------------------------------------------------------
H0: logBM does not Granger-cause UNE.
H1: logBM does Granger-cause UNE for at least one panel (CID).

.
. xtgcause UNE logDCPS


Dumitrescu & Hurlin (2012) Granger non-causality test results:
------------------------------------------------------------
Lag order: 1
W-bar =          4.4286
Z-bar =         11.1101   (p-value = 0.0000)
Z-bar tilde =    6.7279   (p-value = 0.0000)
------------------------------------------------------------
H0: logDCPS does not Granger-cause UNE.
H1: logDCPS does Granger-cause UNE for at least one panel (CID).

.
. xtgcause UNE logCBA


Dumitrescu & Hurlin (2012) Granger non-causality test results:
------------------------------------------------------------
Lag order: 1
W-bar =          9.3118
Z-bar =         26.9332   (p-value = 0.0000)
Z-bar tilde =   17.0635   (p-value = 0.0000)
------------------------------------------------------------
H0: logCBA does not Granger-cause UNE.
H1: logCBA does Granger-cause UNE for at least one panel (CID).

.
. xtgcause UNE logTOP


Dumitrescu & Hurlin (2012) Granger non-causality test results:
------------------------------------------------------------
Lag order: 1
W-bar =          2.4158
Z-bar =          4.5877   (p-value = 0.0000)
Z-bar tilde =    2.4675   (p-value = 0.0136)
------------------------------------------------------------
H0: logTOP does not Granger-cause UNE.
H1: logTOP does Granger-cause UNE for at least one panel (CID).
```

```
. xtgcause UNE logFDI


Dumitrescu & Hurlin (2012) Granger non-causality test results:
------------------------------------------------------------
Lag order: 1
W-bar =          0.8176
Z-bar =         -0.5911   (p-value = 0.5545)
Z-bar tilde =   -0.9153   (p-value = 0.3601)
------------------------------------------------------------
H0: logFDI does not Granger-cause UNE.
H1: logFDI does Granger-cause UNE for at least one panel (CID).

.
. xtgcause UNE logINF


Dumitrescu & Hurlin (2012) Granger non-causality test results:
------------------------------------------------------------
Lag order: 1
W-bar =          1.0664
Z-bar =          0.2151   (p-value = 0.8297)
Z-bar tilde =   -0.3887   (p-value = 0.6975)
------------------------------------------------------------
H0: logINF does not Granger-cause UNE.
H1: logINF does Granger-cause UNE for at least one panel (CID).

.
.
.
. xtgcause logFDI logGDP


Dumitrescu & Hurlin (2012) Granger non-causality test results:
------------------------------------------------------------
Lag order: 1
W-bar =          1.2518
Z-bar =          0.8159   (p-value = 0.4146)
Z-bar tilde =    0.0038   (p-value = 0.9970)
------------------------------------------------------------
H0: logGDP does not Granger-cause logFDI.
H1: logGDP does Granger-cause logFDI for at least one panel (CID).

.
. xtgcause logFDI logBM


Dumitrescu & Hurlin (2012) Granger non-causality test results:
------------------------------------------------------------
Lag order: 1
W-bar =          1.8541
Z-bar =          2.7675   (p-value = 0.0056)
Z-bar tilde =    1.2786   (p-value = 0.2011)
------------------------------------------------------------
H0: logBM does not Granger-cause logFDI.
H1: logBM does Granger-cause logFDI for at least one panel (CID).

.
. xtgcause logFDI logDCPS


Dumitrescu & Hurlin (2012) Granger non-causality test results:
------------------------------------------------------------
Lag order: 1
W-bar =          1.5220
Z-bar =          1.6914   (p-value = 0.0908)
Z-bar tilde =    0.5757   (p-value = 0.5648)
------------------------------------------------------------
H0: logDCPS does not Granger-cause logFDI.
H1: logDCPS does Granger-cause logFDI for at least one panel (CID).
```

```
. xtgcause logFDI logCBA


Dumitrescu & Hurlin (2012) Granger non-causality test results:
------------------------------------------------------------
Lag order: 1
W-bar =          1.6136
Z-bar =          1.9884   (p-value = 0.0468)
Z-bar tilde =    0.7697   (p-value = 0.4415)
------------------------------------------------------------
H0: logCBA does not Granger-cause logFDI.
H1: logCBA does Granger-cause logFDI for at least one panel (CID).

.
. xtgcause logFDI logTOP


Dumitrescu & Hurlin (2012) Granger non-causality test results:
------------------------------------------------------------
Lag order: 1
W-bar =          1.1092
Z-bar =          0.3539   (p-value = 0.7234)
Z-bar tilde =   -0.2980   (p-value = 0.7657)
------------------------------------------------------------
H0: logTOP does not Granger-cause logFDI.
H1: logTOP does Granger-cause logFDI for at least one panel (CID).

.
. xtgcause logFDI UNE


Dumitrescu & Hurlin (2012) Granger non-causality test results:
------------------------------------------------------------
Lag order: 1
W-bar =          2.4389
Z-bar =          4.6627   (p-value = 0.0000)
Z-bar tilde =    2.5165   (p-value = 0.0119)
------------------------------------------------------------
H0: UNE does not Granger-cause logFDI.
H1: UNE does Granger-cause logFDI for at least one panel (CID).

.
. xtgcause logFDI logINF


Dumitrescu & Hurlin (2012) Granger non-causality test results:
------------------------------------------------------------
Lag order: 1
W-bar =          1.4521
Z-bar =          1.4651   (p-value = 0.1429)
Z-bar tilde =    0.4278   (p-value = 0.6688)
------------------------------------------------------------
H0: logINF does not Granger-cause logFDI.
H1: logINF does Granger-cause logFDI for at least one panel (CID).

.
.
.
. xtgcause logINF logGDP


Dumitrescu & Hurlin (2012) Granger non-causality test results:
------------------------------------------------------------
Lag order: 1
W-bar =          1.6179
Z-bar =          2.0021   (p-value = 0.0453)
Z-bar tilde =    0.7786   (p-value = 0.4362)
------------------------------------------------------------
H0: logGDP does not Granger-cause logINF.
H1: logGDP does Granger-cause logINF for at least one panel (CID).
```

```
. xtgcause logINF logBM


Dumitrescu & Hurlin (2012) Granger non-causality test results:
------------------------------------------------------------------
Lag order: 1
W-bar =          2.2754
Z-bar =          4.1327   (p-value = 0.0000)
Z-bar tilde =    2.1703   (p-value = 0.0300)
------------------------------------------------------------------
H0: logBM does not Granger-cause logINF.
H1: logBM does Granger-cause logINF for at least one panel (CID).

.
. xtgcause logINF logDCPS


Dumitrescu & Hurlin (2012) Granger non-causality test results:
------------------------------------------------------------------
Lag order: 1
W-bar =          1.8055
Z-bar =          2.6101   (p-value = 0.0091)
Z-bar tilde =    1.1757   (p-value = 0.2397)
------------------------------------------------------------------
H0: logDCPS does not Granger-cause logINF.
H1: logDCPS does Granger-cause logINF for at least one panel (CID).

.
. xtgcause logINF logCBA


Dumitrescu & Hurlin (2012) Granger non-causality test results:
------------------------------------------------------------------
Lag order: 1
W-bar =          3.3190
Z-bar =          7.5143   (p-value = 0.0000)
Z-bar tilde =    4.3792   (p-value = 0.0000)
------------------------------------------------------------------
H0: logCBA does not Granger-cause logINF.
H1: logCBA does Granger-cause logINF for at least one panel (CID).

.
. xtgcause logINF logTOP


Dumitrescu & Hurlin (2012) Granger non-causality test results:
------------------------------------------------------------------
Lag order: 1
W-bar =          1.9879
Z-bar =          3.2010   (p-value = 0.0014)
Z-bar tilde =    1.5618   (p-value = 0.1183)
------------------------------------------------------------------
H0: logTOP does not Granger-cause logINF.
H1: logTOP does Granger-cause logINF for at least one panel (CID).

.
. xtgcause logINF UNE


Dumitrescu & Hurlin (2012) Granger non-causality test results:
------------------------------------------------------------------
Lag order: 1
W-bar =          3.6621
Z-bar =          8.6262   (p-value = 0.0000)
Z-bar tilde =    5.1055   (p-value = 0.0000)
------------------------------------------------------------------
H0: UNE does not Granger-cause logINF.
H1: UNE does Granger-cause logINF for at least one panel (CID).
```

```
. xtgcause logINF logFDI


Dumitrescu & Hurlin (2012) Granger non-causality test results:
------------------------------------------------------------------
Lag order: 1
W-bar =          1.9683
Z-bar =          3.1377   (p-value = 0.0017)
Z-bar tilde =    1.5204   (p-value = 0.1284)
------------------------------------------------------------------
H0: logFDI does not Granger-cause logINF.
H1: logFDI does Granger-cause logINF for at least one panel (CID).
```

Results of Stationarity Test

```
. xtunitroot llc logGDP

Levin-Lin-Chu unit-root test for logGDP
---------------------------------------

Ho: Panels contain unit roots               Number of panels  =     21
Ha: Panels are stationary                   Number of periods =     14

AR parameter: Common                        Asymptotics: N/T -> 0
Panel means:  Included
Time trend:   Not included

ADF regressions: 1 lag
LR variance:     Bartlett kernel, 7.00 lags average (chosen by LLC)
------------------------------------------------------------------------------
                     Statistic      p-value
------------------------------------------------------------------------------
 Unadjusted t       -11.9742
 Adjusted t*         -6.2643        0.0000
------------------------------------------------------------------------------

.
. xtunitroot llc logBM

Levin-Lin-Chu unit-root test for logBM
--------------------------------------

Ho: Panels contain unit roots               Number of panels  =     21
Ha: Panels are stationary                   Number of periods =     14

AR parameter: Common                        Asymptotics: N/T -> 0
Panel means:  Included
Time trend:   Not included

ADF regressions: 1 lag
LR variance:     Bartlett kernel, 7.00 lags average (chosen by LLC)
------------------------------------------------------------------------------
                     Statistic      p-value
------------------------------------------------------------------------------
 Unadjusted t        -6.1024
 Adjusted t*         -3.1756        0.0007
------------------------------------------------------------------------------

.
. xtunitroot llc logDCPS

Levin-Lin-Chu unit-root test for logDCPS
----------------------------------------

Ho: Panels contain unit roots               Number of panels  =     21
Ha: Panels are stationary                   Number of periods =     14

AR parameter: Common                        Asymptotics: N/T -> 0
Panel means:  Included
Time trend:   Not included

ADF regressions: 1 lag
LR variance:     Bartlett kernel, 7.00 lags average (chosen by LLC)
------------------------------------------------------------------------------
                     Statistic      p-value
------------------------------------------------------------------------------
 Unadjusted t       -11.0533
 Adjusted t*         -9.2242        0.0000
------------------------------------------------------------------------------
```

```
.
. xtunitroot llc logCBA

Levin-Lin-Chu unit-root test for logCBA
---------------------------------------

Ho: Panels contain unit roots               Number of panels  =     21
Ha: Panels are stationary                   Number of periods =     14

AR parameter: Common                        Asymptotics: N/T -> 0
Panel means:  Included
Time trend:   Not included

ADF regressions: 1 lag
LR variance:     Bartlett kernel, 7.00 lags average (chosen by LLC)
------------------------------------------------------------------------------
                     Statistic      p-value
------------------------------------------------------------------------------
 Unadjusted t       -12.9638
 Adjusted t*        -10.3690        0.0000
------------------------------------------------------------------------------

.
. xtunitroot llc logTOP

Levin-Lin-Chu unit-root test for logTOP
---------------------------------------

Ho: Panels contain unit roots               Number of panels  =     21
Ha: Panels are stationary                   Number of periods =     14

AR parameter: Common                        Asymptotics: N/T -> 0
Panel means:  Included
Time trend:   Not included

ADF regressions: 1 lag
LR variance:     Bartlett kernel, 7.00 lags average (chosen by LLC)
------------------------------------------------------------------------------
                     Statistic      p-value
------------------------------------------------------------------------------
 Unadjusted t       -10.4693
 Adjusted t*         -3.6945        0.0001
------------------------------------------------------------------------------

.
. xtunitroot llc UNE

Levin-Lin-Chu unit-root test for UNE
------------------------------------

Ho: Panels contain unit roots               Number of panels  =     21
Ha: Panels are stationary                   Number of periods =     14

AR parameter: Common                        Asymptotics: N/T -> 0
Panel means:  Included
Time trend:   Not included

ADF regressions: 1 lag
LR variance:     Bartlett kernel, 7.00 lags average (chosen by LLC)
------------------------------------------------------------------------------
                     Statistic      p-value
------------------------------------------------------------------------------
 Unadjusted t        -5.1716
 Adjusted t*         -1.7810        0.0375
------------------------------------------------------------------------------

.
```

```
. xtunitroot llc logFDI

Levin-Lin-Chu unit-root test for logFDI
----------------------------------------

Ho: Panels contain unit roots               Number of panels  =     21
Ha: Panels are stationary                   Number of periods =     14

AR parameter: Common                        Asymptotics: N/T -> 0
Panel means:  Included
Time trend:   Not included

ADF regressions: 1 lag
LR variance:     Bartlett kernel, 7.00 lags average (chosen by LLC)
------------------------------------------------------------------------------
                     Statistic      p-value
------------------------------------------------------------------------------
 Unadjusted t       -10.6413
 Adjusted t*         -5.6409        0.0000
------------------------------------------------------------------------------

.
. xtunitroot llc logINF

Levin-Lin-Chu unit-root test for logINF
----------------------------------------

Ho: Panels contain unit roots               Number of panels  =     21
Ha: Panels are stationary                   Number of periods =     14

AR parameter: Common                        Asymptotics: N/T -> 0
Panel means:  Included
Time trend:   Not included

ADF regressions: 1 lag
LR variance:     Bartlett kernel, 7.00 lags average (chosen by LLC)
------------------------------------------------------------------------------
                     Statistic      p-value
------------------------------------------------------------------------------
 Unadjusted t       -12.4958
 Adjusted t*         -7.4306        0.0000
------------------------------------------------------------------------------
```

Results of Hausman Spsecification Test

```
. hausman fixed .
```

	Coefficients (b) fixed	(B) random	(b-B) Difference	sqrt(diag(V_b-V_B)) S.E.
logBM	-.2047944	-.1344394	-.0703549	.1123797
logDCPS	-.0898887	.0289772	-.1188659	.0731339
logCBA	.1245995	.0715143	.0530852	.046494
logTOP	.0166409	.0153493	.0012916	.0064376
UNE	-.0382524	-.0101859	-.0280665	.0132512
logFDI	-.0109515	-.0068017	-.0041499	.0035211
logINF	-.0381022	-.0284425	-.0096598	.022052

```
                b = consistent under Ho and Ha; obtained from xtreg
 B = inconsistent under Ha, efficient under Ho; obtained from xtreg

    Test:  Ho:  difference in coefficients not systematic

                  chi2(7) = (b-B)'[(V_b-V_B)^(-1)](b-B)
                          =        9.93
                Prob>chi2 =      0.1927
```

Results of Fixed Effect Estimator

```
. xtreg logGDP logBM  logDCPS logCBA logTOP UNE logFDI logINF, fe

Fixed-effects (within) regression               Number of obs     =        294
Group variable: CID                             Number of groups  =         21

R-sq:                                           Obs per group:
     within  = 0.0504                                         min =         14
     between = 0.2055                                         avg =       14.0
     overall = 0.0384                                         max =         14

                                                F(7,266)          =       2.02
corr(u_i, Xb)  = -0.9306                        Prob > F          =     0.0535
```

logGDP	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
logBM	-.2047944	.1331165	-1.54	0.125	-.4668904	.0573017
logDCPS	-.0898887	.0874477	-1.03	0.305	-.2620665	.0822891
logCBA	.1245995	.0605517	2.06	0.041	.005378	.243821
logTOP	.0166409	.0378339	0.44	0.660	-.0578511	.0911328
UNE	-.0382524	.013736	-2.78	0.006	-.0652975	-.0112073
logFDI	-.0109515	.0118073	-0.93	0.354	-.0341991	.0122961
logINF	-.0381022	.0424147	-0.90	0.370	-.1216135	.045409
_cons	4.359042	.5265594	8.28	0.000	3.322287	5.395796
sigma_u	.25098066					
sigma_e	.23971223					
rho	.52295222	(fraction of variance due to u_i)				

```
F test that all u_i=0: F(20, 266) = 1.59                     Prob > F = 0.0536
```

Results of Random effect Estimator

```
. xtreg logGDP logBM  logDCPS logCBA logTOP UNE logFDI logINF, re

Random-effects GLS regression                   Number of obs     =        294
Group variable: CID                             Number of groups  =         21

R-sq:                                           Obs per group:
     within  = 0.0201                                         min =         14
     between = 0.4031                                         avg =       14.0
     overall = 0.0667                                         max =         14

                                                Wald chi2(7)      =      14.90
corr(u_i, X)   = 0 (assumed)                    Prob > chi2       =     0.0373
```

logGDP	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
logBM	-.1344394	.07135	-1.88	0.060	-.2742828	.0054039
logDCPS	.0289772	.047943	0.60	0.546	-.0649894	.1229438
logCBA	.0715143	.0387919	1.84	0.065	-.0045164	.147545
logTOP	.0153493	.0372821	0.41	0.681	-.0577224	.0884209
UNE	-.0101859	.0036169	-2.82	0.005	-.017275	-.0030969
logFDI	-.0068017	.01127	-0.60	0.546	-.0288905	.0152872
logINF	-.0284425	.0362314	-0.79	0.432	-.0994547	.0425698
_cons	3.556067	.3819492	9.31	0.000	2.807461	4.304674
sigma_u	.05182501					
sigma_e	.23971223					
rho	.04465388	(fraction of variance due to u_i)				