Institutional Quality, Bilateral Trade and Global Value Chains in Africa

Abdulkareem Alhassan

Submitted to the
Institute of Graduate Studies and Research
in partial fulfillment of the requirements for the degree of

Doctor of Philosophy
in
Economics

Eastern Mediterranean University
February 2021
Gazimağusa, North Cyprus

Approval of the Institute of Graduate Studies and Research

Prof. Dr. Ali Hakan Ulusoy
Director

I certify that this thesis satisfies all the requirements as a thesis for the degree of Doctor of Philosophy in Economics.

Prof. Dr. Mehmet Balcılar
Chair, Department of Economics

We certify that we have read this thesis and that in our opinion it is fully adequate in scope and quality as a thesis for the degree of Doctor of Philosophy in Economics.

Prof. Dr. Cem Eşref Payaslıoğlu
Supervisor

Examining Committee

1. Prof. Dr. Eralp Bektaş
2. Prof. Dr. Ali Hakan Büyüklü
3. Prof. Dr. Fatma Doğruel
4. Prof. Dr. Mustafa İsmihan
5. Prof. Dr. Cem Eşref Payaslıoğlu

ABSTRACT

The importance of trade and institutions as drivers of economic growth and development has been established in both theoretical and empirical literature. Moreover, global value chains (GVC) propels substantial expansion in international trade across the globe over the last two decades. However, the institutions-GVC link and institutions-bilateral trade nexus in Africa suffers complete neglect in international trade research. This is despite the dismal performance of the continent in institutional quality, bilateral trade and GVC participation. Therefore, this thesis evaluates the effect of institutional quality on bilateral trade and GVC participation in Africa. In the first part, Poisson Pseudo Maximum Likelihood with High-Dimensional Fixed Effects estimator (PPMLHDFE) is applied to estimate Structural Gravity Model for the evaluation of the impact of both political and economic institutions on bilateral exports, imports and aggregate trade. A sample of 37 Sub-Sahara African countries with 124 of their trading partners for the period 2000-2018 was used for the analysis. The second part investigates the impact of institutions on backward, forward and total GVC participation as well as GVC position (upstreamness) in Africa using system-GMM estimator for a sample of 47 African countries over the period 2000-2018. The findings reveal that both political and economic institutions are significant determinants of bilateral trade and GVC participation in Africa. However, the popular submission of previous studies that institutions generally have positive impact on international trade does not apply in this case. The effects of the institutional factors are heterogeneous depending on the components of institutional quality, bilateral trade, GVC participation and income groups of the countries. Thus, this thesis offers

appropriate policy recommendations on the appropriate institutional framework to adopt for the improvement of bilateral trade and GVC participation in the continent.

Keywords: Institutional quality, bilateral trade, global value chains, Africa.

ÖZ

Dış ticaretin ve kurumların ekonomik büyüme ve kalkınma üzerindeki etkisi hem teorik hem uygulamalı çalışmalarda geçerliliği kanıtlanmış bir olgudur. Öte yandan, son yirmi yılda küresel değer zincirleride (KDZ) küresel dış ticaret hacminin genişlemesinde önemli katkıda bulunmuştur. Bununla beraber, kurumsal yapıların KDZ ile olan etkileşimi ve ikili ticaretle olan bağlantıları konusunda özellikle Afrika ülkelerini kapsayan çalışmalar uluslararası dış ticaret araştırmalarında yer almamıştır. Bölge ülkelerinin kurumsal kalitelerinin tatminkar olmaktan uzak olmaları, ikili ticaret ilişkilerinin ve KDZ katılım oranlarının düşük seviyede seyretmesi bile kıtayla ilgili çalışmaları motive etmekte çok yetersiz kalmıştır. Bu tez çalışmasının ana amacı Afrika ülkelerinin kurumsal kalite faktörlerinin ikili ticaret ve KDZ katılımına olan etkilerini inceleyerek bu alandaki boşluğu doldurmaktır. Mevcut tez çalışmasının ilk bölümünde Afrika ülkelerinin siyasi ve ekonomik kurumlarının ikili dış ticaret ilişkileri, ihracat , ithalat ve KDZ katılımı üzerindeki etkileri, çok-boyutlu sabit etkileri de içeren yeni PPMLHDFE tahmin metoduyla Yapısal Çekim Modeli çerçevesinde tahmin edilmektedir. Çalışmada 37 Sahra-Altı Afrika ülkesinin 2000-2018 döneminde ticaret yaptığı 124 ülkeyle olan ticaret verileri kullanılmıştır. Çalışmanın ikinci bölümünde 47 Afrika ülkesinin 2000-2018 dönemine ait verileri kullanılarak, kurumların ileri ve geriye dönük ve toplam katma değer katılımları ve KDZ pozisyonları (üst zincir) üzerindeki etkileri Genelleştirilmiş Momentler Yöntemi (GMM) tahmin yöntemiyle incelenmektedir. Bulgular siyasi ve ekonomik kurumların karşılıklı ticaret ve KDZ katılımı üzerinde önemli etkileri olduğuna işaret etmektedir. Öte yandan genel olarak kurumların dış ticarete olan etkilerinin daima olumlu yönde olduğu görüşü doğrulanmamıştır. Kullanılan kurumsal kalite faktörünün özelliğine,

KDZ katılım oranına ve ülkelerin gelir düzeyine göre kurumsal faktörlerin etkileri değişkenlik arzetmektedir. Çalışmada bu durum gözönüne alınarak ikili dış ticaret ilişkilerinin gelişmesi ve KDZ katılım oranlarının artırılması için uygun kurumsal çerçevenin oluşturulmasına yönelik politika önerileri yeralmaktadır.

Anahtar Kelimeler: Kurumsal kalite, ikili ticaret, küresel değer zincirleri, Afrika.

DEDICATION

To my lovely Mother, Hadisat Alhassan Sama (Formerly, Alhassan, Yawo Dembe).

ACKNOWLEDGMENT

All praises be to God for the gift of life and sound health and all other blessings bestowed on me to undertake this research work. First and foremost, i would like to specially thank my supervisor, Prof. Dr. Cem Eşref Payaslioğlu for his invaluable contributions, guidance, support, care and love since the beginning of the thesis. He always shares his time, knowledge, experience, energy and other resources for me. The numerous materials he printed for me at his expense speak volumes of his kindness and generosity. He did not only groomed me to an independent researcher but also taught me a lot more virtues concerning general principles of life and good interpersonal relationship. These will immensely help me in both my future professional and personal life. I am deeply indebted to him for expending his intellectual wealth on me. He is a wonderful advisor!

My sincere gratitude goes to the thesis monitoring committee members and Jury members, Prof. Dr. Eralp Bektaş Prof. Dr. Mustafa İsmihan, Prof. Dr. Ali Hakan Büyüklü and Prof. Dr. Fatma Doğruel for their helpful remarks, which contributed to the substantial improvement of the thesis. My special gratitude goes to Professor Muhammad Sanusi Liman, the Vice Chancellor, Federal University of Lafia (FULafia), Nasarawa State, Nigeria, for giving me the opportunity to undertake this course. I equally appreciate the support of Dr. Abubakar Mamuda, Registrar FULafia and Mr. Daniel Anjola Wilson, Bursar FULafia.

I would also like to thank, Professor Shehu Abdurrahman, Professor Mohammed Isa Kida, Dr. Ilemona Adofu and Dr Abdulhakeem Abdullahi Kilishi for their guidance

and intellectual support. All my colleagues in the Department of Economics, Federal University of Lafia are equally appreciated for their supports. I sincerely acknowledge Tertiary Education Trust Fund (TETFund) for the sponsorship of my Doctoral Degree (Ph.D. Economics). Federal University of Lafia, Nasarawa State, Nigeria is also acknowledged for proving me the opportunity to receive the TETFund sponsorship.

Moreover, I would like to express my deepest appreciation for the invaluable support and care of my lovely wives, the mothers of my children and comfort of my life, Idris B. Rahamat (Bake Bare) and Mohammed Safiyat (Yon Taruwere). Both of you are amazing! Equally, I am extremely grateful to my children, Usman, Suleiman, Zainab, Luqman, Ruqqayat and Mohammed for being the delight of my existence. I am extremely grateful to my siblings, Samaru family and the entire Ningurume community for their support and concerns particularly during the Coronavirus (COVID-19) pandemic. I would like to specially thank Mr. Abubakar Asare Halidu for his all-time kindness, generosity and brotherly care. I also thank Salihu Bata Idris and Ishiak Buko for taking care of my family throughout my stay abroad. I also thank my friends especially Abdulkareem Umar (Taba), Umar Mohammad Bello, Safiyanu Sidi Shuaibu for their financial and moral support. I equally appreciate the company of my co-students especially Rasheed Olajide Alao (roommate), Salim Hamza Ringim, Mfonobong Udom Etokakpan and Gizem Uzuner for their unalloyed support.

Above all, my due regard and profound appreciation go to my parents, Alhassan Sabi Sama (Bakenduro) and Hadisat Alhassan (Dembe) for investing enormously on my education as well as giving me parental support and sound moral background, which enabled the success of my educational pursuit.

Thank you all and God bless.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF SYMBOLS AND ABBREVIATIONS

ACFTA	African Continental Free Trade Agreement
AfDB	African Development Bank
AR	Autoregressive
C-D	Cobb-Douglas
CEPII	Centre d'Etudes Prospectives et d'Informations Internationales
CES	Constant Elasticity of Substitution
CIS	Commonwealth of Independent States
DOT	Direction of Trade Statistics
DVA	Domestic Value Added
DVX	Domestic value Added exports
ECOWAS	Economic Community of West African States
EE	Emerging Economies
FDI	Foreign Direct Investment
FVA	Foreign Value Added
GDP	Gross Domestic Product
GMM	Generalized Method of Moments
GTAP	Global Trade Analysis Project
GVC	Global Value Chains
H-O	Heckscher-Ohlin
ICIO	Inter-Country Input-Output
IIT	Inter-Industry Trade
IMF	Monetary Fund
IRS	Increasing Return to Scale

LICs	Low-Income Countries
MENA	Middle East and North Africa
MRIO	Multi-Region-Input-Output
MRT	Multilateral Resistance Terms
OECD	Organization of Economic Cooperation and Development
OLS	Ordinary Least Square
PPLM	Poisson Pseudo Maximum Likelihood
PPMLHDFE	PPML with High-Dimensional Fixed Effects
RTA	Regional Trade Agreements
SACU	Southern African Customs Union
SEE	South-East Europe
TiVA	Trade in Value Added
UNCTAD	United Nations conference on trade and development
UNDP	United Nations Development Programme
UNIDO	United Nations industrial development organization
USD	United States Dollar
WDI	World Development Indicators
WDR	World Development reports
WGI	World Governance Indicators
WOID	World Input-Output Database
WTO	World Trade Organization

Chapter 1

INTRODUCTION

1.1 Background and motivation of the study

Trade has been the source of wealth, power, and overall economic growth and development since time immemorial. It is identified as an engine of economic growth and, nations often sought to engage in international trade to promote economic progress and welfare of their citizens. The channels through which trade enhances welfare range from the availability of a variety of products, technological transfer, a factor-specific comparative advantage to scale, and rationalization effect. With the current wave of globalization, international trade has become more important than ever before. It is practically impossible for any country to adopt autarky. An attempt to operate a closed economy often results in a severe decline in economic progress. The harshest economic sanctions imposed by countries on each other are trade embargoes. Thus, following the creation of the World Trade Organization (WTO), trade integration has been intensified among countries across the world. The trade liberalization plus improvement in transportation and communication technology led to a substantial reduction in tariffs and non-tariff trade barriers. Consequently, traditional trade cost has reduced over time. Nevertheless, international trade involves non-negligible costs. Therefore, trade cost occupies a central position in the modern literature on international trade. The literature divided trade cost into traditional trade costs and non-traditional trade costs. While early studies have paid adequate attention

to the traditional trade costs, the non-traditional trade costs are less explored due to the difficulty in their identification and measurement.

Until recently, the traditional trade costs; bilateral distance, tariffs, and non-tariff barriers, have been considered as the only major determinants of cross-border trade. Recently, the world witnessed tremendous dynamics in international trade inexplicable by the traditional determinants of trade. There is 'missing international trade', a huge gap between theoretical predictions and the actual trade flows (Trefler, 1995). Similarly, McCallum (1995) submits evidence of home trade bias (border) effect, whereby a large disproportion exists between international and domestic trade. In a bid to explain the phenomena of the home biased (border) effect and missing trade mystery, the international trade literature has identified the importance of non-traditional trade costs. The non-traditional costs include hidden transaction costs such as bad domestic national institutions.

Although several sources of the non-traditional costs are suggested, institutional and contract enforcement costs are identified as important determinants of trade (Rauch, 2001; Anderson and Marcouiller, 2002; Nunn, 2007; Levchenko, 2007; Nunn and Trefler, 2014). This latter strand of international trade literature does not pay attention to the trade dynamics in Africa. Whereas, the non-traditional trade costs, especially bad institutions are seemingly the most important determinants of the African trade flows. This is because, in addition to the home biased (border) effect and missing trade mystery, Africa's international trade performance remains dismal despite the significant reduction in trade barriers due to technological improvement in transport and communication. Moreover, the engagement of the African countries in several bilateral trade agreements seems not to be yielding the desired result (UNCTAD, 2019;

WTO, 2019). The signing of the African Continental Free Trade Agreement (ACFTA) is another attempt to further liberalize trade within Africa. This is an indication that the traditional trade determinants may be important but the institutional costs could be the fundamental determinants of the African trade performance. In other words, the traditional trade barriers probably have done less in explaining the African trade flows than the non-traditional trade cost such as institutions could have done. This becomes more likely considering the concurrent existence and persistence of abysmal trade performance and weak institutions in the continent.

Equally, Africa falls below other continents in all the ten components of economic institutions and the six components of political institutions (governance indicators) considered in this thesis. Under the conditions of weak institutions, international transactions and contracts are uncertain and riskier, time-consuming and costlier (Coase 1937; North, 1990; Nunn, 2007; Levchenko, 2007; Nunn and Trefler; Acemoglu and Robinson, 2012). Thus, the disappointing trade performance and poor quality of institutions in Africa cannot be considered as a mere coincidence.

Meanwhile, institutions in this context as North (1990) describes are "the rules of the game in a society or, more formally, are the humanly devised constraints that shape human interaction" They are the rules and regulations, norms and conventions that shape the economic, political and social interactions." Institutions could be formal rules (for instance, constitutions, laws, property rights), informal constraints (for example, sanctions, taboos, traditions, customs, norms, conventions, self-imposed codes of conduct), and the features of their enforcement. Institutions reduce transaction costs and uncertainty by harmonizing the actions of actors, prescribing the appropriate

behavior, and structuring incentives in human exchange (Coase, 1937; North, 1990; Acemoglu and Robinson, 2001).

The notion of institutions has received adequate attention recently and the role of institutions in the areas of growth and international economics has long been recognized. Institutions are considered as fundamental determinants of economic growth (Rodrik, Subramanian, and Trebbi, 2004; Acemoglu and Robinson, 2012). One of the channels through which institutions affect economic growth is the creation of comparative advantage in trade. Good institutions promote trade while bad institutions lead to comparative disadvantage and could negatively affect international trade (Nunn and Trefler, 2014).

However, the extant theoretical literature assumed the existence of good-functioning institutions by default and the empirical studies focused only on the relationship between some institutional indicators (political institutions such as rule of law and contract enforcement), comparative advantage, and trade volumes. There is a dearth of studies on the institution-bilateral trade nexus. The few studies considered only political institutions and ignored the economic institutions in their analysis. Even the few studies that included political institutions neglected the African case.

Furthermore, the nexus between the new dimension of trade, global value chains (GVC), and institutional quality, particularly in Africa, also suffers absolute neglect in the international trade literature. International trade expanded significantly over the last two decades. For instance, world merchandise trade increased from about 2.7 trillion USD in 1990 to 19.67 trillion USD in 2018 (World Trade Organization－WTO, 2019). Global value chains (GVC) is the driving force behind the expansion in trade

(UNIDO, 2019; WDR, 2020). The GVC describes a series of internationally distributed (at least two different stages are distributed across countries) stages involved in the production and sales of a product or service, with each of the stages adding value to the product or service (Antràs, 2020). The GVCs are dramatically changing across the world. The increasing wave of globalization resulting from trade liberalization, lower investment barriers, reduced transport cost, and advances in information and communication technologies lead to the separation of the processes of the production of goods and services across borders. Industries fragment their production processes and intermediate goods crisscross different countries. This comes in the form of the 'snakes' value chains or 'spider' value chains which means following sequential processing or assembling of intermediates into different goods and services respectively (Baldwin and Venables, 2013). The production activities that are capital and technology-intensive are carried out in the developed (advanced) economies while the labor-intensive, low-skilled activities take place in the developing countries to benefit from a low cost of labor. Firms distribute their production stages across borders based on comparative advantage. Thus, GVC has deepened geographically (including more developed and emerging economies), sectorally (manufacturing and services) and functionally (research and development, and innovation, production, and distribution). Countries derived many benefits from participating in the GVC. It opens a vital avenue for the developing economies to integrate into the world economy and build their productive capacity at a lower cost. The benefits derivable therefrom include unprecedented prosperity resulting from massive job creation, a significant rise in productivity and incomes, poverty reduction, and sustained economic growth in countries that deeply partake in the GVC (WDR, 2020).

Nonetheless, there is an uneven distribution of the GVC participation and gains across the globe. For instance, while East and Southeast Asia and Latin America deeply participate in GVC trade and benefitted immensely therefrom, South Asia and Africa participate less in the GVC. The former represent about 85% of the GVC trade since 2014 (UNCTAD, 2015). Equally, the participation in the GVC does not necessarily reflect participation in world trade. The participation of Africa, the least developed and most poverty-ridden continent in the world, in the GVC is dismal. In 2011, the share of Africa's global value-added was 2.2% (UNCTAD, 2015). Van Biesebroeck and Mensah (2019) reported that sub-Saharan Africa's engagement in manufacturing GVC is low and the regions' average performance in several indicators of GVC is negative over the period 1995-2018. Largely, the firms in the continent provide primary inputs to the firms in other regions and thus participate in the upstream production, which does not involve much value addition (Foster-McGregor, Kaulich, and Stehrer, 2015). Examining the drivers of GVC and the determining factors that engender uneven engagement of regions on the GVC trade, the existing studies do not adequately consider institutional factors, especially in Africa. Africa being drifting behind other continents vis-à-vis institutional quality, the reasons for her underperformance in GVC trade might not be unconnected to the poor quality of institutions.

For Africa to achieve the desired level of economic growth and development, policy measures that would enhance both bilateral trade and GVC are inevitable. Thus, a clear understanding of the relationship between international trade (bilateral and GVC) and institutional quality in the continent is imperative. Therefore, this thesis provides analytical insights on the impact of institutional quality on bilateral trade and GVC in Africa. The choice of Africa is informed by the concurrent existence and persistence

of weak institutions on one hand and the poor trade performance of the continent on the other hand. Also, the period under study witnessed tremendous changes in the dynamics of trade in the continent.

1.2 Statement of the research problem

The importance of trade as a driver of economic growth has been established. However, little emphasis is laid on the effect of institutions on trade in Africa. Theoretically, it is established that institutions may have a direct impact on trade by creating comparative advantage or serving as trade barriers. It is firmly established in both theoretical and empirical literature that trade enhances economic outcomes. Researchers and policymakers have focused their attention on the determinants of trade flows. However, little research has been done on institutional quality as the driver of bilateral trade flows. The few studies in this area have concentrated on the effect of some political institutions on merchandise trade in selected countries and regions. The impact of economic institutions on trade in Africa is yet to be explored. Meanwhile, African countries are lagging behind the rest of the world in terms of international trade performance and the quality of institutions (Kaufmann, Kraay& Mastruzzi, 2011; WTO, 2018; Miller, Kim and Roberts, 2019).

Institutions reduce transaction cost, reduce the uncertainty of outcomes, of decisions and create a level playing ground for all actors of international trade. Reduction in transaction cost and uncertainties encourages foreign investors and traders to increase trade (de Groot, Linders, Rietveld, and Subramanian (2004). In other words, with strong institutions (sustained democracy, preserved property rights, rule of law, impartial judiciary, bureaucratic quality, economic freedom, freedom from corruption, et cetera), investors and foreign traders will more willingly engage in trade. Few

studies concerning the effect of political institutions on international trade find that institutions positively affect trade. For instance, de Groot, *et al* (2004), Levchenko (2007), Souva and Smith (2008), Papaioannou (2009), Dutt and Traca (2010), de Jong and Bogmans (2011), Angkinard and Chiu (2011), Gil-pareja Llorca-Vivero and Martínez-Serrano (2019), Akhtaruzzaman, Hajzler, and Owen (2018), Álvarez, Barbero, Rodríguez-Pose, and Zofío, (2018), Beverelli, Keck, Larch, and Yotov (2018), Jiang and Borojo (2018) and Nordås (2018) found that political institutions have a positive impact on trade flows and countries that have strong political institutions attract more trade.

Nonetheless, the case of Africa is yet to be explored. None of the previously mentioned studies apply appropriate techniques or pay specific attention to the impact of the origin country's institutions on international trade in Africa. Given her peculiarities in terms of institutional dynamics and trade, it is important to provide pragmatic explanations on the effect of institutions on international trade in Africa. The studies also fail to analyze the effect of economic institutions on international trade. Although political and economic institutions are closely related, reforms on economic institutions create growth faster than reforms on political institutions do (Kilishi, 2017). It is important to study both economic and political institutions as determinants of bilateral trade flows so that Africa and other less developed countries can reap the full benefits of international trade. Moreover, the studies did not compare the effect of the institutions on the trade of the Emerging Economies (EE henceforth) and Low-Income Countries (LICs henceforth) in Africa. The effect could vary significantly with the level of income of the countries. Also, the studies failed to properly account for multilateral resistance terms (MRTs). Consequently, their estimates and findings are

unreliable (Anderson & Wincoop, 2003; Beverelli, Keck, Larch & Yotov, 2018; Larch, Wanner, Yotov & Zylkin, (2019).

Furthermore, in recent times, the importance of GVC in promoting economic prosperity, reducing poverty, and creating jobs has occupied a center stage in international economics. Researchers begin to ask critical questions regarding the unbalanced participation of regions in GVC. In trying to answer this question, the recent development of the measures of GVC brought about the emergence of studies on the drivers of GVC engagement across the world (Kowalski, Lopez-Gonzalez, Ragoussis, and Ugarte, 2015; UNCTAD, 2015; Dollar, Ge, and Yu, 2016; Murandov, 2017; Fellbermayr, Teti and Yalcin, 2019; Fernades et al, 2019; WDR, 2020). The studies identified factor endowment, geography, foreign direct investment (FDI inflows), market size, labor cost, and tariffs as the critical determinants of the GVC trade. Yet, the studies give little or no attention to the African case. Most of the studies also failed to consider institutions in their discussions. Despite the abundance of both low-skilled labor and natural resources in the continent, why is the continent unable to attract sufficient foreign capital to boast GVC trade? Why is the continent stocked at forward GCV trade rather than upgrading to complex backward GVC? All these issues point to the fact that the extant literature fails to provide sufficient explanation about the drivers of GVC trade in Africa. The few exceptions included only the rule of law (Dollar and Kidder, 2017) and protection of property rights (Kowalski *et al*, 2015). Numerous components of economic and political institutions were omitted in the discourse. Countries differ in terms of the quality of their institutions (North, 1990; Acemoglu and Robinson, 2012). Thus, institutional quality may have a substantial impact on their GVC engagement. Countries with weak institutions experience the

high cost of the transaction, high rate of poverty, and low-level economic development (North, 1990; Acemoglu and Robinson, 2012). Moreover, Nunn and Trefler (2013) identified the importance of institutions as the source of comparative advantage. In addition, institutions are fundamental determinants of international trade flows and patterns (Nunn, 2007; Levchenko, 2007). The institutions harmonize behavior and reduce uncertainty and transaction cost (Acemoglu, 2012 and North, 1990). Thus, it is imperative to examine the role of institutional quality in the GVC participation of Africa. Therefore, this thesis provides analytical insights on the impact of institutional quality on bilateral trade and GVC participation in Africa.

1.3 Research questions

Derivable from the statement of the research problem, several research questions are still begging for answers in the field of institutional economics and international trade. Therefore, this study raised the following research questions concerning the impact of formal institutions (both political and economic institutions) on bilateral trade and GVC participation in Africa.

1. Does institutional quality matter for bilateral trade flows in Africa?
2. Does institutional quality matters for Africa's participation in GVC?
3. Which kinds of formal (political or economic) institutions are relevant determinants of bilateral and GVC trade flows?
4. Are the effects of the institutions the same for all kinds of bilateral trade (import, export, and total) in Africa?
5. Are the effects of the institutions the same for all kinds of GVC participation (forward, backward, total, and upstreams) in Africa?
6. Are the effects of the institutions on trade the same at all levels of income of the African countries?

1.4 Objectives of the study

Derived from the research questions, the main objective of the thesis is to evaluate the effect of institutions on bilateral trade and global value chain participation in Africa. The specific objectives are;

1. To evaluate the impact of economic institutions on bilateral trade in Africa.
2. To find out the effects of political institutions on bilateral trade in Africa.
3. To investigate the impact of economic institutions on GVC participation in Africa.
4. To evaluate the impact of political institutions on GVC participation in Africa.
5. To examine the heterogeneity in the effect of the institutions on bilateral trade in Africa,
6. To examine the heterogeneity in the effect of the institutions on GVC participation in Africa.

1.5 Contributions and Significance of the study

This thesis covers the impact of institutional quality on two distinct but interdependent kinds of international trade, the bilateral trade and GVC participation of African countries. The contributions of the thesis are numerous. First, the inclusion of both political and economic institutions in the institutional quality-international trade nexus. Although economic and political institutions are interrelated, reforms in each result in different policy outcomes. It is thus important to evaluate their separate effects on bilateral trade and GVC participation, particularly in Africa where both kinds of institutions are adjudged to be weak.

Second, components of the indicators of institutional quality are used instead of only the overall index. Both political and economic institutions are multifaceted. Hence, the use of the overall measures of the institutions could obscure the understanding of

policymakers regarding the nexus between institutions and international trade as well as institutional quality-GVC association.

Third, it captures heterogeneity in the effects of institutions by considering imports, exports, and total bilateral trade for Low-income and emerging African countries. Similarly, the heterogeneity of the effect of the institutional quality on GVC participation by the inclusion of forward, backward, and total GVC participation and upstreams constitutes a significant contribution of this thesis. These will enable policymakers and stakeholders to have a clear understanding of the components of the bilateral trade, the GVC participation, and institutions to match together in their policy framework of the countries at different categories of income and sectors of the economies.

In addition, for the model on institutional quality and bilateral trade, the structural gravity model was estimated by the state-of-the-art technique, Poisson Pseudo-Maximum Likelihood with High Dimensional Fixed Effects estimator (PPMLHDFE). The estimation technique is developed by Larch, *et al* (2019) to properly account for MRTs of the structural gravity model and allows the inclusion of country-specific characteristics like institutional quality (the advantages of the technique are discussed in chapter 3-methodology). This remedied the failure of the early studies which fail to properly account for MRT (multilateral resistance term). Also, instead of consecutive yearly data used in previous studies, this study used 4-year interval panel data to effectively capture the slow-changing dynamics of institutional quality in the continent.

Therefore, the thesis contributes immensely to the literature and provides policy inferences that are valuable for trade policymaking in Africa. This becomes necessary owing to the desperate need of African countries to expand their trade. Without an adequate understanding of the main drivers of the bilateral trade flows, it will be difficult, if not impossible to design a desirable trade policy for the continent. Other developing economies that share similar characteristics with the African countries can also benefit from the policy suggestions of this thesis.

1.6 Outline of the thesis

The thesis is divided into five chapters. Chapter one contains the background of the study which briefly discusses the main direction of the thesis. The statement of the research problem is also presented in chapter one. It identifies the main issues, research gaps and introduces the motivation for the study. Here, the failure of previous studies to focus on African and other gaps are discussed. Still, in chapter one, the research questions, and objectives are highlighted and the contributions and significance of the study are aptly captured. The theoretical and empirical literature is presented in chapter two. The extant theoretical models are discussed and appropriately linked to the main focus of the thesis. Also, the empirical studies are evaluated in chapter two. Chapter three contains the research methodology which includes the nature and sources of data, the theoretical framework, and the empirical model as well as the methods of estimations in this thesis. The empirical results are presented and discussed in chapter four while the summary, conclusion, and policy implications are fully discussed in chapter five.

Chapter 2

LITERATURE REVIEW

2.1 Theoretical literature

Trade is recognized as an engine of growth, and the trade theories evolve over the years with a primary focus on the explanation on the basis for international trade patterns and distribution of gains therefrom. In the tradition of the Ricardian and Heckscher-Ohlin theories, comparative advantage and factor endowment are the sources of international trade and determines the distribution of gains from trade accruable to each country and factors accordingly. Ricardo submits that countries have to specialize and export goods in which they have a comparative advantage and import the goods in which they have a comparative disadvantage. On the other hand, Heckscher-Ohlin theory posits that labor-abundant country should specialize in the production of labor-intensive goods and export same while capital abundant country specializes on the production and export of capital-intensive goods. These theories expressed that physical and human capital, and technology (innovations) are the main drivers of comparative advantage and hence determinants of trade volumes and patterns.

In recent literature, institutions are identified as the deep determinants of both growth and comparative advantage. This brought new insights into the international trade literature. The factors identified by the early theories are proximate (not deep) determinants of international trade. That, the institutions are fundamental determinants

of international trade. Nevertheless, the earlier trade theories have not undermined the role of institutions in shaping international trade patterns. Instead, the theories assumed the existence of well-functioning institution by default. In the view of Ricardo for instance, differences in productivity between the developed (North) and the less developed (South) countries represent institutions. He expressed, better institutions in the developed economies connotes that the former (North) are more productive in the institutionally dependent sector (s) than the latter (South). This implies that the North will gain by specializing on the production and trading of such goods whereas the South will stop producing the goods. Thus, the South equally gains from trade and does not suffer the negative consequence (cost) of its weak institutions.

The current reality of institutional dissimilarity among nations across the world defiles that claim and reiterate the relevance of institutions in explaining international trade patterns. For instance, the developed economies have strong institutions while the less developed economies, especially Africa, are trapped at vicious cycle of weak institutions over the years (Acemoglu and Robinson, 2012; Alhassan and Kilishi, 2019). At the same time, the developed economies have made unprecedented progress in international trade. It is a reality that imperfect (weak) institutions do not bring about outright stoppage of production of certain goods. Rather, economies continue to incur huge production and transaction cost due to bad institutional framework. This is because weak institutions manifest as lower productivity in institutionally-intensive sector by distorting firms' choice of production and influencing the behavior of economic agents (Blanchard and Kremer, 1997; McMillan and Woodruff, 1999; Claessens and Laeren 2003).

Therefore, contrary to the view of Ricardian theory, Grossman-Hart-Moore view posits that instead of manifesting merely as productivity, institutions govern the relationship between factors and thus serve as drivers of comparative advantage (Levchenko, 2007, Nunn, 2007; Nunn and Trefler, 2014). In this view, international trade involves contractual agreement at various degrees depending on the nature of the goods traded. For example, the production of a high-tech product such as aircraft involves relationship-specific investment and its exchange requires strong contractual institutions to prevent renegotiation and hold-up problem. On the other hand, production and exchange of standard product such as T-shirt requires no contract for its exchange. A country with strong contractual institutions would have comparative advantage in production of aircraft over T-shirt.

2.1.1 Levchenko's model

Starting with standard Hechscher-Ohlin (H-O) model of international trade, Levchenko (2007) formalized the relationship between contractual institutions and comparative advantage. Considering the H-O model with factor equalization for an economy with two factors of production — labor (L) and capital (K) producing three goods. Two of the goods, called L-good and K-good, are produce using only L and K each respectively. Only the third good, 'mixed good' (M-good), is produced using the combination of L and K.

Assuming an identical Cobb-Douglas (C-D) utility functions for the consumption of the three products, the utility function is specified as follows;

$$U(G_K, G_L, G_M) = G_K^{\alpha} G_L^{\beta} G_M^{\gamma} \quad (1)$$

As a C-D utility function, $\alpha + \beta + \gamma = 1;\ \gamma = 1 - \alpha - \beta$. Given the prices of G_K, G_L and G_M as P_K, P_L and P_M respectively, a numeraire was set to an ideal price index *a la* the C-D utility function as;

$$P = \left(\frac{P_K}{\alpha}\right)^{\alpha}\left(\frac{P_L}{\beta}\right)^{\beta}\left(\frac{P_M}{\gamma}\right)^{\gamma} = 1 \quad (2)$$

Hence, the first order conditions (F.O.C) of the utility maximization results to;

$$P_K = \alpha\frac{U(G_K,G_L,G_M)}{G_K} \quad (3)$$

$$P_L = \beta\frac{U(G_K,G_L,G_M)}{G_L} \quad (4)$$

$$P_M = \gamma\frac{U(G_K,G_L,G_M)}{G_M} \quad (5)$$

Assuming a production function linear in K and L for the production of the K-good and L-good, and unit output of K and L are *a* and *b* respectively, while the returns on K and L are *r* and *w* respectively, the profit maximization condition in the two sectors (K-good and L-good) will be;

$$P_K a = r \quad (6)$$

$$P_L b = w \quad (7)$$

A Leontief-typed production function is assumed for the third good (G_M). One unit of L and χ units of K are required to produce $\mathcal{Y}$ units of G_M. Since G_M requires the combination (joining) of two factors (parties) of production, it is institutionally dependent good. Institutions play a vital role in facilitating transaction between the two distinct factors which pursue distinct selfish interests. Under the Ricardian view, imperfect institutions would connote productivity loss in G_M. Suppose that for a unit of G_M produced, a fraction, θ of the output $\mathcal{Y}$ is lost due to imperfect institutions. The parameter θ captures the quality of institutions. Thus, lower values of θ denotes better institutions. Therefore, the profit maximization in the G_M sector will be;

$$P_M(1-\theta)\mathcal{Y} = w + r\chi \quad (8)$$

That is marginal revenue, $P_M(1-\theta)\mathcal{Y}$, is equal to marginal cost, $w + r\chi$. In line with the submission of Caballero and Hammour (1998), using combination of K and L to produce a unit of G_M, K's investment becomes specific to the relationship. That is it suffers the hold-up problem. As such, K recovers only $1-\theta$ of its investment. Then, for K to operate, $P_M\mathcal{Y} \geq w + (1-\theta)r\chi$, that is, share of surplus, $\mathcal{S} \geq P_M\mathcal{Y} = w - (1-\theta)r\chi$ must hold. This implies that the reward for a unit of capital invested in G_M sector is

$$\mathcal{S} = P_M\mathcal{Y} - w - (1-\theta)r\chi \tag{9}$$

The first term of equation (9), $P_M\mathcal{Y}$ represents unit revenue to K, w denotes returns lost to L due to the relationship-specific nature of the investment, and $(1-\theta)r\chi$ denotes returns lost due to imperfect institutions. Perfect institutions and absence of hold-up is indicated by $\theta = 0$.

2.1.2 Derivation of international trade model

Levchenko (2007) characterized the model into the general equilibrium H-O model of international trade involving two countries, i and j with productivity difference. The respective share of surplus of the countries are;

$$\mathcal{S}^i = P_M\mathcal{Y}^i - w - (1-\theta^i)r\chi \tag{10}$$

$$\mathcal{S}^j = P_M\mathcal{Y}^j - w - (1-\theta^j)r\chi \tag{11}$$

Assuming institutions are weaker in country j ($\theta^j > \theta^i$), the unit cost of producing G_M in country j is greater than the unit cost of producing G_M in country i. That is, $w + (1-\theta^j)r\chi > w + (1-\theta^i)r\chi$. Therefore, country i has comparative advantage in the production of the relationship-specific (contract-intensive) good ($e.g.\ G_M$).

Following Helpman-Krugman (1985), the model assumes two countries ($\mathcal{C} = i, j$) producing differentiated varieties of two goods, say, g_x and g_z, using two factors of

production (L and K) with increasing return to scale (IRS) under monopolistic competition. With the varieties valued by preferences, the model posits that both countries demand for foreign goods largely depend on the level of their Gross Domestic Product (GDP) relative to the world GDP. Then, country $i's$ imports from j (M^{ij}) and country $j's$ imports from i (M^{ji}) will respectively be;

$$M^{ij} = \mathbb{S}^i\left[p_{g_x} n^j_{g_x} g^j_X + p_{g_z} n^j_{g_z} g^j_Z\right] \tag{12}$$

$$M^{ji} = \mathbb{S}^j\left[p_{g_x} n^i_{g_x} g^i_X + p_{g_z} n^i_{g_z} g^i_Z\right] \tag{13}$$

The prices of good g_x and g_z are denote by p_{g_x} and p_{g_z} respectively while $n^{C=i,j}_{g_x}$ and $n^{C=i,j}_{g_z}$ represent the varieties of the good g_x and g_z in country j and i respectively. The country $i's$ and country $j's$ shares of GDP relative to the world GDP are symbolized by $\mathbb{S}^i$ and $\mathbb{S}^j$ respectively. Applying the composite commodity theorem, g_z can represent other goods and its price, p_{g_z} can be chosen to be a numeraire ($p_{g_z} = 1$).

Relating equations (12) and (13) to the Levchenko (2007) model,

$$p_{g_x} g^i_X \equiv P_M Y^i = w + (1 - \theta^i) r\chi \tag{14}$$

$$p_{g_x} g^j_X \equiv P_M Y^j = w + (1 - \theta^i) r\chi \tag{15}$$

Therefore, the bilateral imports will be;

$$M^{ij} = \mathbb{S}^i\left[P_M Y^j n^j_{g_x} + p_{g_z} n^j_{g_z} g^j_Z\right] \tag{16}$$

$$M^{ji} = \mathbb{S}^j\left[P_M Y^i n^i_{g_x} + p_{g_z} n^i_{g_z} g^i_Z\right] \tag{17}$$

Substituting for $P_M Y^j = w + (1 - \theta^i) r\chi$, equations (16) and (17) become

$$M^{ij} = \mathbb{S}^i\left[n^j_{g_x}(w + (1 - \theta^j) r\chi) + p_{g_z} n^j_{g_z} g^j_Z\right] \tag{18}$$

$$M^{ji} = \mathbb{S}^j\left[n^i_{g_x}(w + (1 - \theta^i) r\chi) + p_{g_z} n^i_{g_z} g^i_Z\right] \tag{19}$$

Equations (18) and (19) shows that the bilateral imports depend on the quality of institutions in the trading countries. This can be generalized to all kinds of trade flows (Evenett & Keller, 2002). In the style of Nunn (2007), the general equation for the test of hypothesis on the impact of institutions on comparative advantage (and then international trade) can be specified and follows;

$$X_{g_c} = \delta_g + \delta_c + \emptyset_1 z_g \mathbb{Q}_c + \emptyset_2 l_g L_c + \emptyset_3 k_g K_c + \varepsilon_{ic} \quad (20)$$

Where X_{g_c} represents total exports in industry g from country c to the rest of the world; $\delta_g \; and \; \delta_c$ denote the industry and country fixed effects respectively; z_g measures the contract intensity in industry g; $\mathbb{Q}_c$ measures the quality of institutions (contract enforcement) in country c; L_c and K_c represent country c's endowment of labor and capital respectively, and l_g and k_g are the measures industry g's labor (skill) and capital intensities. Although Nunn (2007) narrowly focused on the effect of rule of law on contact-intensive goods, in the line with the theoretical model of Levchenko (2007), equation (20) can be used to evaluate the relationship between any kind of institutions (including economic and political institutions) and any form of international trade —including bilateral trade and GVC participation considered in this thesis (see Ma et al, 2010; Essaji and Fujiwara, 2012; Feenstra *et al*, 2012; Li *et al*, 2012).

2.1.3 Derivation of gravity model

The terms in square brackets, of equation (12) and (13), $\left[p_{g_x} n^j_{g_x} g^j_X + p_{g_z} n^j_{g_z} g^j_Z\right]$ and $\left[p_{g_x} n^i_{g_x} g^i_X + p_{g_z} n^i_{g_z} g^i_Z\right]$ are equal to the GDP of country j and the GDP of country i respectively. Concisely, when the GDP of country j is represented by $\mathbb{Y}^j$ and the GDP of country i is represented by $\mathbb{Y}^i$ while the world GDP is symbolized by $\mathbb{Y}^w$, the bilateral imports of the countries under the assumption of zero trade and transport costs and trade balanced trade become;

$$M^{ij} = \mathbb{S}^{i}\mathbb{Y}^{j} = \frac{\mathbb{Y}^{i}\mathbb{Y}^{j}}{\mathbb{Y}^{w}} = \mathcal{S}^{j}\mathbb{Y}^{i} = M^{ji} \quad (21)$$

It is noteworthy that equation (21) represents a basic gravity model derived from the Helpman-Krugman model of international trade. Evenett and Keller (2002) argue that the model can be generalized to a multi-factor, multi-country and multi-sector model with trade cost. Although the basic gravity model makes intuitive meaning, it has been criticized for lack of theoretical basis (Anderson, 1979; Bergstrand, 1989). The criticisms prompted intensified effort in search for theoretical explanation of the basic gravity model. Among several studies, the structural gravity model of Anderson and Van Wincoop (2003) stands out and thus used in this thesis to specify the model on institutions-bilateral trade nexus.

The Anderson and Van Wincoop (2003) structural gravity model consistent with the Helpman-Krupman (1985) model is adopted in this thesis. The model expresses that each country involved in bilateral trade produces certain quantity of specific bundle of goods. The utility function of a typical consumer, from the demand side, in the destination (importer) is assumed to be the constant elasticity of substitution (CES) type. The consumer's utility maximization problem can be express as follows;

$$Maximize\ U(X_{ij,t}) = \left(\sum_i \beta_{it}^{\frac{1-\sigma}{\sigma}} X_{ij,t}^{\frac{\sigma-1}{\sigma}}\right)^{\frac{\sigma}{\sigma-1}} \quad (22)$$

$$subject\ to\ \sum_i p_{ij,t}X_{ij,t} = y_{j,t} \quad (23)$$

Where $\beta_{it}^{1-\sigma/\sigma}$ denotes the number of goods in a unique bundle produced by the exporter (country i) at a given time t. The elasticity of substitution is represented by σ which is assumed to be greater than zero. This implies that the consumers in the country j (importer) have a preference to consume the biggest possible number of

varieties of the goods. The import price from the exporter (country i) and the nominal income of the importer (country j) at time t are denoted by $p_{ij,t}$ and $y_{j,t}$ respectively. Since international trade involves the cost of shipment of the goods from country i to country j ("iceberg" cost), the country i's producer price of the goods ($p_{i,t}$) at time t is augmented by the shipping cost ($t_{ij,t}$), so that $p_{ij,t} = t_{ij,t}\, p_{i,t}$. The trade cost (amount lost to the shipping of the goods from country i to country j) is $t_{it,j} - 1$. Therefore, the solution to the optimization problem yielded an import demand equation expressed below.

$$X_{ij,t} = \left(\frac{\beta_{it} p_{it} t_{ij,t}}{p_{j,t}}\right)^{1-\sigma} y_{j,t} \tag{24}$$

Where $p_{j,t}$, expressed as follows, represents the importer's ideal price index at given time t.

$$p_{j,t} = \left(\sum_i (\beta_{i,t} p_{i,t}\, t_{ij,t})^{1-\sigma}\right)^{\frac{1}{1-\sigma}} \tag{25}$$

Consequently, imposing market clearing condition, $y_{i,t} = \sum_j X_{ij,t}$, Anderson and Van Wincoop (2003) show that the bilateral trade flow between the importer and exporter can be expressed as follows;

$$X_{ij,t} = \frac{y_{i,t} y_{j,t}}{y_{w,t}} \left(\frac{t_{ij,t}}{p_{i,t} \rho_{j,t}}\right)^{1-\sigma} \tag{26}$$

$$p_{i,t}^{1-\sigma} = \sum \left(\frac{\tau_{ij}}{\rho_j}\right)^{1-\sigma} \frac{y_{j,t}}{y_{w,t}} \tag{27}$$

$$\rho_{j,t}^{1-\sigma} = \sum \left(\frac{t_{ij}}{p_{i,t}}\right)^{1-\sigma} \frac{y_{i,t}}{y_{w,t}} \tag{28}$$

Where;

$X_{ij,t}$ = Norminal value of exports from country i to country j at time t

$y_{i,t}$ = Nominal GDP of country i (exporter), $y_{w,t}$ = World GDP

$y_{j,t}$ = Expenditure of country j (importer), $t_{ij,t}$ = Trade cost (trade barriers)

$p_{i,t}$ = Outward Multilateral Resistance term, $\rho_{j,t}$ = Inward Multilateral Resistance term.

Sigma (σ), elasticity of substitution of CES utility function is expected to be greater than 1. Otherwise, trade cost effect on bilateral trade cannot be negative. The model insightfully identified that it is the relative prices (not the absolute level of trade barriers) that matters for the size of the bilateral trade flow. The price indices, $p_{i,t}$ and $p_{j,t}$ (multilateral resistance terms) are unobserved and needed to be accounted for in the estimation of structural gravity model.

2.2 Empirical literature

The empirical literature is divided into two subsections. The first part focuses on the relationship between institutions and bilateral trade while the second part concentrates on the drivers of GVC trade. This is done to discern the trend of research in both strands of literature and clearly identify the lacuna therein.

2.2.1 Institutions and bilateral trade

Understanding the nexus between institutional quality and bilateral trade flows has attracted global attention of scholars and policy makers. Both theoretical and empirical literature is growing due to an increasing wave of globalization. Theoretical evaluation of the role of the domestic institutional environment on trade competitiveness is submitted in the work of Belloc (2006). The study posits that institutional design is the cause of the relative advantage/disadvantage in international trade. This occurs when the institutions alter production and transaction costs. Several empirical studies have considered the effect of institutions, institutional quality, institutional difference, and institutional reforms on trade. For example, Zeynalov (2016) examines the effect of institutions on international trade in the resource-rich country of Azerbaijan, and

submits that although similarity in the level of income will boost international trade, the main determinant is the quality of institutions. The study revealed that strong rule of law and effective control of corruption boosts confidence and promotes international trade. Therefore, the study observed that reliable countries (countries with strong institutions) tend to trade more with each other and less with unreliable countries (countries with weak institutions.) Moreover, unreliable countries actively trade with each other and less with the reliable ones. Thus, a large deviation in the level of institutional quality reduces bilateral trade across countries. The fundamental question is why African countries do not trade more with other African countries despite the existence of a similar level of institutional quality (weak institutions) and the fact that most are resource-rich countries. This is an indication that the findings of Zeynalov (2016) cannot be generalized to the African situation of international trade. Similarly, Soeng and Cuyvers (2017) observed that domestic institutions such as regulatory quality, rule of law, control of corruption, government effectiveness, and political stability have a significant positive impact on export performance of Cambodia. In addition, some literature has assessed the link between institutions and different categories of exports. Meon and Sekkat (2008) assesses the extent of the institutional framework on total exports, manufactured goods export and non-manufactured goods exports, and indicates that the quality of institutions positively affects only manufactured good exports. The quality of institutions of the domestic countries does not significantly affect total exports and non-manufactured good exports. Further, Kucharčuková, Babecký, and Raiser (2012) uses Poisson Pseudo Maximum likelihood (PPML) and Tobit estimates of the gravity model, to examine the effect of the quality of economic institutions on international trade of South East Europe (SEE) and the Commonwealth of Independent States (CIS) countries. It finds

that a low quality of economic institutions in the SEE and CIS countries contributes to low international trade performance of the countries.

Nonetheless, there is no consensus on the kind of institutions that significantly affect trade. Souva, Smith, and Rowan (2008) argue that the promotion of trade comes from market protecting (economic) institutions, property rights, banking and insurance laws, and the common standard of measurement. Political and other kinds of institutions do not mater for trade. Balding (2011) reexamines the nexus between international trade and democracy with a sample of 150 countries over 1950-1999 period using gravity model. The author argues that democracy does not have significant impact on international trade. However, there is agreement that the quality of governance does have a broad economic and statistical impact on international trade.

Recently, Aziz, Hossain, and Mowlah (2018) finds that strong political institutions enhance vertical inter-industry trade (IIT), but do not increase horizontal inter-industry trade (IIT). Osabuohien, Beecroft, and Efobi (2018) shows that good institutions reduce protectionist tendencies. This implies that a country's level of protectionism depends largely on the level of institutional development. Rin, Giacomo, and Sembenelli (2019) find that trust enhances Foreign Direct Investment and increases the probability of co-investment and trade with partners across Europe. Regarding institutional difference, Karam and Zaki (2018) find that institutional gaps have a significant negative impact on trade flows of MENA countries. The authors argue that the level of institutional quality does not matter but the gap between the institutional qualities of trading countries does matter. Consequently, it is argued that the smaller the institutional gap, the more countries engage in trade. The effect of institutional

reform was also examined. For instance, Angkinand and Chiu (2011) evaluates the effect of permanent and temporary institutional reforms (political, legal, and administrative reforms) on the trade flows of 62 countries over the period 1980-2008. The study found that institutional reforms, especially permanent ones, enhance bilateral trade flows.

2.2.2 Institutions and global value chains

The research on the determinants of GVC trade is relatively nascent and growing. Therefore, the only handful of empirical studies identified some structural (non-policy based) and policy-based factors that drive GVC engagement. The non-policy-based factors mostly identified in the literature include market size, factor endowment, level of income, and remoteness (distance from GVC hubs or economic activities). The policy-based factors include regional trade agreements and tariffs, foreign direct investment (FDI), and institutions among others.

Foremost among the recent studies is the work of Kowalski, *et al* (2015) which empirically examines the drivers of GVC trade in 57 countries for 22 years using the TiVA database. The study finds strong evidence that the non-policy factors such as distance from GVC hubs, market size, and the level of development (income) are key determinants of GVC participation. The study further revealed that policy factors such as foreign direct investment, regional trade agreements, tariffs, logistics, infrastructure, and institutions play a vital role in the GVC engagement of the countries. This study seems to have comprehensive coverage of the factors affecting GVC trade. However, the number of countries sampled based on data availability limits the generalization of its findings. Meanwhile, the study acknowledged that the impact of identified factors differs by region and the differences and similarities open

gaps for further engagement of researchers and policymakers to assess the driers of GVC engagement in various countries and regions.

Fernandes, Kee, Winkler, (2019) broadly categorized the fundamental drivers of the GVC participation into factor endowment, geography, market size, and institutional quality. The report also suggests that the fundamentals do not necessarily dictate the destiny of the economies vis-a-vis GVC involvement. The policy-based factors can influence the fundamentals and thus shape the GVC trade. Hence, we review relevant literature regarding the effects of both the structural and policy-based factors on GVC engagements across the world.

The structural gravity model of trade posits that trade costs, measured by distance and other factors, are a fundamental determinant of trade flows. Geographical proximity promotes trade among countries. Distance and GVC engagement are also related. Baldwin and Lopez-Gonzalez (2015) observed that GVC activities are highly clustered around the manufacturing hubs (the United States, China, and Germany). Remoteness to the GVC hubs deters GVC integration (Fernandes, et al, 2019). Particularly, Kowalski, *et al* (2015) found a negative correlation between backward GVC participation and distance to the manufacturing GVC hubs.

Regarding the resource endowment, the classical and the neoclassical trade theories have recognized the relevance of factor endowment as a determinant of trade flows and volumes. Countries produce and export goods in which they have a comparative advantage and import the goods in which they have a comparative disadvantage. Trade theories such as the Heckscher-Ohlin and Stolper-Samuelson theorems stressed the importance of factor endowment for comparative advantage (Feenstra, 2015). Labor

abundant countries produce and export labor-intensive goods while capital abundant countries produce and export capital-intensive goods. These theorems have undergone series of refinement over time. However, recent studies derive an insight from the extant trade theories and observe that factor endowment matters for GVC participation. For instance, the abundance of low-cost (low-skilled) labor in lower-income economies attracts efficiency-seeking companies to developing countries and serves as an incentive for entry into the labor-intensive segments of the GVC trade as observed in Vietnam (WDR, 2020). Similarly, resource abundance drives forward GVC participation. Murandov (2017) and Fernandes, et al, (2019) submit that resource-rich countries engage in upstream production which requires primary inputs and largely produces intermediate outputs. On the other hand, WDR (2020) suggests that the abundance of capital promotes backward GVC participation. The report shows that natural non-oil-resource-rich Sub-Saharan countries engage in greater forward manufacturing GVC linkages than other countries do. Further, the report provided that efficiency-seeking and resource-seeking foreign capitals enhance upstream sectors in apparel, electronics, and automotive sectors in Bangladesh, Vietnam, and Morocco respectively.

Although African forward GVC participation is greater than the backward participation, the overall GVC engagement is dismal (Biesebroeck and Mensah, 2019). This is despite the abundance of both low-skilled labor and natural resources in the continent. Why is the continent unable to attract sufficient foreign capital to boast GVC trade? Why is the continent stocked at the forward GCVs trade rather than upgrading to complex backward GVC? All these issues point to the fact that the extant literature fails to provide sufficient explanation about the drivers of GVC trade in Africa.

Market size is another factor considered as a vital determinant of GVC trade across the world. The market size, often represented by the GDP, influences participation in GVC trade. Large market economies majorly source inputs domestically and thus participate more on the forward GVC than the backward GVC (Kowalski, *et al*, 2015). On the other hand, small economies depend largely on foreign markets for inputs and hence participate in backward GVC trade (Fellbermayr, Teti and Yalcin, 2019; Fernades et al, 2019; WDR, 2020). Both large and small economies in Africa tend to have similar patterns of GVC participation. If market size is a fundamental determinant, why is there no significant difference in the GVC participation of African countries by their market size? Therefore, market size may be important, but probably not the main determinant of GVC trade in Africa.

Foreign direct investment (FDI) also occupies a central position as a catalyst for GVC participation. The Multi-National enterprises drive the GVC revolution via FDI over the years (OECD, 2013). FDI inflows provide a viable alternative for capital scarcity. Relative capital scarcity hinders GVC engagement in capital-intensive sectors but countries can attract FDI to overcome the capital shortage and upgrade GVC participation (UNCTAD, 2019; Teti and Yalcin, 2019; Fernandes, et al, 2019). For example, investment by Samsung and Singapore's Olam are instrumental for the success of Vietnam in smartphones and the rise in Cocoa exports in Ghana respectively (WDR, 2020).

Another policy factor that receives attention as a determinant of GVC is tariffs. The imposition of tariffs especially on intermediate inputs reduces firms' accessibility to foreign inputs, increases production cost, and hinders the growth of the downstream industries (Kowalski et al, 2015). Moreover, the GVC entails crisscrossing of borders

several times which amplifies the trade cost and affects the GVC competitiveness (Yi, 2003; Miroudot, Rouzet and Spinelli, 2013; OECD, 2013). Also, the linkage between the tariffs and GVC could exist despite the concentration of tariffs on goods and GVC on manufacturing. The latter involves substantial service content that transmits the effects of tariffs to GVC flows (OECD, 2013). Meanwhile, Kowalski et al (2015) observed that backward GVC is more elastic than the forward GVC to the changes in imports tariffs because the former involves the importation of foreign inputs while the latter source inputs domestically.

However, lower tariffs may be necessary but insufficient for the promotion of GVC flows because non-tariff measures (barriers) such as regulatory constraints matter (WDR, 2020). Weak institutions and regulatory constraints increase production and transaction costs (North, 1990; Acemoglu and Robinson, 2012) and can alter the GVC phenomenon. This might be relevant particularly for GVC flows and participation in Africa. The African countries are highly engaged in preferential trade agreements that substantially reduce tariffs. Yet, the GVC participation of the continent is disappointing. Therefore, beyond tariffs, other factors such as institutions could fundamentally explain the GVC dynamics of the continent.

Some studies recognized the importance of institutions as a determinant of value chain trade because institutions shape the ability of firms to enforce contracts. For instance, Levchenko (2007) found that institutions have a significant impact on trade flows mainly in products characterized by the considerable spread of intermediate inputs across countries. Likewise, good institutions promote trade performance of industries characterized by high job-task complexity (Costinot, 2009). Nunn (2007) equally recognized the importance of strong (weak) contract enforcement as a source of

comparative advantage (disadvantage) and determinant of export performance in relationship-specific sectors of the economy. Recently, Kowalski *et al* (2015), Dollar, Ge, and Yu (2016), and WDR (2020) reiterates the importance of contract enforcement, political stability, and property rights as fundamental determinants of GVC participation. However, all these studies concentrated on political institutions in a narrow sense. Economic institutions are not considered. In addition, the studies fail to identify the aspect of institutions that matter for GVC flows. Identifying specific areas of the institutional framework will enhance the understanding of policymakers regarding the institutions-GVC nexus.

In addition, Cheng, *et al.* (2015) evaluate the effect of economic complexity and distance on GVC participation. The study reveals that distance to final demand and economic complexity have positive impacts on GVC trade. This is in addition to the negative effect of investment and trade restrictiveness, and tariffs on the GVC. Moreover, Lopez-Gonzalez (2016) investigate the determinants of value-added exports (domestic) of developed and emerging economies using the OECD-ICIO factor-content data. Controlling for country-sector and time (year) characteristics, the study submits factor intensity (capital-labor ratio), labor productivity (output per worker), FDI, and export sophistication are fundamental propellers of GVC participation. Contrarily, a longer distance to economic activities and high tariffs hamper domestic value-added exports. The study suggests that the effects of the factors vary depending on the group of the countries. Similarly, Allard *et al* (2016) evaluate the determinants of foreign value-added of 185 countries with the use of the EORA database over the period 2007-2011. The study concludes that GDP and tariffs inhibit foreign value-added (backward GVC) while income per capita, education, private

sector access to credit, rule of law, and good infrastructure promote the backward GVC participation.

The aforementioned studies do not consider African specific sample. Given the specificity of the African economies, the use of a mixed sample of countries can becloud the understanding of researchers and policymakers about the determinants of GVC in the continent. The effects of the determinants of GVC participation largely depend on the group of countries under consideration (Kowalski *et al*, 2015). Therefore, it is imperative to discern the African case of GVC engagement separate from other countries. This is because of the abysmal performance of the continent in the GVC trade. To provide insights on the drivers of GVC engagement in Africa, Tinta (2017) examined the determinants of GVC for a sample Economic Community of West African States (ECOWAS). The study found that competitive trade structure and structural factors drive GVC in the sub-region. Moreover, Pathinkonda and Farole (2017) suggest that distance to markets, efficient logistics, and quality of institutions are vital capabilities that drive GVC participation of Southern African Customs Union (SACU) member countries. The study further demonstrates that the impact of the identified factors varies by sector. Each sector requires a unique combination of factors for GVC participation. Del-Prete, Giovannetti, and Marvasi (2018) also conclude that a favorable investment climate and lower trade restrictions (costs) are instrumental for improving the GVC involvement of the North African countries. High tariffs and trade restrictions are detrimental for intra-African foreign value-added trade but the development of communication infrastructure and regulatory quality is desirable for the regional value chains in Africa (Slany, 2019). At the firm level, Amendolagine *et al* (2019) evaluate the impact of local sourcing of foreign investors on the GVC

position of 19 Sub-Sahara African countries and Vietnam. They found that local sourcing promotes intense GVC participation and upstream sector participation. Further, the effect is more in countries with good political institutions and better education.

2.2.3 Research gap

Despite the plethora of studies on the relationship between institutions and trade, very few have studied the African continent regarding the issue. Jiang and Borojo (2018) examines the effect of institutions, border and transport efficiency, and physical and communication infrastructure on overall and intra-African trade. The study used a sample of 44 African countries with their 173 trade partners over 2000-2014. It finds that institutions robustly determine international trade flows. However, the study used an index of institutional quality and thus failed to identify the particular institutional characteristic that matters for international trade. Besides, it considered overall trade rather than bilateral imports and exports individually. This approach makes it difficult, if not impossible, to proffer specific policy suggestions regarding the form of institutions that require attention for the promotion of bilateral trade flows in the continent. The study used the Heckman two-step procedure instead of PPML, which has become an outstanding estimation of the gravity model due to its desirable properties. The shortcoming of the Heckman two-step procedure is that it imposes identification restrictions that are difficult to find. It is more effective when the dependent variable (trade flow) is censored. Additionally, using per capita GDP instead of aggregate nominal GDP will not adequately account for the Multilateral Resistance term. The estimates are therefore likely to be misleading (see Anderson & Wincoop, 2003; Shepherd, 2013). To fill this research gap, this study explores the

impact of formal institutions (both political and economic institutions) on bilateral trade in Sub-Sahara Africa using PPML estimation of the Structural Gravity Model.

Moreover, the extant literature on drivers of GVC participation fails to examine the case of Africa. Again, the different components of the quality of institutions are suffering outright neglect in the literature. Few studies that recognized the importance of institutions as a driver of GVC trade only focused on rule of law (or governance indicators. Thus, their studies are narrow in coverage and cannot be adopted for policy inferences concerning Africa. The studies also failed to recognize the asymmetries in the institutions-trade relationship. This is imperative for understanding the specific effects of different components of economic and political institutions on GVC trade and providing specific policy framework therefrom. Therefore, this thesis bridge the research gap by finding out the impact of institutional quality on both bilateral trade and GVC participation in Africa.

Chapter 3

METHODOLOGY

3.1 Sources and measurement of data

The data used for the empirical analysis are gathered from several sources. Bilateral trade data is from the International Monetary Fund (IMF) Direction of Trade Statistics (DOT), and the data on GDP is obtained from World Bank World Development Indicators (WDI). The data covers the period from 2000 to 2017 and includes 37 Sub-Saharan African countries and 124 of their trading partners for the first part of the thesis. Significant dynamics in the trade flow of the African continent existed in this period. However, the quality of institutions often changes gradually and the effect on bilateral trade may not be simultaneous. Therefore, an interval of four years, the common tenure of democratic regimes in the subcontinent, is used to properly capture the dynamics of institutional quality indicators and their effect on bilateral trade. Although zero trade flows are handled properly by the PPML technique, the number of trading partners is limited to 124 to minimize zero trade flows.

Indicators of standard gravity variables, physical (geographical) distance, colonial link and common language are taken from Centre d'Etudes Prospectives et d'Informations Internationales (CEPII) database while the Regional Trade Agreements data is obtained from Mario Larch's Regional Trade Agreements database (https://www.ewf.uni-bayreuth.de/en/research/RTA-data/index.html). To account for the quality of political institutions, the data on the indicators of political (governance)

institutional quality are gathered from the World Bank World Governance Indicators (WGI). The indicators include; control of corruption, government effectiveness, regulatory quality, political stability, and absence of violence, rule of law as well as voice and accountability. The values of the indicators range from -2.5 to 2.5, with higher values indicating better institutional quality (see Kaufmann, *et al*, 2011).

The Heritage foundation Index of Economic Freedom database is used to capture the indicators of the quality of economic institutions. The components of the economic institutions included are; property rights, government integrity, government spending, business freedom, monetary freedom, investment freedom and financial freedom. The components, rather than the overall score, are used to clearly examine the effect of specific aspects of institutional quality on trade flows. The use of overall score could make it difficult to understand the effect of the specific institutional factors on the bilateral trade flows. Each of the components is measured on scores ranging from 0 to 100, with higher scores indicating better quality institutions (see Miller, Kim and Roberts, 2019 for detail explanation on the measurement of the indicators).

For the model on GVC participation, this thesis used the UNCTAD-Eora Multi-Region-Input-Output (Eora MRIO) database (UNCTAD-Eora henceforth), which covers 189 countries for 26 sectors from 1990 to 2018 (Casella, Bolwijn, Moran and Kanemoto, 2019; Aslam, Novta and Rodrigues-Bastos, 2017). However, this study used a sample of 47 African countries for the period 2000-2018. The period witnessed significant dynamics in the GVC flows and institutional quality in Africa. Moreover, African economies record low participation in the GVC trade over the period (Dollar and Kidder, 2017). The need to explain the dynamics necessitated the choice of the period and the African sample. The distinctive features of the UNCTAD-Eora database

that make it most desirable and preferred source of GVC data include wide geographical coverage, inclusion of many developing countries and the use of up-to-date ("nowcast") methodology (AfDB, OECD and UNDP, 2014; UNIDO, 2016; Feenstra, 2015; Aslam *et al*, 2017). The other common input-output tables are the OECD Inter-Country Input-Output (ICIO) tables, the World Input-Output Database (WOID) and the Global Trade Analysis Project (GTAP) among others (see Tukker and Dietzenbacher, 2013). All these datasets are expanding but smaller than UNCTAD-Eora database in terms of time and geographical coverage (Aslam *et al*, 2017; Casella, *et al*, 2019). In other words, the UNCTAD-Eora database solve the main problems of the existing value added databases. The problems include lagging behind by some years, narrow geographical coverage and methodological defects. Most importantly, UNCTAD-Eora is the only GVC database that provides information for Sub-Sahara African countries (Casella, *et al*, 2019). Furthermore, the database provides basic GVC indicators based on the Koopman, Powers, Wang and Weil (2011) and later Koopman, Wang and Weil (2014) decomposition of the gross export. The indicators include foreign value added (FVA) and domestic value added (DVA). The DVA is further divided into direct domestic value added, indirect domestic value added and re-imports. Figure 1 displays the complete decomposition of the gross exports into different components following Koopman, *et al* (2014). These desirable features are the reasons for the use of the UNCTAD-Eora in this study.

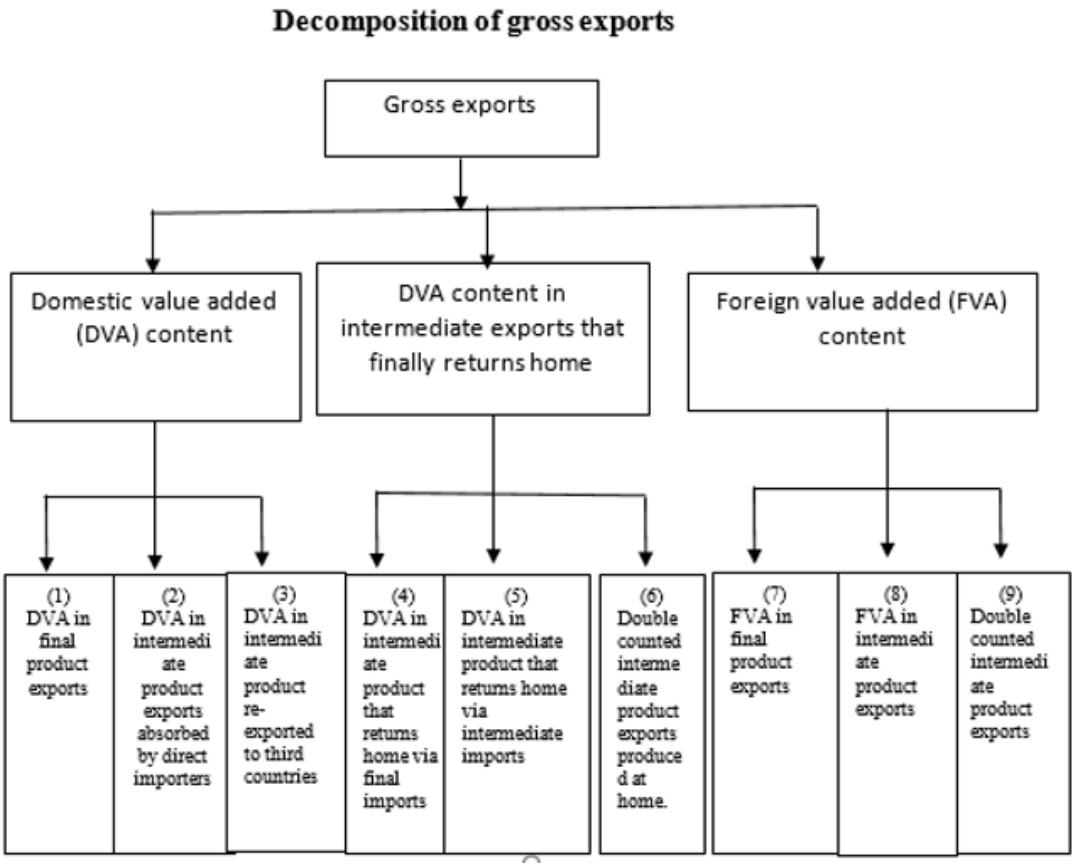


Figure 1: Decomposition of exports into value added components
Source: Koopman et al (2014)

The sum of the first six components (1 to 6) in the figure 1 equal to the domestic value added (DVA) while the sum of (7), (8) and (9) composed the foreign value added (FVA). The DVA implies the domestic countries intermediate inputs imbedded in other countries exports. Conversely, the FVA represents the foreign countries intermediate inputs imbedded in the domestic country's exports.

Additionally, following Hummels et al (2001), Koopman, *et al* (2014) and Aslam et al (2017) noted that the basic GVC indicators (DVX and FVA) can be used to compute GVC participation (backward and forward), position (upstreamness). We therefore calculated these vital GVC indicators using the UNCTAD-Eora database. Therefore, using the UNCTAD-Eora database, we calculated the GVC indicators with the

formulas derived by Koopman, et al (2014) and elaborated by other studies (Backer and Miroudot, 2014; Taglioni and Winkler, 2016) as follows:

$$BWDGVC_{i,s,t} = \left(\frac{fva}{vaexp}\right) * 100 \quad (29)$$

$$FWDGVC_{i,s,t} = \left(\frac{dvx}{vaexp}\right) * 100 \quad (30)$$

$$GVCPART_{i,s,t} = \left(\frac{fva+dvx}{vaexp}\right) * 100 \quad (31)$$

$$GVCPOS_{i,s,t} = lin\left(1 + \frac{fva}{vaexp}\right) - lin\left(1 + \frac{dvx}{vaexp}\right) \quad (32)$$

Equation (29), (30), (31) and (32) represent the backward (BWDGVC), forward (FWDGVC), total GVC participation (GVCPART) and GVC position (GVCPOS) respectively. The subscript i, s and t denote country, sector and time respectively. The larger the ratios the greater the intensity of the GVC involvement of a country in a particular sector. The *dvx* represents the domestic value added excluding the value added that returns home. The *fva* denotes the foreign value added while *vaexp* represents the total value added exports. Equation (32) measures the GVC position index (upstreamness) as defined by Koopman et al (2014). The higher the index, relatively the more upstream is the country. In other words, countries with higher GVC position index contribute more value added to other countries' exports than the other countries' value added contribution to their exports. For comprehensive understanding of the effect of institutional quality on GVC involvement, this thesis used all the four GVC indicators. However, sectoral GVC is not considered because of the insignificant contribution of many sectors of the African economies.

3.2 Model specifications

Two models are used in this thesis. One involves the impact of institutional quality on bilateral trade while the other captures the drivers of GVC participation with particular focus on quality of institutions in Africa. These models are discussed as follows.

3.2.1 Institutional quality-bilateral trade model

To evaluate the impact of institutional quality on bilateral trade, this thesis adopts the Anderson and Van Wincoop (2003) structural gravity model specified in chapter 2, equation (26), for the specification and estimation of the empirical model. Taking the logs of the variables in equation (26), the following specification is obtained:

$$logX_{ij} = logY_{i,t} + logE_{j,t} - logY_{w,t} + (1-\sigma)\left[logt_{ij,t} - logp_{i,t} - logp_{j,t}\right] \quad (33)$$

Following Hummels (2001) and Feenstra (2015), Multilateral Resistance Terms (MRTs) and exporter and importer fixed effects (γ_i and μ_j) were included in the model. Hence, the model becomes;

$$X_{ijt} = \gamma_i + \mu_j + \beta_1 logY_{it} + \beta_2 logE_{jt} + \beta_3 log\tau_{ijt} + \beta_4 MRT_{ij,t} + \mu_{ijt} \quad (34)$$

Yotov, Piermartini, Monteiro and Larch (2016) noted that the exporter-time and importer-time fixed effects properly account for MRTs. Moreover, the relative incomes and relative price indices are equally captured by the MRTs (Hummels, 2001; Feenstra, 2015; Yotov, *et al*., 2016; Larch, *et al*., 2019). Therefore, following Larch, *et al* (2019), and adopting the Poisson Pseudo-Maximum Likelihood with High Dimensional Fixed Effect (PPMLHDFE) estimation technique,the empirical model is is econometrically specified as follows:

$$X_{ij,t} = exp\left(\boldsymbol{\tau_{ij,t}}\theta + IQ_{i,t}\varphi + \gamma_i + \mu_j\right) + \varepsilon_{ij,t} \quad (35)$$

$i = 1, 2 \ldots\ldots 37; j = 1, 2, \ldots\ldots 166; t =, 2000, 2004, \ldots\ldots 2016$

$IQ_{i,t}$ represent a vector of institutional quality indicators of exporter (African) countries (i) at time t. The trade barriers, τ_{ij} (the trade cost) is further specified to

include physical distance and geographical contiguity, cultural distance (e.g. common official language), colonial link, commercial association (regional trade agreement). Accordingly, τ_{ij} is further specified as follows:

$$\tau_{ij,t} = \gamma logDist_{ij} + \delta Colink_{ij} + \vartheta lang_{ij} + \varphi rta_{ij} \quad (36)$$

This thesis adopts the structural gravity model due to its empirical success with aggregate and disaggregated data (Feenstra, *et al*, 2001; Head & Mayer, 2014), sectoral gravity for goods trade (Anderson & Yotov, 2010), sectoral gravity for service trade (Anderson, Borchert, Mattoo & Yotov, 2015; Nordås, 2018) as well as sectoral gravity for agriculture, mining, manufacturing goods, and services (Aichele, Felbermayr & Heiland, 2014). In addition, the Structural Gravity Model has been theoretically examined and proved satisfactory (See Feenstra, 2015).

3.2.2 Institutional quality-GVC model

Consistent with the theoretical model of Levchenko (2007), generally represented in equation (20), and following previous studies (Kowalski et al, 2015; Allard *et al*, 2016; Tinta, 2017; Fernades et al, 2019; Fellbermayr, Teti and Yalcin, 2019; ; Kersan-Škabić, 2019) the empirical model evaluating the effect of institutional quality on GVC participation is specified as follows;

$$GVC_{it} = \beta_0 + \theta CONT_{it} + \delta INST_{it} + \varepsilon_{it} \quad (37)$$

The GVC is a vector of all the four GVC indicators (GVC position, backward, forward and total participation) while CONT and INST represent vector of control variables and indicators of institutional quality respectively. The subscript i and t denote country and time respectively, $\boldsymbol{\beta_0}$**,** $\boldsymbol{\theta}$ **and** $\boldsymbol{\delta}$**,** are the parameters while ε is the stochastic error term.

3.3 Methods of estimation

The structural gravity model adopted in this thesis insightfully identified that it is the relative prices (not the absolute level of trade barriers) that matters for the size of the bilateral trade flow. The price indices, (multilateral resistance terms) are unobserved and needed to be accounted for in the estimation of structural gravity model. Estimation of the gravity model without properly accounting for the multilateral resistance terms (MRTs) produces biased and unreliable estimates (Anderson and Van Wincoop, 2003). Therefore, some procedures were developed to account for the MRTs. Anderson and Van Wincoop (2003) developed multi-step nonlinear least square procedure to estimate the MRTs. Baier and Bergstrand (2009) approximated the MRTs by "remoteness index" calculated from the GDPs and bilateral distance. However, the Anderson and Van Wincoop (2003) procedure suffers computational complexity and the Baier and Bergstrand (2009) "remoteness index" does not represent the theoretical counterpart of the MRTs (Head and Mayer, 2014). Hummels (2001) and Feenstra (2015) advocate the use of importer-time and exporter-time fixed effects to account for the MRTs. This is adopted in this thesis because of its advantage in overcoming the computational complexity of Anderson and Van Wincoop (2003) procedure and as well properly accounting for the MRTs regardless of the kind of data (Olivero and Yotov, 2012).

Therefore, the empirical estimations of the bilateral trade-institutional quality model in this thesis rely on the Poisson Pseudo Maximum Likelihood with High-Dimensional Fixed Effects (PPMLHDFE) estimator. The PPML technique deals with the problem of zero trade flows and provides consistent and unbiased estimates in the presence of heteroscedasticity and multicollinearity (Santos Silava & Tenyero, 2010). With the

recent improvement, the PPMLHDFE estimator becomes even more desirable because it allows a combination of multidimensional fixed effects and country-specific characteristics such as institutional quality indicators. Thus, it properly accounts for MRTs, and solves the problems of zero trade, heteroscedasticity, endogeneity, and controls for heterogeneity (Santos Silava & Tenreyro, 2010, Larch, *et al*, 2019; Correia, Guimarães, & Zylkin, 2019). Trade data often contains substantial number of zeros because most of the countries sampled might not have engaged in trade with all the trading partners in the sample. This zero trade constitute a methodological defect as it makes the estimates of previous studies inconsistent and biased (Anderson and Van Wincoop, 2003). The PPMLHDFE solves the problem of zero trade because it does not require logging of the dependent variable. By the same token, the PPMLHDFE solves the problem of heteroscedasticity. Other estimators such as the ordinary least square (OLS) necessarily requires taking the logs of the trade variables. In the process, the zero values are dropped because their logs cannot be obtained. Regarding the problem of endogeneity, it is important to note that the problem often emanates from omission variable bias. Since, the estimator allows for the inclusion of multidimensional fixed effects, it solves the problem of endogeneity because it contains adequate number of paired-fixed-effect variables capturing the MRTs. The paired fixed effects variables captures most of the trade policy variables that would have been omitted to cause the problem of endogeneity. In addition, the used of interval data solves the problem of reverse causality. Lastly, the estimator involves large number of observation, particularly in this thesis, and thus solves the problem of multicollinearity**.** The desirable properties make the PPML estimator popular for the estimation of structural gravity models in multiple studies (see Siliverstovs &

Schumacher, 2009; Santos Silava and Tenyero, 2010; Westerlund and Wilhelmsson, 2011; Santos Silava and Tenyero, 2015; Alvarez *et al*, 2018; Beverelli, *et al*, 2018).

Therefore, the PPMLHDFE estimator is suitable for all estimations in the first part of this thesis for the following reasons: First, there are zero trade flows in the data. Many Sub-sahara Africa countries do not trade with some of the trading partners. This leads to prevalence of zero trade flows in the data. Second, panel data is prone to the problem of heteroscedasticity, and inclusion of institutional factors in the model could prevent proper control for MRTs in previous estimators (OLS, PPML etc). Thirdly, institutions and international trade could be endogenous (Rodrik, Trebbi and Subramanian, 2002). The engagement in trade with countries that have better institutions may results to improvement of the domestic institutions. However, the African countries have engaged in trade with several countries with strong economic and political institutions over the years. Yet, the institutions in African countries still remain weak. This is an indication that trade is not driving institutions in the continent. Hence, the reverse causality between institutions and international trade is unlikely in the case of African sample. Nonetheless, the PPMLHDFE estimator and the use of 4-year interval solves the problem of reverse causality. Therefore, these problems enumerated are sufficiently addressed by the PPMLHDFE technique.

To estimate the institutional quality-GVC participation nexus, panel data econometric techniques are applied. The common econometric problems generally associated with panel data are heteroscedasticity and endogeneity. The problems render the estimates of the Ordinary Least Square (OLS) biased and inconsistent (Baltagi, 2008; Roodman,2009). To capture dynamic relationship and solve the aforementioned problems, Arellano and Bond (1991) performed the first difference transformation of

the level model, equation (37), to develop the Generalized Method of Moments (GMM) estimator. Applying the first differenced GMM, the institutional quality-GVC model specified in equation (37) becomes;

$$\Delta GVC_{it} = \varphi \Delta GVC_{it-k} + \theta \Delta CONT_{it-1} + \delta \Delta INST_{it-1} + (\varepsilon_{it} - \varepsilon_{it}) \quad (38)$$

The Δ symbolizes the difference operator. In addition to the first-differenced independent variables, the first difference GMM uses the higher-order lagged values of the dependent variables as instruments to solve the problem of endogeneity. However, Arellano and Bover (1995), Blundell and Bond (1998) and Blundell, Bond and Windmeijer (2000) find that the first difference GMM estimator is susceptible to large downward finite sample bias and very low precision. Thus, the studies recommend the system GMM estimator. The system GMM applies a combination of the level and first-differenced equations, (37) and (38), to produce two-step system-GMM estimates. The estimator employs a large number of internal instruments and thus handles the problems of heteroscedasticity, endogeneity and finite sample bias more efficiently than the first-differenced GMM estimator does. This is especially in this study where the number of cross-sections (47 countries) is greater than the period (2000-2018). Roodman (2009) provides the most efficient way of estimating the system GMM called the xtabond2. Therefore, this study employs the Roodman (2009) two-step system-GMM to estimate of all the models in the second part of this thesis.

The system-GMM is the appropriate estimator for this study because of the following reasons. First, the possibility of reverse causation, simultaneity bias or endogeneity is apparent in the model. The country-specific characteristics such as institutional quality and other independent variables (FDI, GDP, factor endowment, tariffs) are likely to depend on the GVC flows and thus endogenous in the model. The system-GMM

estimators adequately address the problem of the potential endogeneity. Second, the system-GMM allows for the inclusion of time-invariant (distance to GVC hubs) and slow-changing (institutional quality) variables in the model. Other panel data estimators such as the fixed effect models do not allow for the inclusion of such variables. In addition, the system GMM solves the problem of heteroscedasticity which is an eminent feature of micro panel data(Blundell and Bond, 1998; Roodman, 2009). However, due to the use of a large number of instruments, it becomes necessary to test for the validity of instruments and adequacy of the models (Blundell and Bond, 1998). Therefore, this study applied the Sargan test for over-identifying restrictions and the Arellano-Bond AR (2) test for higher-order autocorrelation as diagnostic tests in all the models.

Chapter 4

RESULTS AND ANALYSIS

4.1 Stylized facts and Preliminary analysis

The dynamics of the institutional quality and the summary statistics of the bilateral trade and GVC participation are presented in this section. First, the section provides a clear picture of the institutional backwardness of the African continent and the potential logical correlation between the poor institutional weakness and dismal trade performance in the continents. This is done by comparing the institutional performance of Africa with other continents across the world. While the focus of this thesis is Africa, the comparison displays the peculiar nature of the African case and the reasons for analyzing it alone.

4.1.1 Stylized fact about institutional quality in Africa

Starting with the economic institutions, figure 2 shows the overall economic freedom of America, Asia Pacific, Europe, Middle East and North Africa and Sub-Saharan Africa. The trend indicates that the score of the economic freedom for Sub-Saharan persistently falls below the scores of other regions over the period, 1995-2019. This is an indication of the persistence of weak economic institutions in Africa over the years. The trend is a true reflection of the report of the Heritage foundation which shows that African countries are mostly unfree and repressed over the years. Weak economic institutions here implies the extractive institutions which fail to provide a level playing field for all economic agents to explore their economic potentials. It is a situation of gross abuse of market power by monopolizing trade in the favor of certain individuals

or groups as well as prevalence of rent-seeking activities. The same underperformance is recorded for the components of economic freedom except for government spending in which Sub-Sahara Africa has the highest score over the years (see figure 3-10 in the appendix). This exception does not mean Africa performs better in that component of economic institution. Rather, it portrays the smaller capacity of the African governments to spend on infrastructural development. Thus, their spending is relatively less than that of other regions which invests massively on infrastructural development. Therefore, Africa generally have weaker economic institutions compare to other regions across the world. The weak economic institutions are capable of inhibiting bilateral trade flows and GVC participation in the continent. This is assessed in the subsequent section of this thesis.

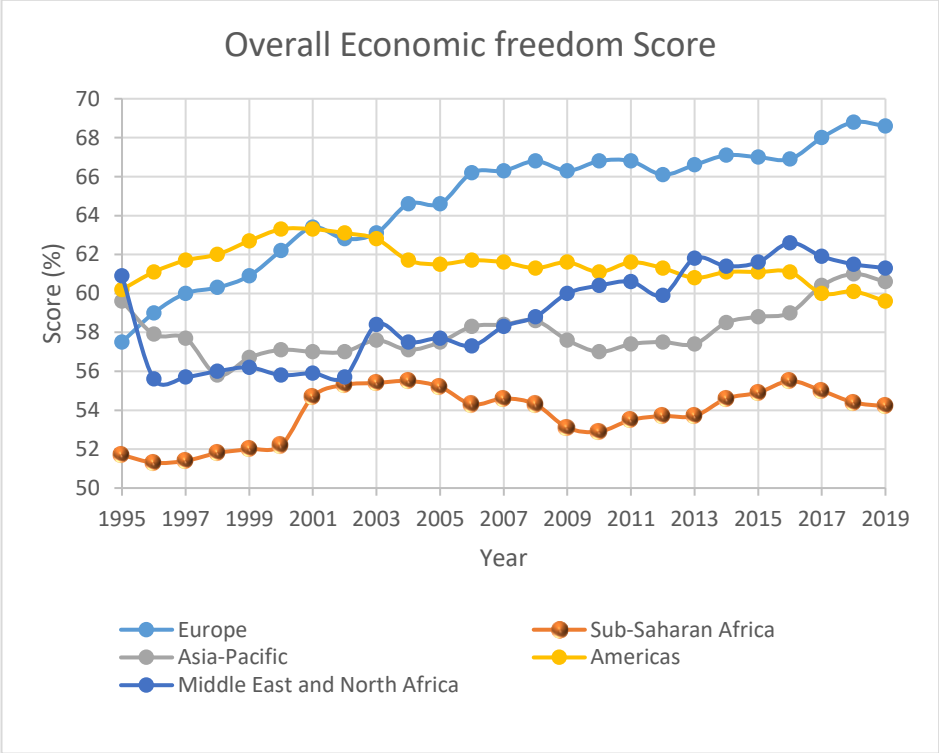


Figure 2: Trend of economic institutions by region

In addition to the regional trend of the economic institutions, the average performance of individual countries are plotted and presented in figure 3. The graph shows that most of the African countries scored less than the world average of economic freedom score (about 60%). Only six African countries, Mauritius, Botswana, South Africa, Namibia, Uganda, Madagascar and Cabo Verde scored above sixty percent (60%). This reiterates the existence of extractive economic institutions in most African countries. The extractive institutions provide undue opportunity to few individuals or groups in the control of resources, which may lead to misallocation of resources and could thwart comparative advantage in trade and investment. The display of the individual countries' performance can be related to the GVC participation as well.

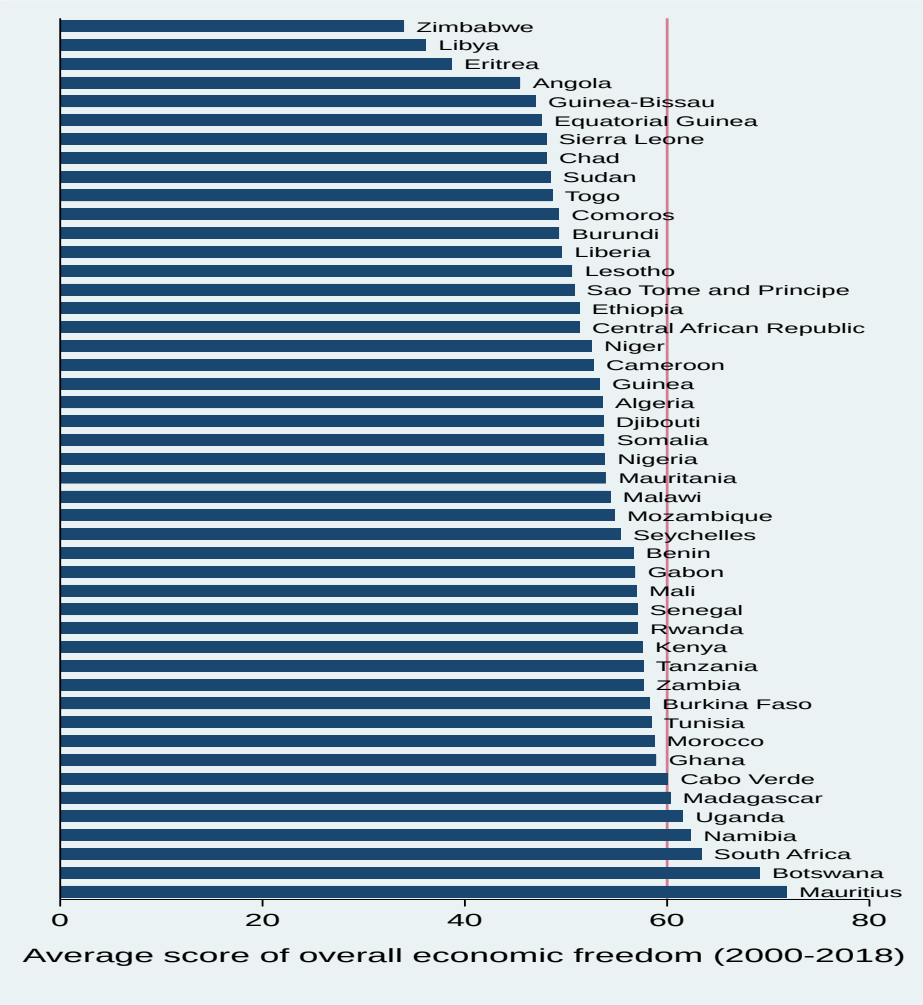


Figure 3: Average economic institutions by country

The performance of the African countries in terms of political institutions is also disappointing. The governance indicators are not available by regions. So, the scores of individual country for each indicator are plotted. Although, there is no overall indicator of political institutions for Africa, the performance of each country for the six components of the governance indicators elaborated by World Bank is dismal. Accordingly, figure 4 displays the average score of control of corruption by each country. The score ranges from -2.5 to +2.5 with more positive scores indicating better institutions. The figure demonstrates that only seven African countries (Botswana, Mauritius, Cabo Verde, Rwanda, Seychelles, South Africa and Lesotho) recorded a positive average score of control of corruption over the period, 2000-2018, considered. These countries have relatively better anticorruption policy and prevents the use of public power for private gains in the economies. Moreover, the seven countries have relatively corrupt-free public sectors. Other countries recorded negative average score over the period. This implies the prevalence of corrupt practices in the countries. Bribery, rent-seeking behaviors and other irregular payments are dominant practices in most of the African countries. In short, it is a common phenomenon for public servants and politicians to use public power for private gains in all aspect of the economy. The poor performance in the average score of control of corruption also reflect the failure of anticorruption policies and agencies across the African continent. This is capable of undermining bilateral trade and GVC participation in continent because the high rate of corruption increases production and transaction costs. Thus, even if tariff and non-tariff barriers are removed via bilateral trade agreements, corruption can impose huge cost on bilateral trade and cost of production and thereby hinders trade flows and GVC participation.

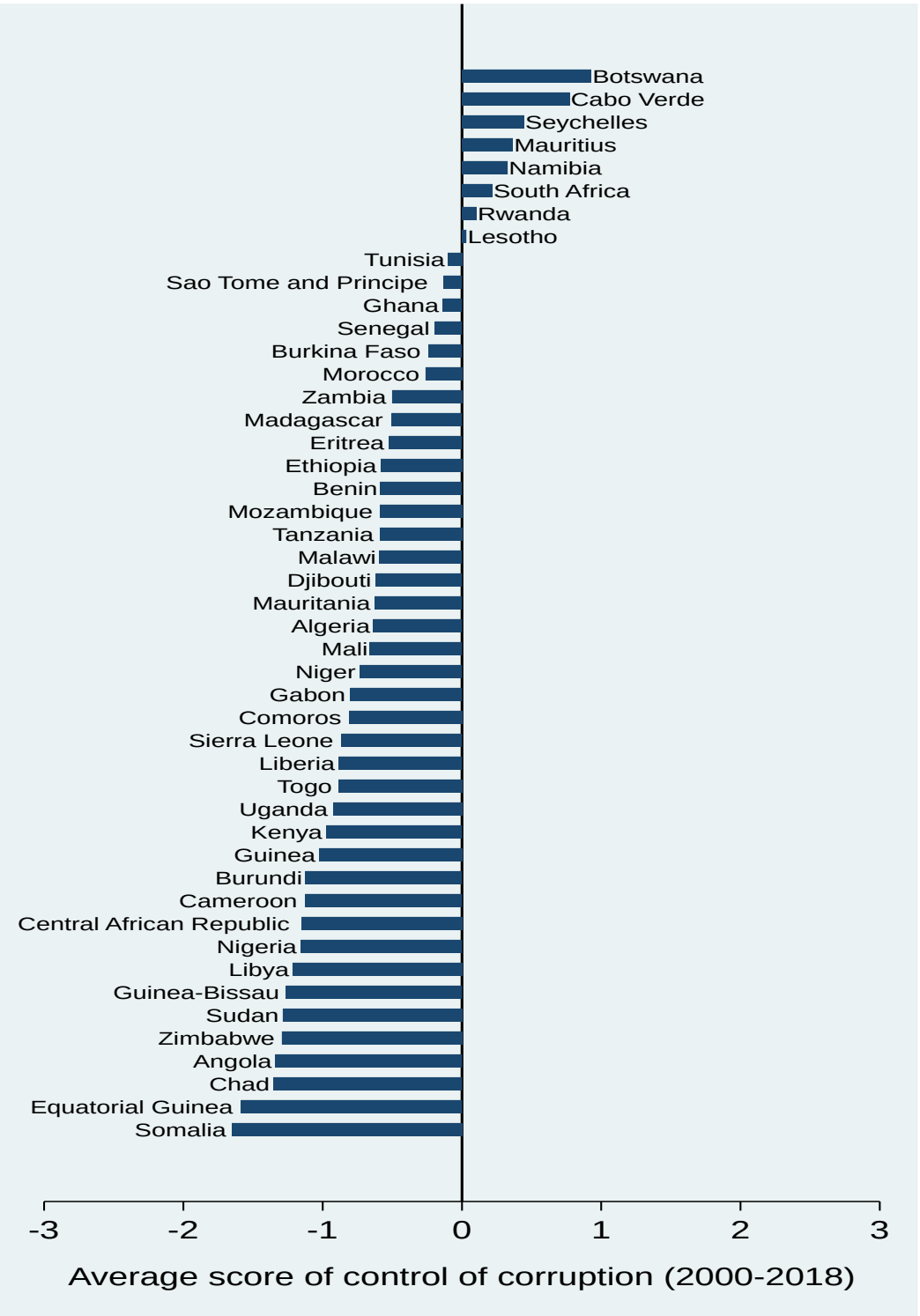


Figure 4: Average score of Control of corruption by country

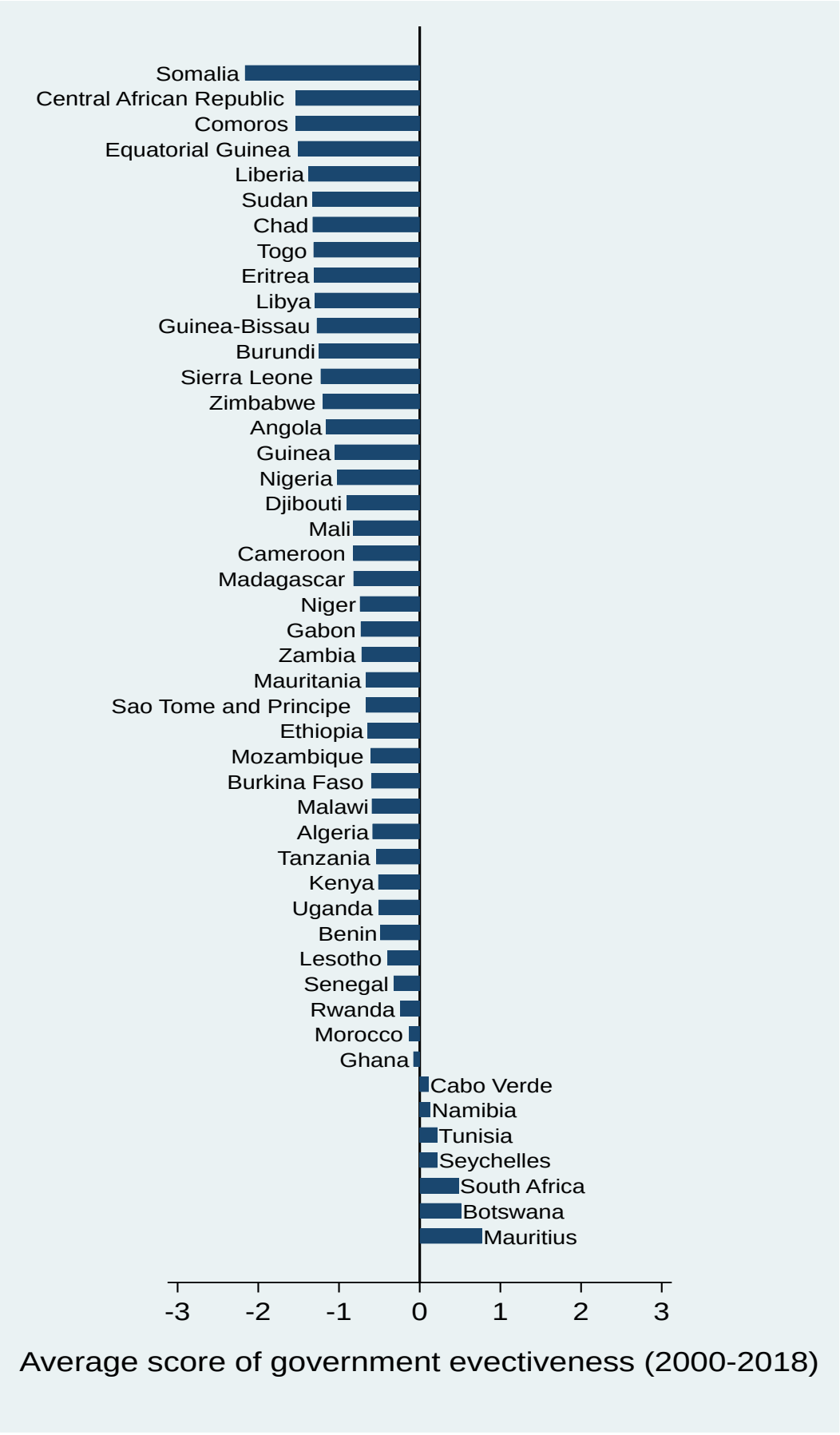


Figure 5: Average score of government effectiveness by country

Figure 5 contains the average score of the government effectiveness in African countries. The graph demonstrates that most of the countries have negative score which implies ineffectiveness of their government. It portrays excessive bureaucratic bottleneck, inefficiency and ineffectiveness of public policies, lack of government credibility and dissatisfaction of general public about public sector performance. The few countries that performs better over the period are Botswana, Mauritius, Cabo Verde, Seychelles, South Africa, Tunisia and Lesotho. These countries have relatively more efficient and effective public policies and better delivery of public services. Anyways, the average score shows poor performance of most African countries in terms of government effectiveness. This could be related to the poor trade performance of the continent.

The average score of political stability and absence of violence/terrorism of individual African country is plotted in figure 6. . Almost all the countries recorded negative average score with Somalia, Sudan, Central African Republic and Nigeria taking the lead due to terrorist activities of *Al Shabaab* and Boko Haram insurgency respectively. The lower scores demonstrate the incessant violence, strife, civil unrest, terrorism, insurgency and political instability that have bedeviled the African continent over the years. This could mean a lot for international trade and GVC participation. Only few countries such as Botswana, Mauritius, Cabo Verde, Rwanda, Seychelles, Namibia, Zambia, Benin, Sao Tome and Principe and Lesotho enjoy relative peace during the period. In one hand, political instability destroys productive capacity and leaves the countries at the mercy of imports to meet up with domestic demand for goods and services. Also, most of the countries are resource-dependent and political instability could make them exploit and trade more natural resources to sponsor military budgets.

This affects bilateral trade flows. On the other hand, violence and social unrest discourages foreign direct investment and hampers backward GVC participation. Thus, the prevalence of political instability and violence in Africa shown in the graph cannot be viewed to be disconnected with bilateral trade and GVC participation in the continent.

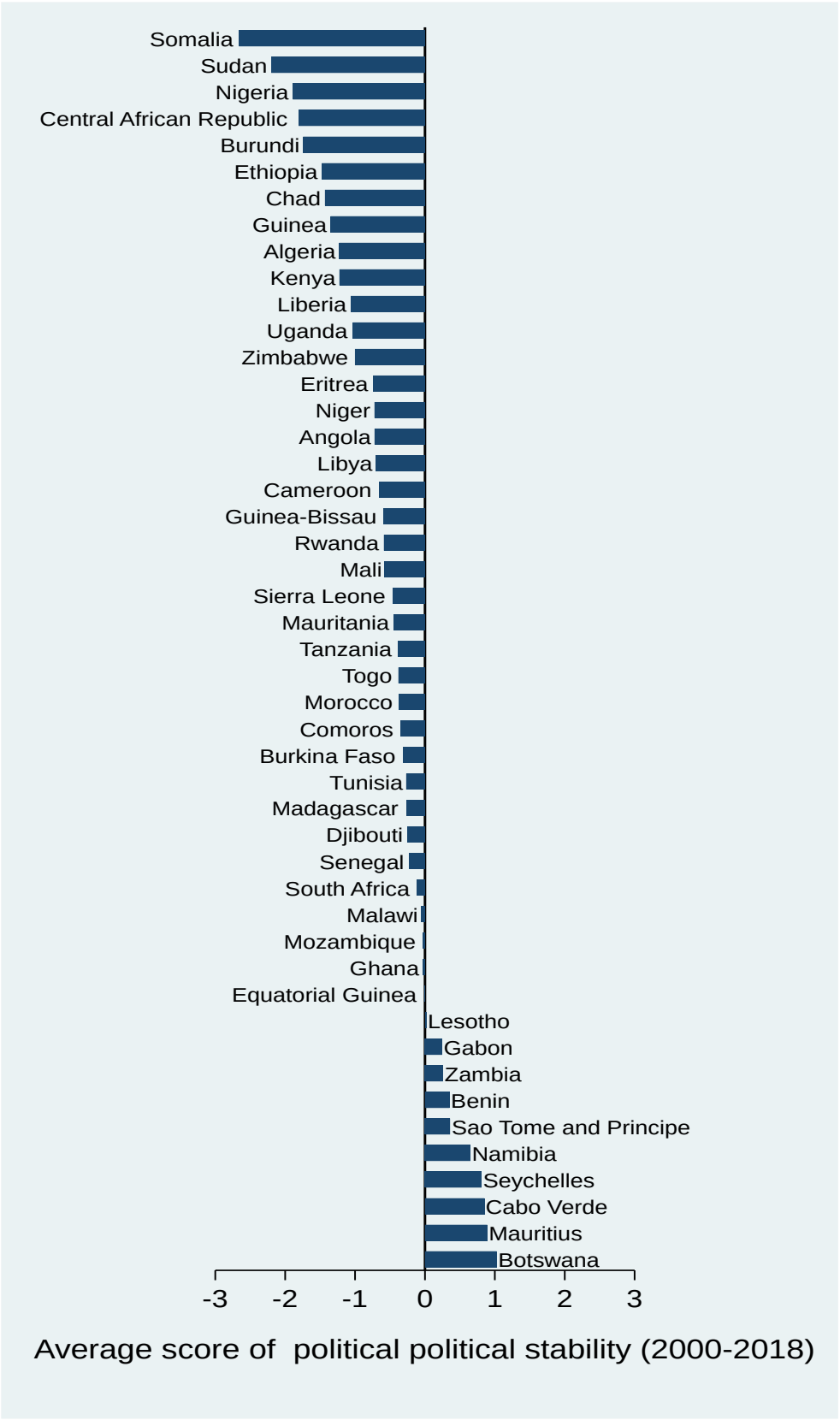


Figure 6: Average score of political stability and absence of violence by country.

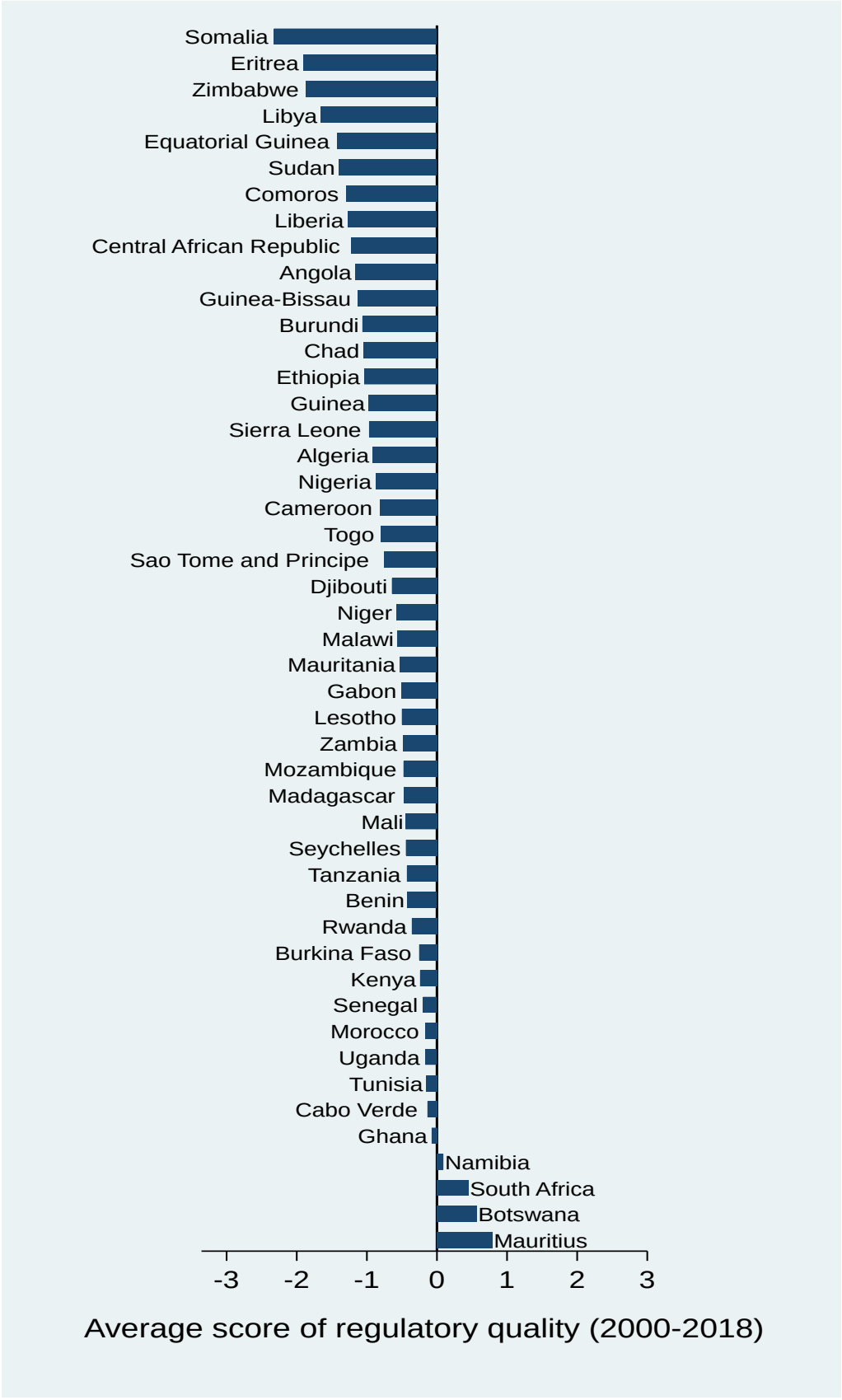


Figure 7: Average score of regulatory quality by country

Furthermore, figure 7 shows that, apart from Namibia, South Africa, Botswana and Mauritius, other African countries have negative average score of regulatory quality. This implies that most of the countries lack the capacity to implement policies and programs, which foster the development of private sector. Consequently, unhealthy competitive practices, high cost of doing business, antitrust policies, undesirable tax policies and excessive protection prevail in most of the countries. This demonstrates poor regulatory quality which cannot be unconnected with the dismal performance of bilateral trade and GVC participation in the continent.

Similarly, figure 8 presents the poor performance of most of the countries in terms of rule of law. Almost all the countries have negative average score of the rule of law indicator of political institutions. Only few countries led by Mauritius and Botswana recorded positive values of the indicator. This signals weak judicial system, which lacks independence and tenacity to enforce criminal law, property rights and contracts. In such situation, protection of property rights are not guaranteed and contract incompleteness cannot be regulated and hold-up problem cannot be curtailed. This is also considered as a determinant of bilateral trade and GVC participation in the continent and the regression results are discussed in the subsequent sections.

Finally, voice and accountability score is displayed in figure 9. Like the previous governance indicators, the average value of the variable is negative for most of the countries over the period. Only few countries have positive values. This demonstrate limited citizen's participation in the choice of their government representatives and lack of freedom of speech, restricted press freedom and human right abuses. The democracy in most of the countries is characterized by weak electoral process with prevalence of electoral malpractices and despotism.

Therefore, the graphical exposition clearly shows the existence of weak economic and political institutions in Africa.

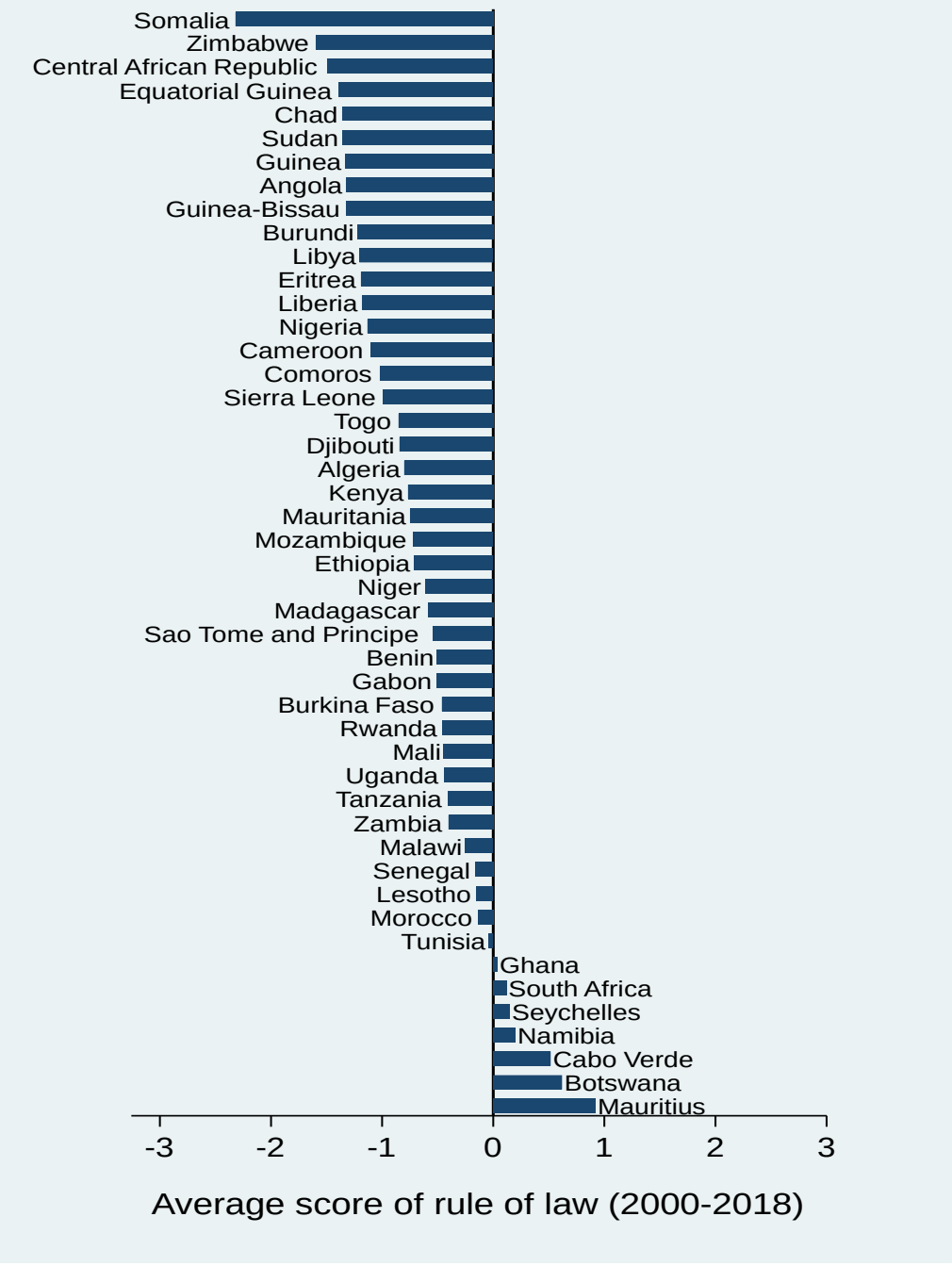


Figure 8: Average score of rule of law by country

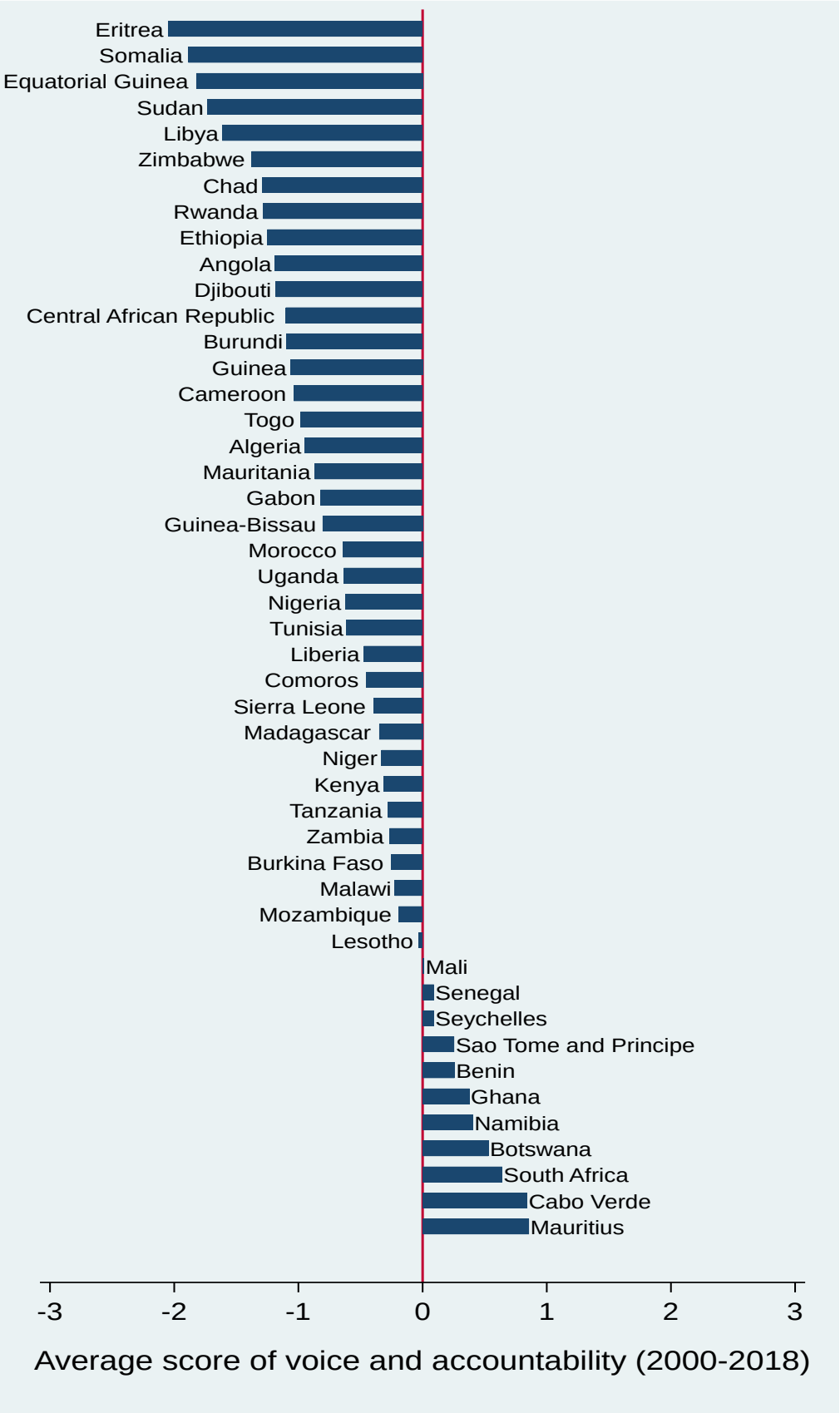


Figure 9: Average score of voice and accountability by country

4.1.2 Stylized fact about bilateral trade in Africa

Having displayed the trend and dynamics of economic and political institutions in Africa, it is important to observe the trend of bilateral trade flows and GVC participation in the continent. This is provided in graphical presentation that follows. Figure 10 shows the trend of bilateral imports of major regions across the world. It clearly shows that Sub-Sahara Africa recorded the lowest bilateral imports throughout the period 1995-2019. Also, considering Africa as a whole, the trend is the same. The continent underperforms other regions of the world. This same trend is observed for bilateral exports over the period in figure 11. Recall that the trend of economic freedom in figure 2 equally shows that Sub-Sahara Africa has the least score over the period. Can this be a mere coincidence? Probably not. The trends are not only concurrently showing Africa's disappointing performance in both institutional quality and bilateral trade flows, but also demonstrate similar pattern of the two trends. For instance, the economic freedom of the Asian continent began significant improvement from about the year 2000 and the bilateral trade flows (imports and exports) also started rising in the same years. Besides, the general curvature of the graphs are similar. This portends the likely association between institutional quality and bilateral trade examined in this thesis. In addition to the trend analysis, the sum of bilateral trade flows of the major regions across the world are plotted in figure 12. The figure shows the dominance of other regions over Africa in terms of bilateral imports, exports and total trade during the period considered. To factor in the number of countries in each region, the average bilateral trade flows were calculated and plotted in figure 13. The result still shows that Africa has least value of bilateral trade flows over the period. Therefore, the poor performance of the African continents in institutional quality and bilateral trade is vividly demonstrated.

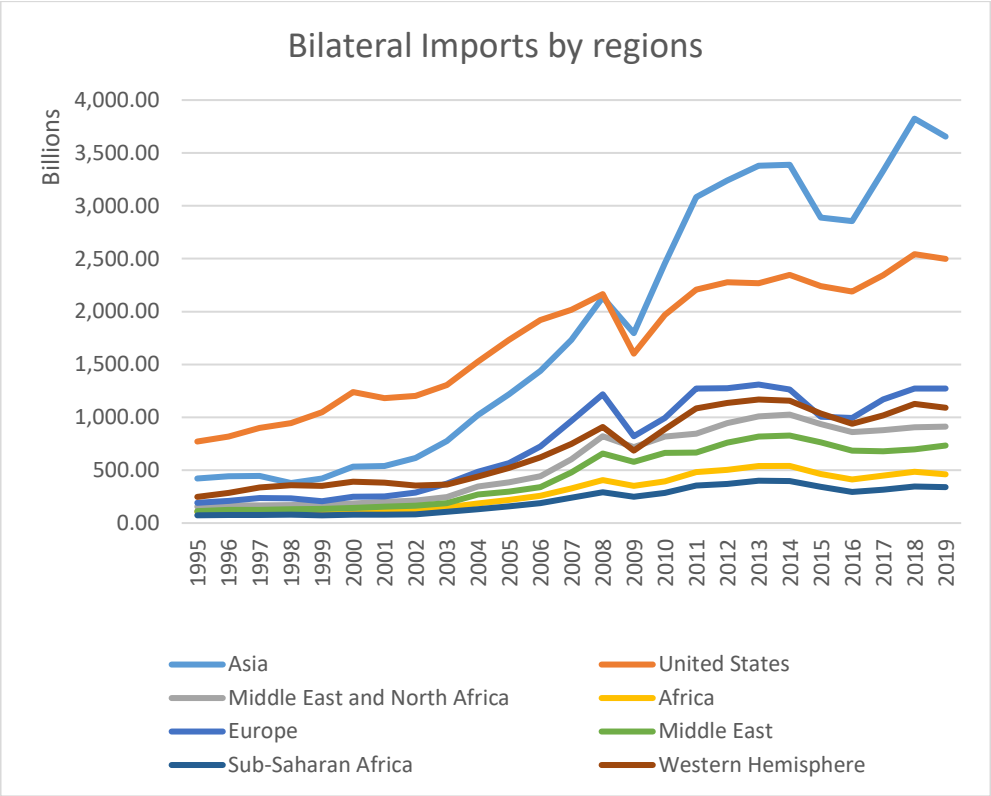


Figure 10: Trend of bilateral imports by region

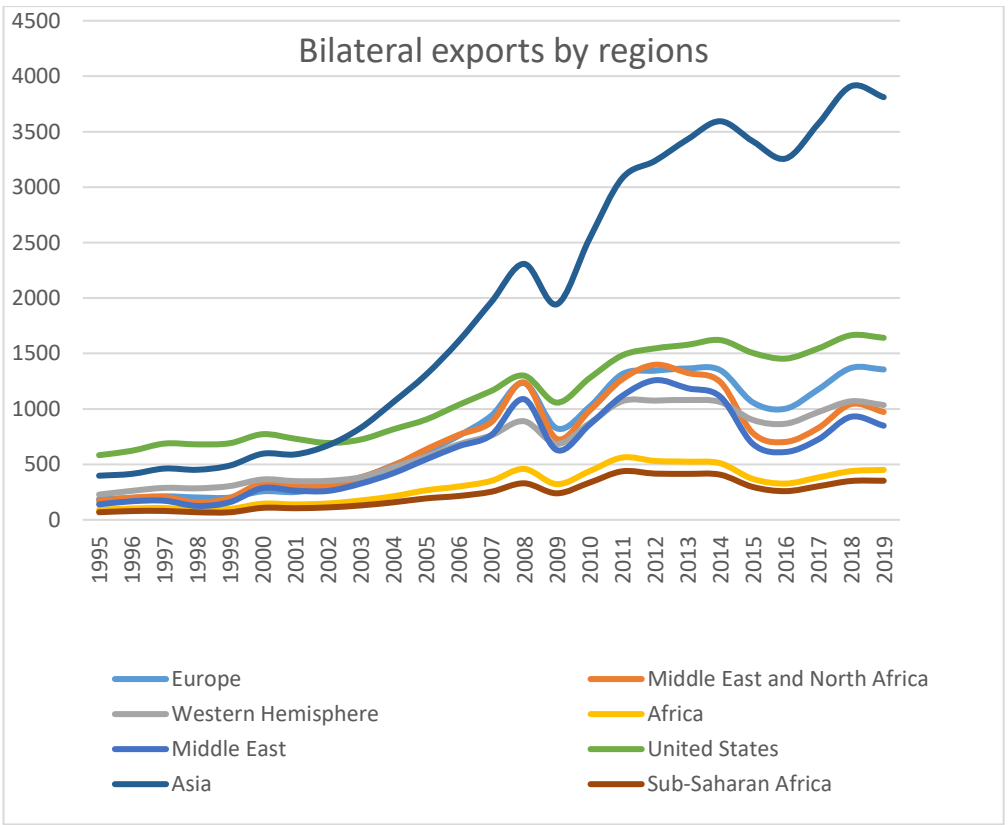


Figure 11: Trend of bilateral exports by region

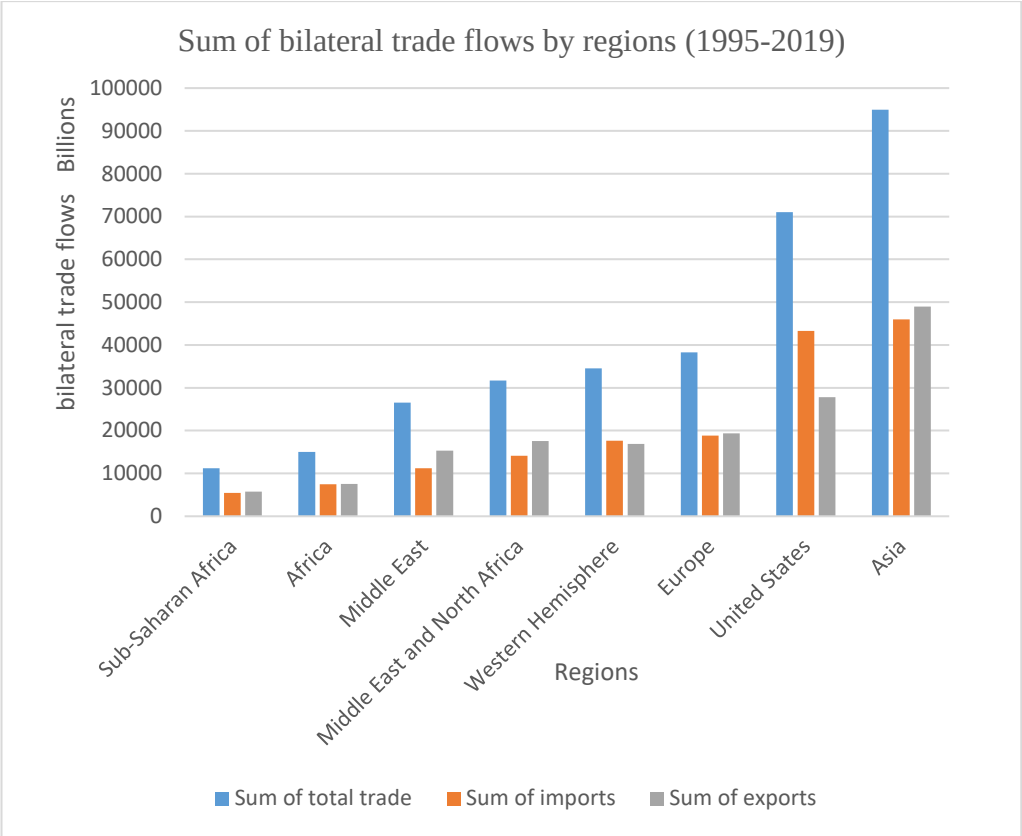


Figure 12: Sum of bilateral trade flows by region

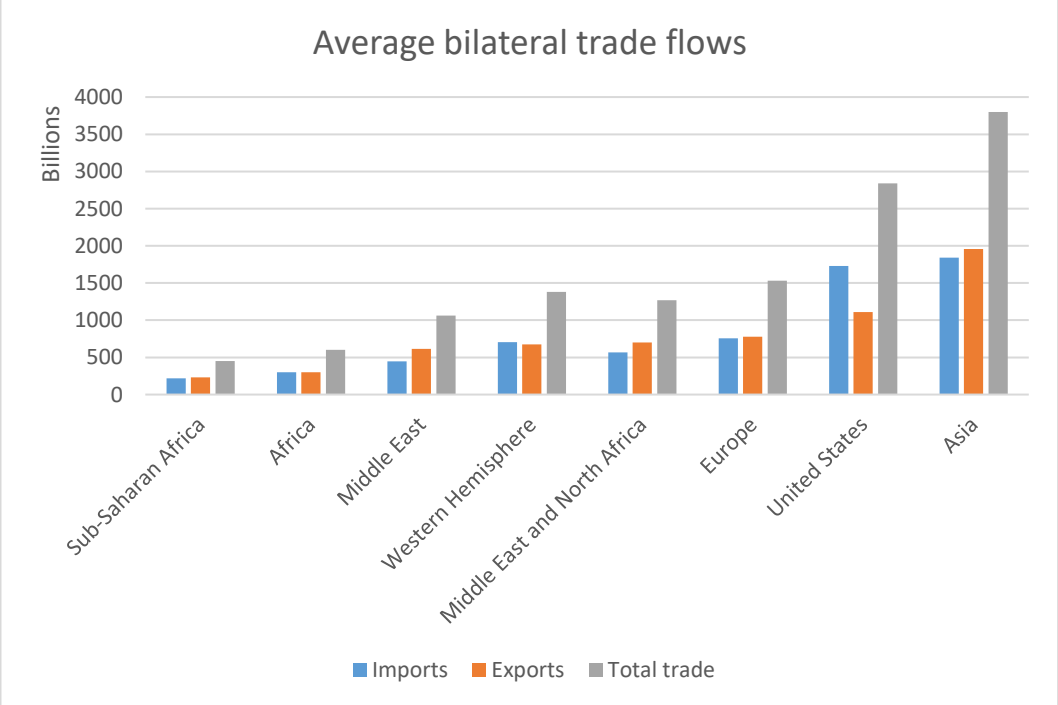


Figure 13: Average bilateral trade flows by region

4.1.3 Stylized fact about GVC participation in Africa

The graphical exposition of the GVC participation of the African countries is also considered in this section. Figure 13 shows the backward GVC participation of each countries. It shows the extent to which each country's intermediate inputs are imbedded in foreign countries' exports. Generally, the figure demonstrates the trifling engagement of most of the countries in forward GVC participation. It displays that only few countries recorded an average participation of 40%. The rest falls below.

Similarly, figure 14 shows the average backward GVC participation to be small. Only few countries including Mauritius, Sao Tome and Principe, Seychelles, Namibia, Rwanda, Botswana, Tunisia, Djibouti and Lesotho recorded about 25% backward GVC participation during the period. The story is also similar for total GVC participation in figure 15.

Further, figure 16 contains the GVC position (upstreamness) of the countries. Positive and negative values denote downstreamness (more participation in the downstream sectors) and upstreamness (more participation in the upstream sectors) respectively. The figure vividly shows that majority of the African countries operate in the upstream GVC. This shows huge export of raw materials to other countries. Most of the countries rely heavily on the export of natural resources to generate foreign exchange. This is buttressed by figure 17 which shows the GVC participation of Africa by sectors. The figure clearly shows that GVC participation in the mining and quarrying and petroleum, chemical and non-metallic minerals sectors dominates other sectors of the economy.

Linking the GVC participation to institutional quality, it is observed that the countries such as Mauritius, Botswana, Rwanda, Seychelles and Namibia with better institutional quality have greater backward GVC participation and downstreamness. On the contrary, the countries with the worst quality of institutions appears to be engaged more on forward GVC participation in the upstream sectors. Although this is graphical display, it foretells the likelihood of the interdependence of institutional quality and GVC participation. Thus, the impact of the institutional quality on GVC participation is considered and the regression results are presented and discussed in the subsequent sections of this thesis.

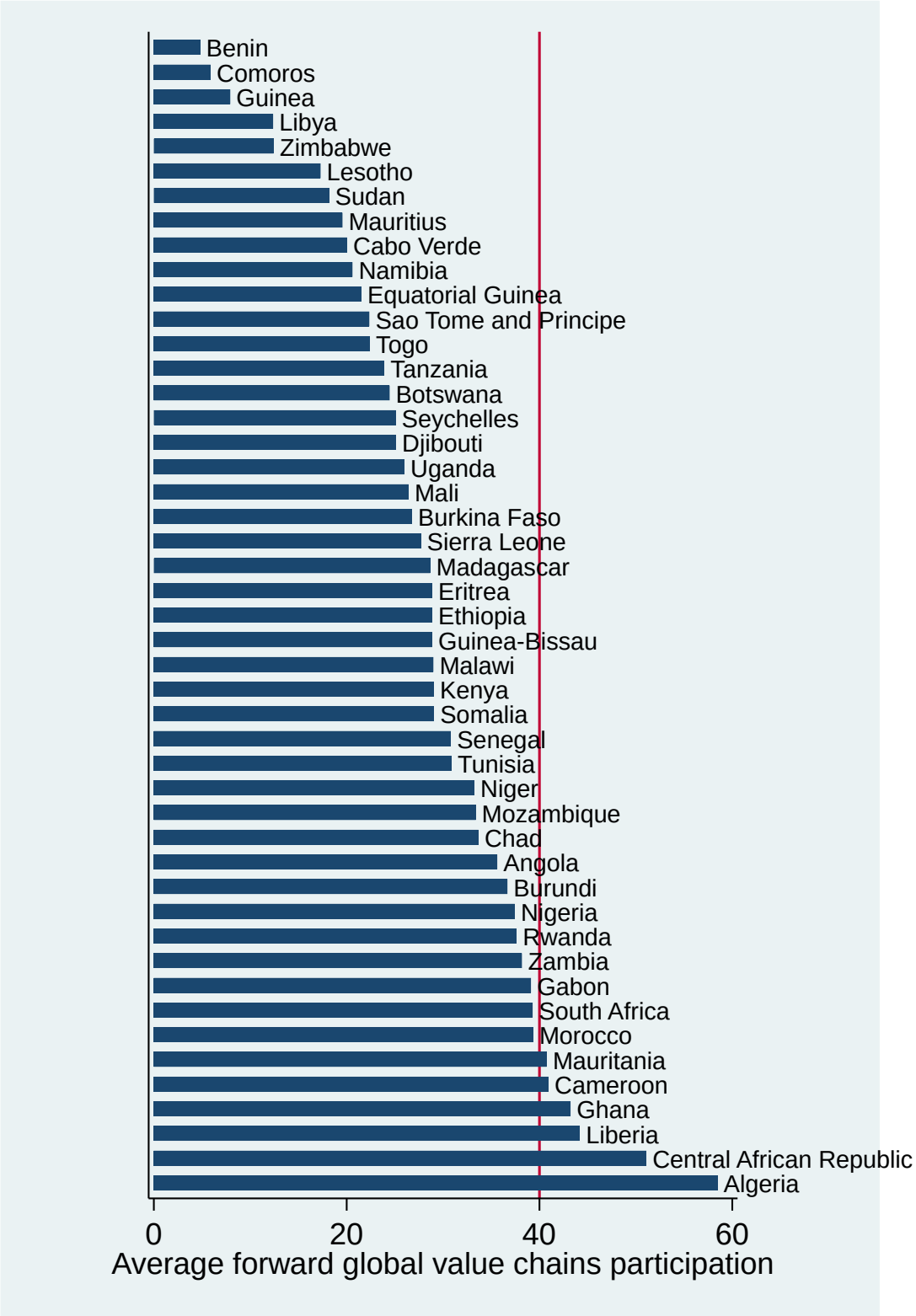


Figure 14: Average forward GVC participation by country

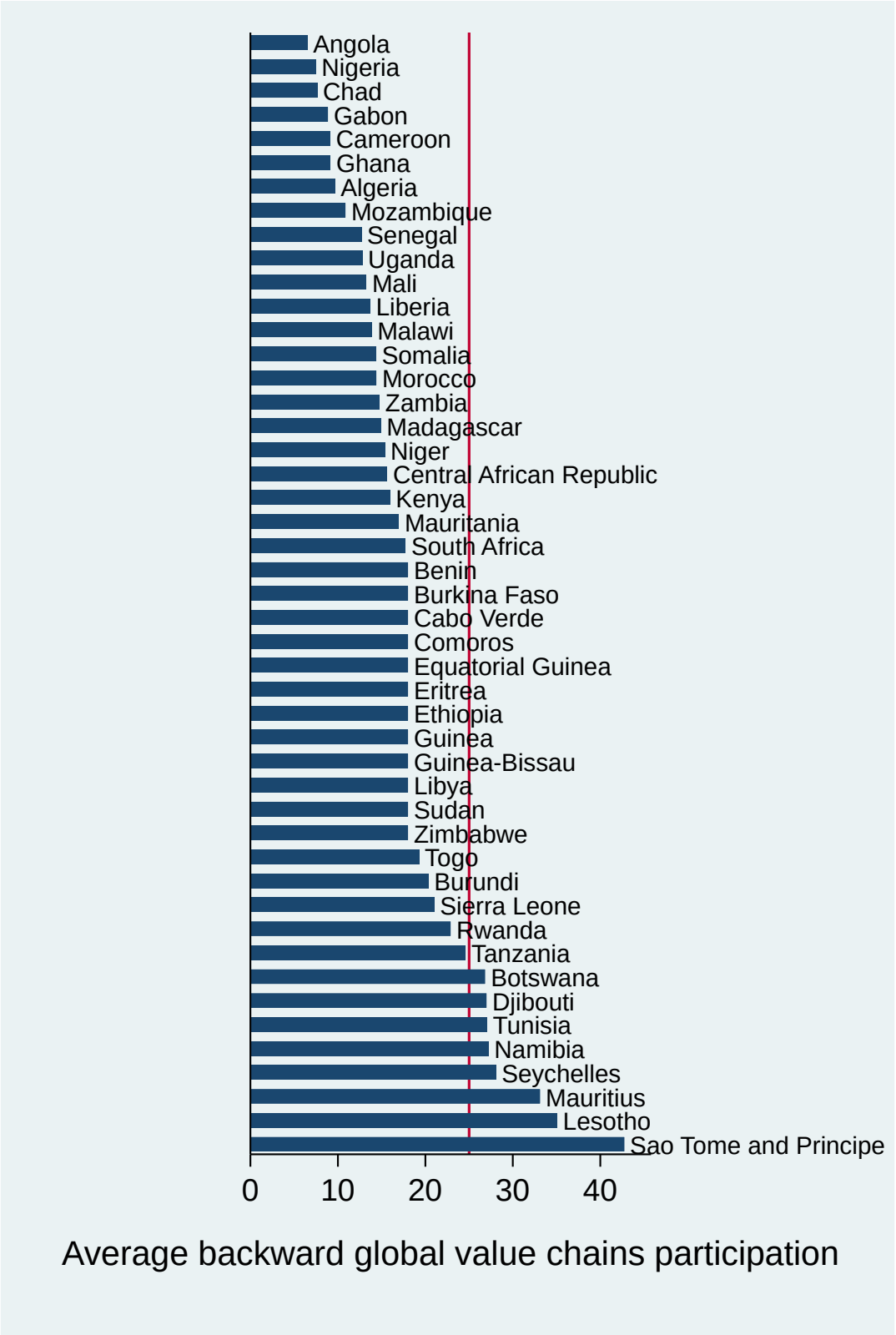


Figure 15: Average backward GVC participation by country

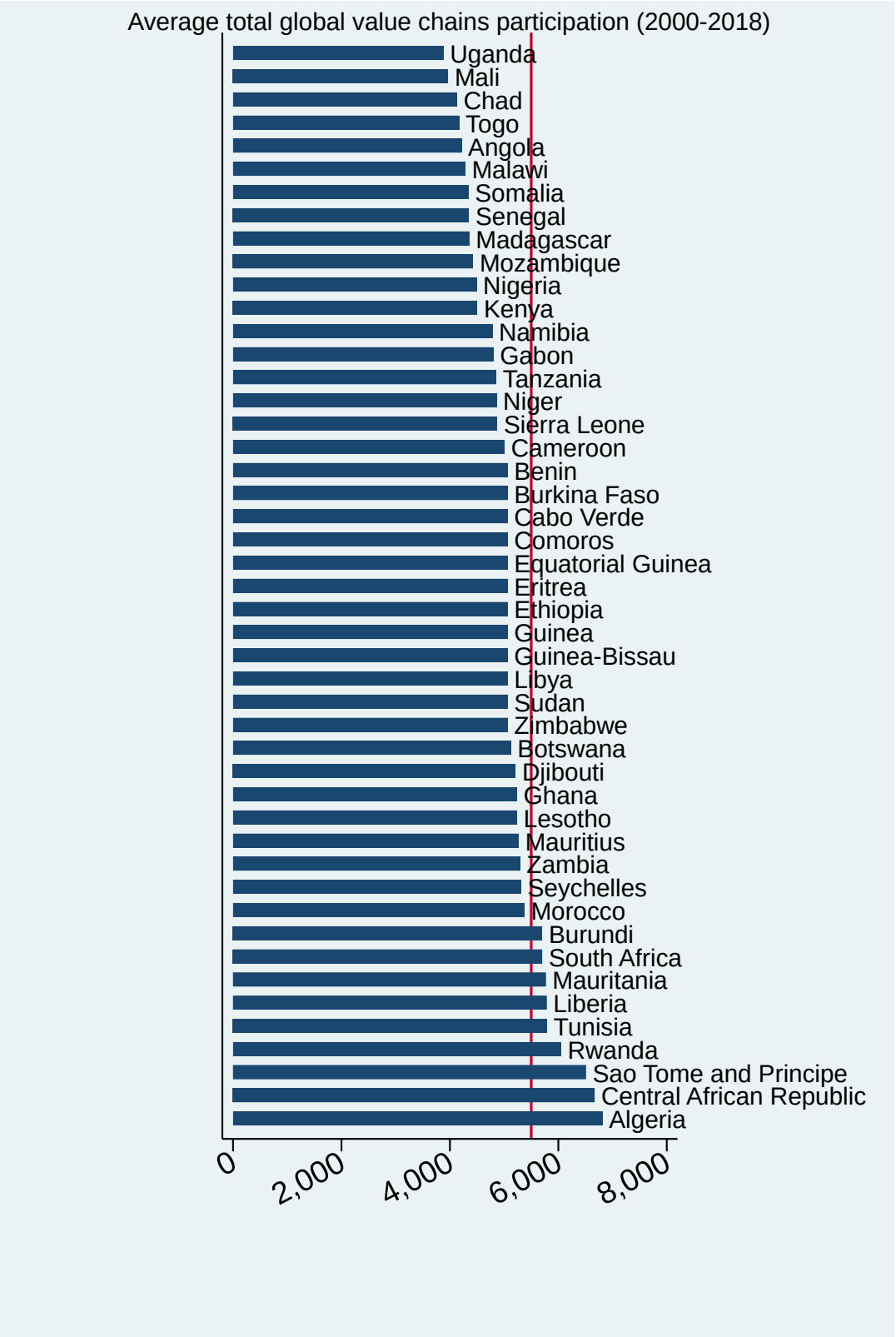


Figure 16: Average total GVC participation by country

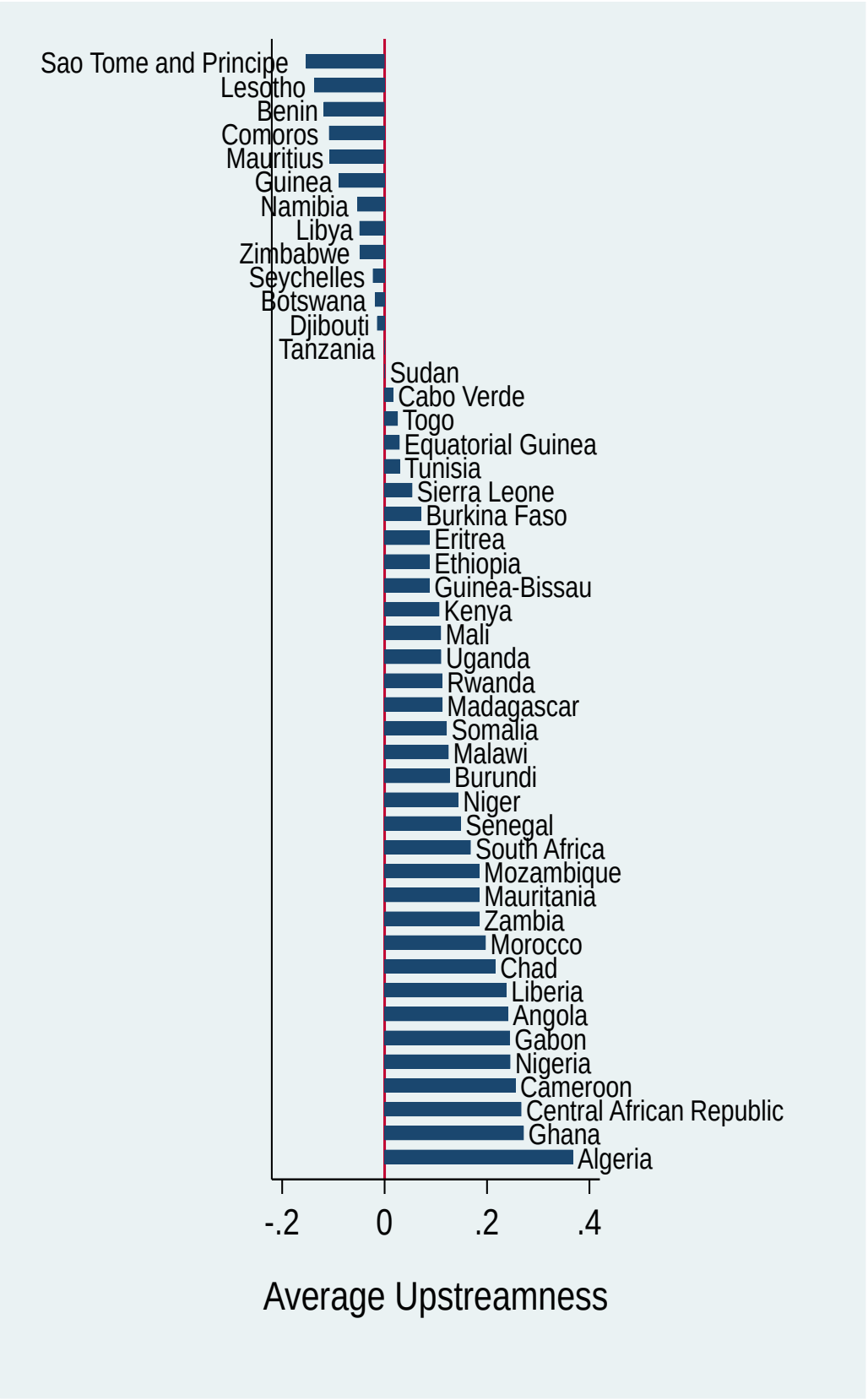


Figure 17: GVC position (upstreamness) by country

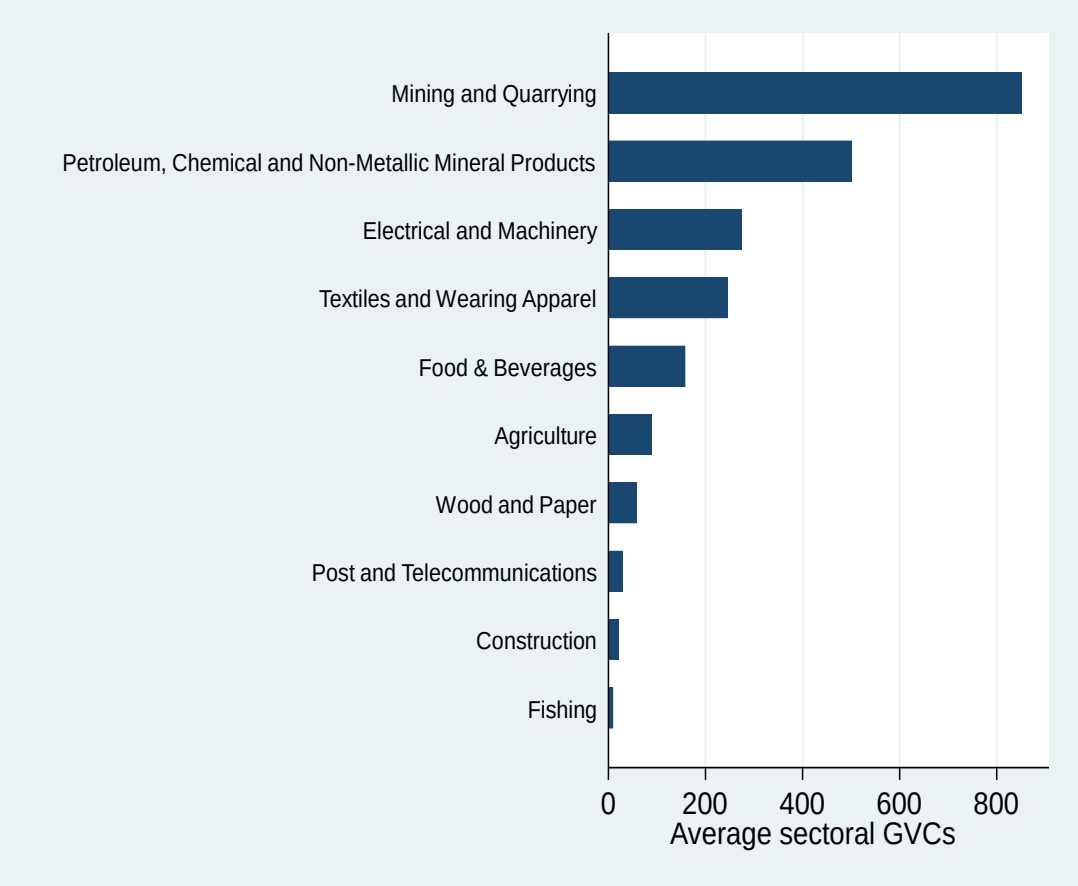


Figure 18: Africa's GVC participation by sector.

4.2 Relationship between institutional quality and bilateral trade flows

The relationship between the average level of institutional quality and trade flows has been examined and the result is displayed in scatter plots. Figure 19 shows the relationship between bilateral exports and the quality of economic and political institutions. There is a positive relationship between average bilateral exports (log of average bilateral exports) and the average quality of economic and political institutions. For instance, Burundi, Eritrea, Comoros, Sao Tome and Principe, Zimbabwe, et cetera, with lower values of institutional indicators, have lower bilateral exports. Conversely, countries such as Mauritius, Botswana, Namibia, Eswatini, and South Africa, with higher values of institutional quality, have higher average bilateral

exports. However, the correlation, R=0.4538, (square root R^2=20.6%) between economic institutions and bilateral exports is stronger than that of the political institutions (R=0.1- square root R^2=1%). This clearly indicates that, on the average, there is a stronger association between economic institutions and bilateral exports than between political institutions and bilateral exports.

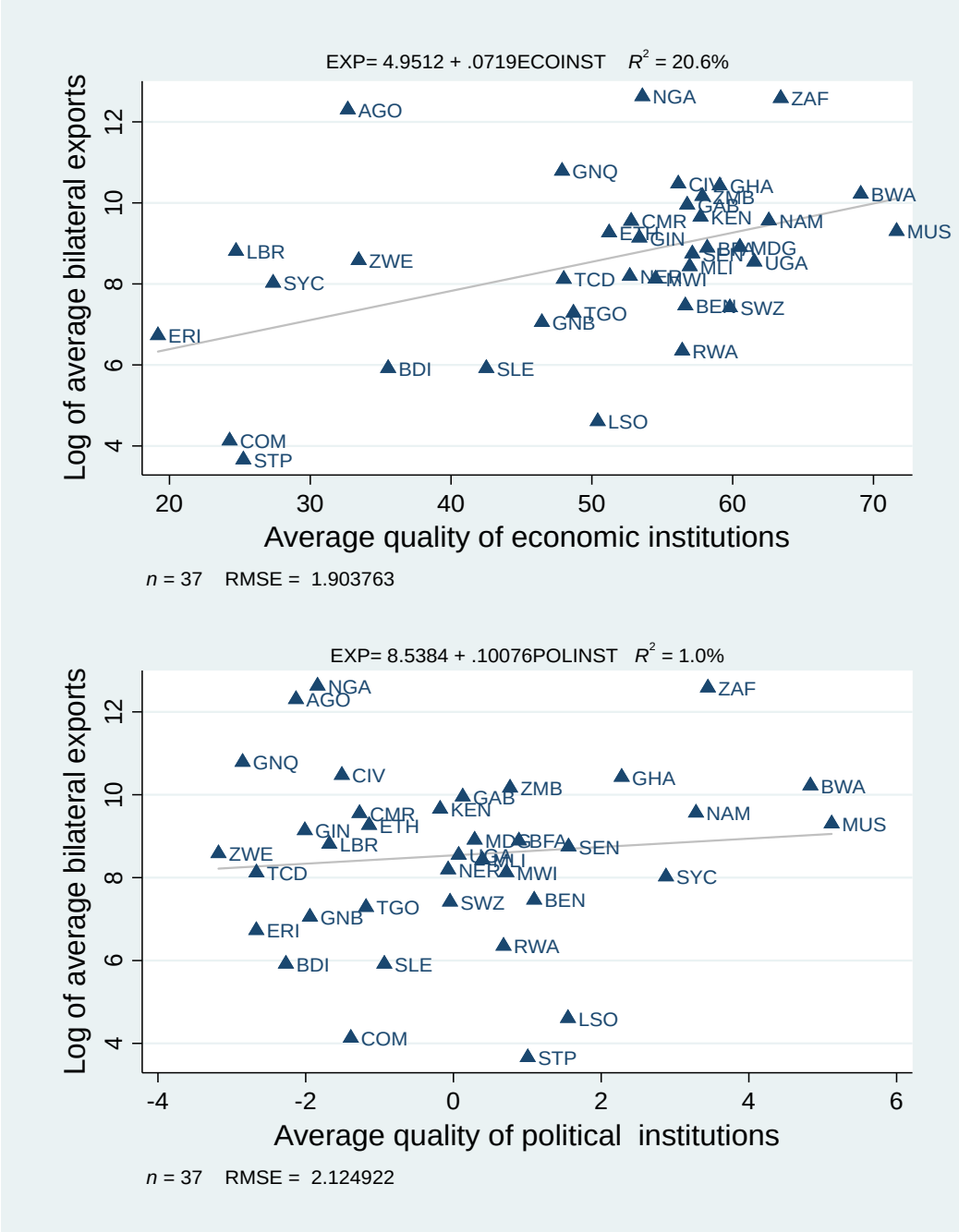


Figure 19: Relationship between institutional quality and exports

Figure 20 depicts the relationship between the bilateral imports and the quality of economic and political institutions. It is clearly shown that countries that have better institutional quality, such as Botswana, Mauritius, Rwanda, and South Africa, have high values of bilateral imports. On the other hand, Comoros, Burundi, and Eritrea recorded lower bilateral imports. This implies that improvement in the quality of political and economic institutions is associated with more engagement in bilateral imports.

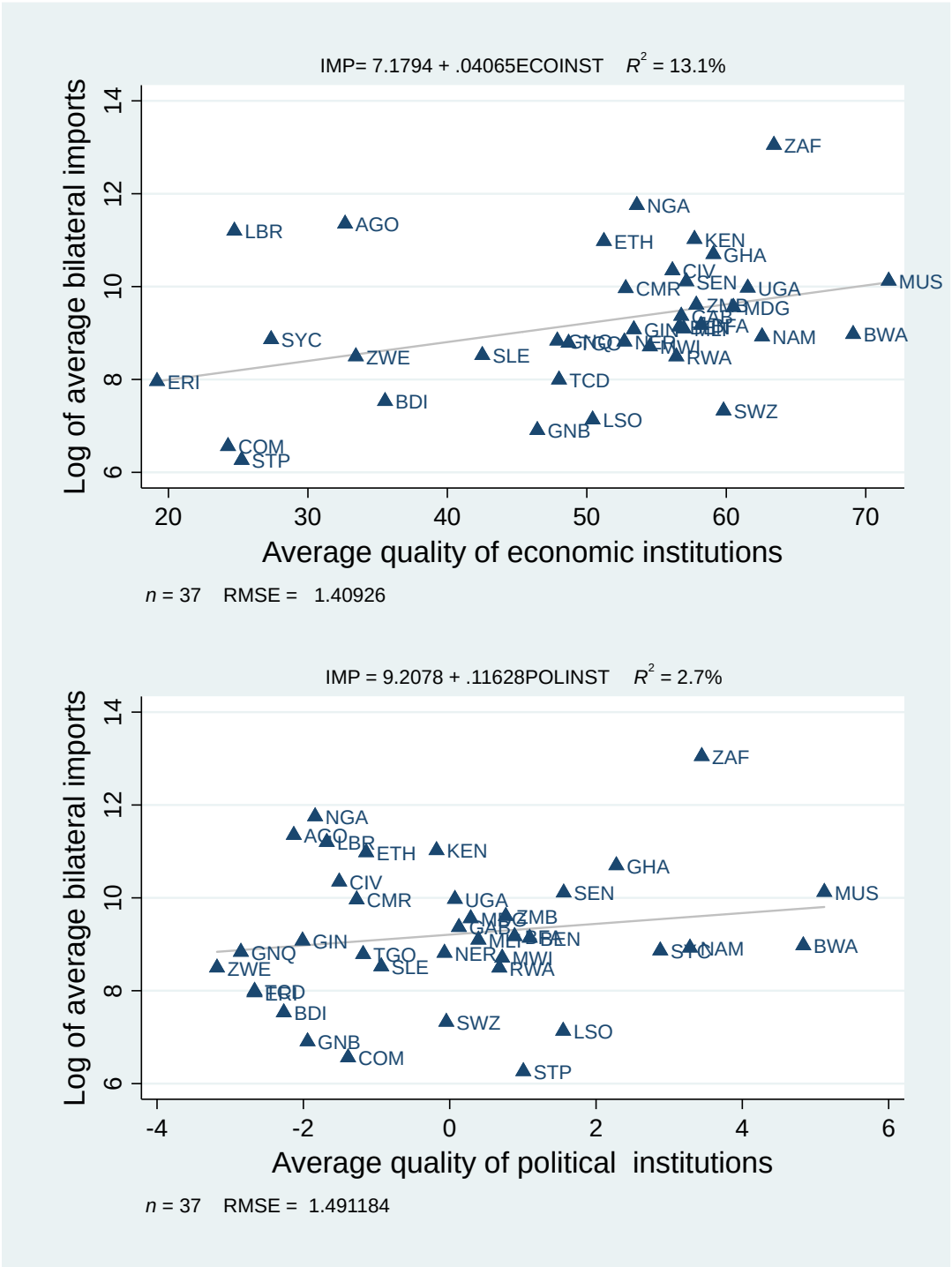


Figure 20: Relationship between institutional quality and imports

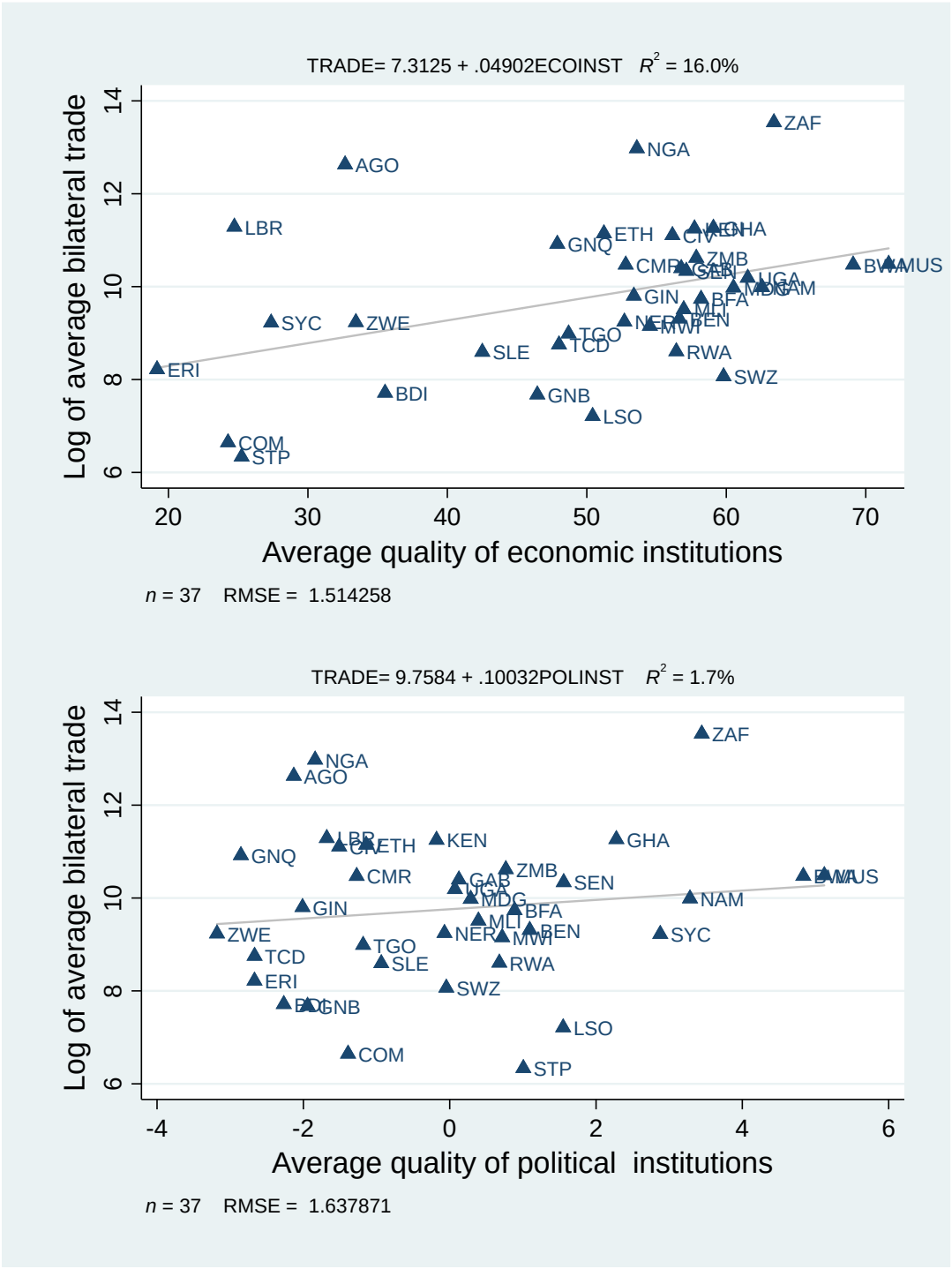


Figure 21: Relationship between institutional quality and aggregate trade flows

Similarly**,** the scatter graph showing the relationship between the average quality of economic and political institutions and aggregate bilateral trade has been plotted as shown in figure 21. The figure shows that, on average, the quality of both political and economic institutions are positively related to the aggregate bilateral trade flow.

Meanwhile, the relationship is stronger for economic institutions (16 %) than for political institutions (1.7%). This implies a direct relationship between economic institutions and bilateral trade. Improvement in business environment, property rights, and contract enforcement, less trade restrictions, price stability et cetera, will directly affect the trade flows. Improvement in the political institutional environment is likely to affect trade flows via some intermediate variables. However, the graphical analysis does not indicate the association of each of the components of institutional quality with trade flows. This is done with the PPML estimates of the Structural Gravity Model.

4.3 Relationship between institutional quality and GVC participation

The relationship between the average level of institutional quality and the four indicators of GVC participation (total, backward, and forward participation and upstreamness) are graphically examined and the results are displayed in scatter plots. Figure 22 shows the relationship between total GVC participation and the quality of economic and political institutions. It shows a positive relationship between the GVC participation and the average quality political institutions. This indicates that the better (stronger) the political institutions the more the total GVC participation. By implication, good governance is associated with higher GVC participation For instance, Mauritius, Botswana, South Africa, Tunisia and Rwanda have better political institutions and at the same time relatively higher level of total GVC participation However, there is zero correlation between economic institutions and total GVC participation. This does not necessarily mean economic institutions are not associated with GVC participation. Rather, the interdependence could depend on the components of economic institutions and/or the indicators of the GVC participation. Nonetheless, the zero correlation reflects the fact that the total GVC in Africa is dominated by the extractive, natural-resources sector. The trade in this sector is often based on long-term

contracts which do not necessarily depend on the quality of economic institutions rather the political institutions.

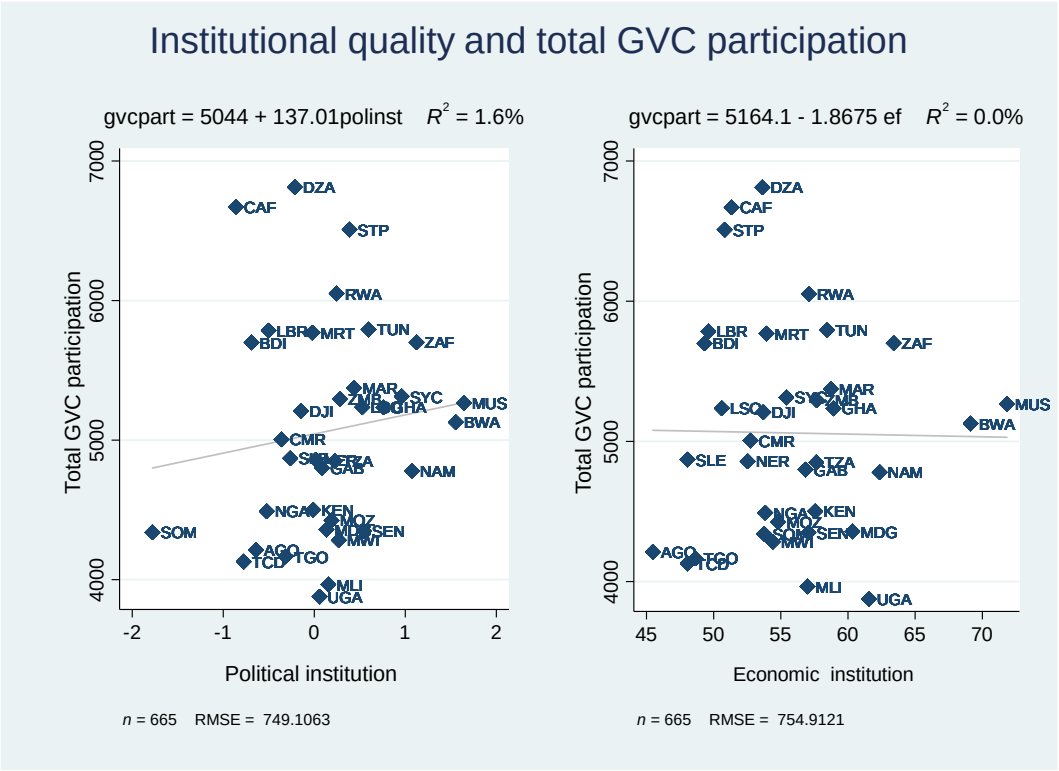


Figure 22: Relationship between institutions and total GVC participation

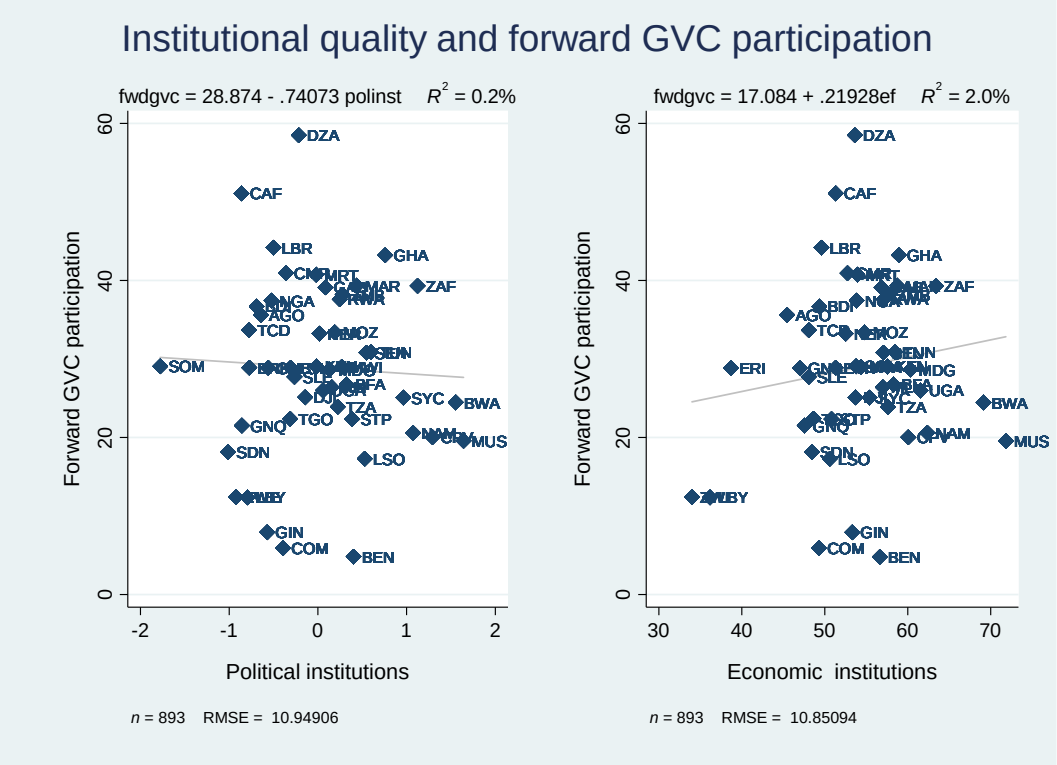


Figure 23: Relationship between institutions and forward GVC participation

Similarly**,** the scatter graph showing the relationship between the average quality of economic and political institutions and forward GVC participation is plotted as shown in figure 23. The figure shows that, on the average, the quality of both political and economic institutions are positively related to the forward GVC participation. Meanwhile, the relationship is stronger for economic institutions (2 %) than for political institutions (0.2%). This implies a direct relationship between economic institutions and forward GVC participation. Improvement in business environment, property rights, and contract enforcement, less trade restrictions, price stability et cetera, is more likely to drive forward GVC than the improvement in the political institutional environment will do. However, this shows mere association and not the marginal impact of the quality of the institutions on forward GVC participation. This is assess in the regression analysis.

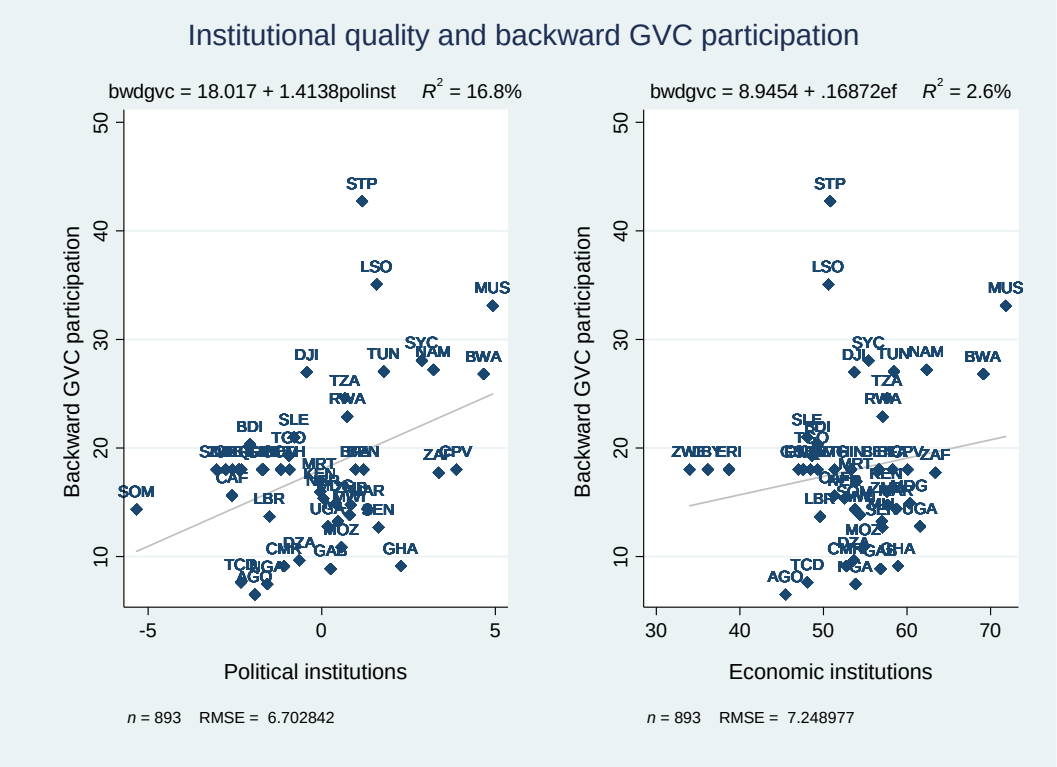


Figure 24: Relationship between institutions and backward GVC participation

Furthermore, figure 24 depicts the relationship between the backward GVC participation and the quality of economic and political institutions. It is clearly shown that countries that have better institutional quality, such as Botswana, Mauritius, Rwanda, and South Africa, have high values of backward GVC participation. On the other hand, Somalia, Chad, Liberia et cetera recorded lower engagement in backward GVC. This implies that improvement in the quality of political and economic institutions is associated with more engagement in backward GVC participation. The downstream sector of the GVC involves contract-intensive investment which requires strong institutional framework to be protected. Weak institutions in this case creates comparative disadvantage by increasing the production cost and making the investment riskier because of uncertainty about the possibility of incomplete contracts. The correlation is stronger for political institution than the economic institution. Good governance encourages foreign firms to invest and engage in backward GVC. Mostly,

improvement in economic institutions, such as property rights, ease of doing business mainly encourage domestic firms. Thus, the relationship between economic institutions and backward GVC is likely to be weaker than that of the political institutions because most domestic firms in Africa do not participate in backward GVC trade or lack international coverage.

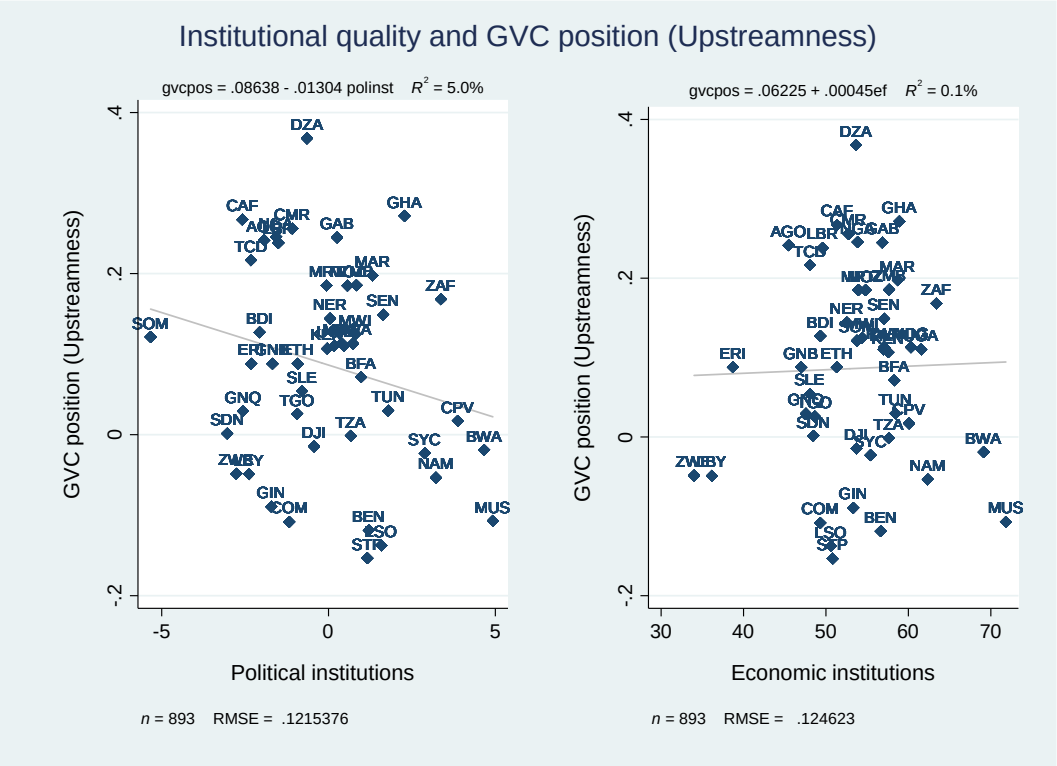


Figure 25: Relationship between institutions and GVC position (upstreamness)

Figure 25 illustrates the relationship between institutional quality and GVC position of the African countries. The graph indicates a negative relationship between political institutions and upstreamness. This implies that strong political institutions is associated with less upstream GVC position. That is, good governance attracts multinational firms into Africa and encourages participation of the African countries in the downstream sector of the GVC trade. Conversely, economic institutions have weak positive relationship with upstream GVC position. To further discern the effect

of the components of both economic and political institutions on the GVC participation and position, a regression analysis is employed and discussed in the subsequent sections.

4.4 Descriptive statistics

The summary statistics of the major variables of interest are presented in table 1. The descriptive statistics indicate enormous dynamics in the institutional factors and the bilateral trade flows. For instance, Equatorial Guinea (control of corruption and government integrity), Comoros (government effectiveness), Eritrea (regulatory quality, voice and accountability, property right and business freedom), Burundi (government spending and political stability), Liberia (rule of law), and Zimbabwe (financial freedom) recorded the lowest quality of institutions. Mauritius (government effectiveness, regulatory quality, rule of law, voice and accountability, property right, investment freedom and financial freedom), Botswana (control of corruption and government integrity), Seychelles (political stability) and South Africa (business freedom) recorded the strongest quality of institutions over the period considered. However, Angola-China, bilateral exports and total trade were highest on bilateral trade flows and South Africa-China import is the highest in import flows. In addition, Ghana to Tuvalu is the longest distance, while Eritrea to Yemen is the shortest among the African countries and their trading partners.

Regarding the GVC variables, South Africa dominates the GVC trade with highest domestic, foreign, and total and value added exports. However, Algeria recorded the highest GVC participation. The domination of South Africa is due to heavy flow of trade while the high participation of Algeria is due to the engagement in exports of natural resources. The graphical exposition earlier indicates the huge participation of

Algeria in the forward GVC. It is noteworthy that Eritrea and Somalia have the weakest institutional quality and recorded the worst bilateral export performance and GVC trade over the period respectively. In sum, there are enormous dynamics and fluctuations in the institutional indicators and the bilateral trade flows and GVC participation of the African countries over the period considered. Therefore, the statistics affirm the need for empirical evaluation of the impact of the institutional quality on bilateral trade flow in Africa and GVC participation in the continent.

Table 1: Descriptive statistics

Variables	Mean	Standard deviation	Min	Min-Country	Max	Max-Country
Distance	8,599	3,741	570.4	Eritrea to Yemen	19,735	Ghana to Tuvalu
Control of corruption	-0.586	0.607	-1.826	Equatorial Guinea	1.217	Botswana
Government effectiveness	-0.701	0.603	-1.776	Comoros	1.049	Mauritius
Political stability	-0.428	0.814	-2.524	Burundi	1.282	Seychelles
Regulatory quality	-0.637	0.614	-2.244	Eritrea	1.127	Mauritius
Rule of law	-0.641	0.613	-2.009	Liberia	1.077	Mauritius
Voice and accountability	-0.519	0.725	-2.226	Eritrea	0.983	Mauritius
Property right	32.14	17.62	10	Eritrea	70	Mauritius
Government integrity	26.43	14.60	10	Equatorial Guinea	64	Botswana
Government spending	67.60	27.69	22.9	Burundi	99.30	Equatorial Guinea
Business freedom	49.54	19.52	17.1	Eritrea	85	South Africa
Monetary freedom	65.65	24.30	52.9	Eritrea	90.30	Niger
Investment freedom	41.95	19.82	10	Zimbabwe	90	Mauritius
Financial freedom	39.03	19.03	10	Zimbabwe	70	Mauritius
Bilateral exports (Billions $)	0.0310	0.432	1.00E-09	Eritrea vs Austria	34	Angola vs China
Bilateral imports (Billions $)	0.0322	0.288	1.00E-09	Gabon vs Georgia	15	South Africa vs China
Total bilateral trade (Billions $)	0.0632	0.614	1.00E-09	Eswatini vs Czech Republic	37.50	Angola vs China
Domestic value added (DVX)	2147689	6788556	4950	STP	4.60e+07	South Africa
Foreign value added (FVA)	726312.6	2446872	3210	Somalia	2.20e+07	South Africa
Global value chains	2872931	9031777	14300	Somalia	6.80e+07	South Africa
Value added exports (VAEXP)	5125709	1.51e+07	3210	STP	1.20e+08	South Africa
Backward GVC participation	18.0167	8.096954	4.615385	Angola	54.01929	STP
Total GVC participation	5060.278	733.0576	3166.667	Uganda	7379.31	Algeria
Forward GVC participation	28.8736	11.29439	4.814815	Benin	63.7931	Algeria
GVC position	.0863849	.1310011	-.2842086	STP	.4012634	Algeria

4.5 Regression results

This section presents the regression results for the evaluation of the impact of institutional quality on bilateral trade and GVC participation in Africa. The first part contains the result of the institutional quality-bilateral trade models while the later part of this section contains presentation and discussion of the results of the institutional quality-GVC participation nexus.

4.5.1 Results of institutions and bilateral trade

Table 2: PPMLHDFE estimates of the Baseline Structural Gravity Model

	Dependent variables		
	(1)	(2)	(3)
Independent variables	Exports	Imports	Total trade
Log of bilateral distance	-0.000147***	-5.46e-05***	-9.54e-05***
	(1.02e-05)	(5.61e-06)	(5.32e-06)
Common official language	0.594***	0.917***	0.643***
	(0.0418)	(0.0364)	(0.0315)
Colonial link	0.360***	0.694***	0.533***
	(0.0445)	(0.0399)	(0.0372)
Common colonizer after 1945	0.198***	0.522***	0.466***
	(0.0520)	(0.0324)	(0.0349)
Free-trade agreement dummy (RTA)	0.962***	0.0783***	0.485***
	(0.0416)	(0.0188)	(0.0241)
Constant	0.684***	-0.405***	0.641***
	(0.0800)	(0.0467)	(0.0437)
Observations	384,319	392,496	393,125
Exporter time fixed effects	Yes	Yes	Yes
Importer time fixed effects	Yes	Yes	Yes
Wald statistics	1260.47	2311.80	2766.50
Probability of Wald statistics	[0.0000]	[0.0000]	[0.0000]
Pseudo R-square	0.6832	0.6239	0.6852

*Source: Author's computation. Note: Robust standard errors in parentheses *** and [ ] denote 1%, level of significance and P-values respectively.*

Baseline Structural Gravity Model

Table 2 contains the result of the baseline structural gravity model. The estimates captured only the standard gravity variables, geographical distance (simple distance), colonial tie (common colonizer after 1945, colonial link), cultural distance (common

official language), and commercial link (Free-trade agreement) as determinants of bilateral trade flows (exports, imports and aggregate bilateral trade). Multilateral resistance terms captured by the exporter-time fixed effects and importer-time fixed effects are included in the model. The estimates for exports, imports, and total bilateral trade are presented in columns 1, 2, and 3 respectively. The results indicate that colonial relationship, common official language, and free trade agreements have a significant positive impact on the bilateral trade flows. This implies that being a former colony or colonized by the same colonial master facilitates the flow of trade among countries. Cultural affinity in terms of common official language enhances bilateral trade. In other words, countries that speak the same official language more commonly engage in trade among themselves than with other countries. This is because the language barrier, which could hinder trade flow is removed when countries share common official language. Language barrier raises cost of contract engagements and increases the cost of doing business. For instance, Nigeria, South Africa, Kenya, Ghana, and other Anglophone African countries trade more with the United States and the United Kingdom than with their Francophone counterparts (Cameroon, Burkina Faso, Benin, Mali, Cote d'Ivoire etc.). Francophone countries trade heavily with France, Belgium, Canada, and other parts of the world where a substantial number of the people speak French.

Similarly, commitment to a free-trade agreement propels bilateral trade flow among countries. On the other hand, geographical distance hampers trade flow among the countries. These findings are robust to imports, exports, and total bilateral trade and thus conform to the theoretical and empirical findings of previous studies regarding the basic gravity variables (Linder, 1961; Tinbergen, 1962; Linneman, 1966;

Anderson, 1979; Brodzicki, 2009, Angkinard and Chiu, 2011; Gil-pareja et al, 2019; Alvarez et al, 2018). This confirms that the study included adequate representative sample. However, other factors such as institutional quality discussed in the subsequent sections, might be responsible for the recent rise in the trade between Asian Tigers and Africa despite language difference.

Table 3: The effects of political institutions on bilateral trade

	Dependent variables		
	(1)	(2)	(3)
Independent variables	Exports	Imports	Total Trade
Log of bilateral distance	0.000147*	8.67e-05	0.000110*
	(8.44e-05)	(6.33e-05)	(6.39e-05)
Common official language	0.432	0.801***	0.614**
	(0.425)	(0.278)	(0.282)
Colonial link	0.494	0.666*	0.547*
	(0.378)	(0.355)	(0.326)
Common colonizer after 1945	0.467	-0.162	0.117
	(0.588)	(0.225)	(0.343)
Free-trade agreement dummy (RTA)	0.761**	0.0913	0.425
	(0.352)	(0.210)	(0.264)
Control of corruption	-1.464***	-0.514*	-0.939**
	(0.559)	(0.308)	(0.403)
Government effectiveness	2.079***	2.557***	2.378***
	(0.572)	(0.371)	(0.426)
Political stability	-0.466	-1.005***	-0.709**
	(0.466)	(0.224)	(0.352)
Regulatory quality	0.741**	0.0337	0.376
	(0.332)	(0.234)	(0.256)
Rule of law	-1.949***	-1.786***	-1.939***
	(0.549)	(0.359)	(0.406)
Voice and accountability	0.872*	1.443***	1.132***
	(0.458)	(0.309)	(0.366)
Constant	-3.502***	-2.722***	-2.365***
	(0.760)	(0.548)	(0.524)
Observations	384,319	392,496	393,125
Exporter time fixed effects	Yes	Yes	Yes
Importer time fixed effects	Yes	Yes	Yes
Wald statistics	124.36	263.45	179.24
Probability of Wald statistics	[0.0000]	[0.0000]	[0.0000]
Pseudo R-square	0.4972	0.5130	0.5318

*Source: Author's computation. Note: Robust standard errors in parentheses ***, **, and * denote 1%, 5%, and 10% level of significance respectively.*

Effects of political (governance) institutions on bilateral trade flows

Table 3 contains the estimates of the PPMLHDFE estimates of the structural gravity model augmented with the indicators of the quality of political institutions. The result indicates that distance has become positive and barely significant. This implies that when political institutions are considered, distance between trading partners does not matter. Thus, the distance puzzle has been solved with the inclusion of institutions.

Regarding the political institutions, the results show that control of corruption, rule of law, and political stability have significant negative effects on bilateral exports, imports, and total trade. This is an indication that the success of Anti-corruption policies creates trade frictions in the African countries. It confirms the theory that corruption lubricates the fabrics of trade and allows the speedy completion of contracts and transactions. That is, the result supports the greasing-the-wheel hypothesis of corruption. The proponents of greasing-the-wheel hypothesis(Eggar and Winner, 2005; Méon and Weill, 2010; Dreher and Gassebner, 2013; Gil-Pareja, et al., 2019) posit that corruption may facilitate economic exchanges and improve efficiency by enabling circumvention of cumbersome regulations, which could serve as barriers to international trade flows. Accordinly, graft may serve as a mechanism for deregulation, thereby enhancing bilateral trade. Hence, the result revealed that the more corruption is reduced in administration and companies, the slower the process of trade engagement becomes. Further, corrupt individuals create unnecessary frictions in trade to portray a regime as unpopular. The findings further indicate that strict adherence to rule of law is undesirable for bilateral trade flows. This does not necessarily mean that rule of law is bad for African economies. Rather, it implies the exploitation of African countries by their partners due to a weak judicial system and

loopholes in the enforcement of African contracts. For example, Grauwe, Houssa, and Piccillo, (2012) found that China imports more often from African countries with weak institutions than from those with stronger institutions.

Therefore, a stronger judiciary and strict compliance with property rights, laws of contract, and criminal laws intimidates trading partners and inhibits bilateral trade flows. Another remarkable finding is that political stability, which is insignificant for exports, has a significant negative effect on imports and total trade. This is an indication that trading partners often take advantage of political violence, social unrest, and armed conflicts in such countries. Additionally, political crisis necessitates greater government spending on military budget to forestall peace and provide basic needs of those suffering from political unrest. This leads to additional purchases from trading partners and facilitates imports.

Expectedly, government effectiveness, and voice and accountability have a positive impact on trade. While government effectiveness, and voice and accountability positively affect exports, imports, and total trade, regulatory quality only affects region exports. When government has more capacity to implement policies and foster private sector development, improve citizens' participation in democracy, increase freedom of the press, and observe human rights, trade engagements among countries are enhanced. Succinctly, the quality of political (governance) institutions significantly determines the flow of bilateral trade in Sub-Sahara Africa.

Effects of economic institutions on bilateral trade flows

To evaluate the effect of economic institutions on bilateral trade flows, the structural gravity model includes seven indicators of the quality of economic institutions. The

estimates are shown in table 4. Exporter-time fixed and importer-time fixed effects are also included to control for outward and inward multilateral resistance terms, respectively. The results indicate that property right and investment freedom have significant inverse effect on exports, imports, and overall bilateral trade. This implies that the stronger the property right institutions the in African countries, the less they participate in global trade. This could be because protection of property rights and less risk of expropriation encourages the acquisition of physical properties and investment in real estate. In such cases, individuals and companies invest more on properties within the country instead of trading with other countries. Hence, there is less investment in trade or production of goods and services. This will hinder bilateral trade flows between Africa and the rest of the world. Similarly, investment freedom leads to capital flight due to underdeveloped capital markets and less competitive and unfavorable investment climate in the Sub-Sahara African countries. Therefore, bilateral trade flows (imports, exports, and total trade) are negatively affected when firms and individuals freely invest resources in domestic and international economic activities.

On the contrary, Government integrity and financial freedom positively influence exports, imports, and aggregate trade. Public trust in government officials, transparency in policy-making, and absence of corruption enable infrastructural development to encourage bilateral trade. In addition, mutual public trust among national governments boosts engagement in bilateral trade. Financial freedom has a positive effect on exports, imports, and total trade. This implies that banking efficiency and a banking sector that is free from government interference lessens the cost of borrowing and ensures easy access to credit. This encourages domestic investment and

enhances trade flows. It further attracts foreign investment and increases domestic production. Meanwhile, other components of economic institutions (government spending, business freedom, monetary freedom) are statistically insignificant. It is worth noting that, given the magnitude of the coefficients, property rights have more impact than other components of economic institutions on exports, imports, and total trade. The effect of the economic institutions is greater on imports and exports than on aggregate trade (see table 4). In short, the findings show that the quality of economic institutions significantly affects bilateral trade flows in Africa. The effects are different for each of the components of the economic institution. These findings are robust to imports, exports, and aggregate bilateral trade of the countries considered.

Table 4: The effects of economic institutions on bilateral trade

	Dependent variables		
	(1)	(2)	(3)
Independent variables	Exports	Imports	Total trade
Log of bilateral distance	-0.000137***	-5.58e-05***	-9.37e-05***
	(2.56e-05)	(1.29e-05)	(4.69e-06)
Common official language	0.613***	0.920***	0.652***
	(0.0637)	(0.140)	(0.0692)
Colonial link	0.346***	0.703***	0.537***
	(0.0505)	(0.126)	(0.0497)
Common colonizer after 1945	0.193	0.525***	0.467***
	(0.210)	(0.0906)	(0.104)
Free-trade agreement dummy (RTA)	0.944***	0.107	0.497***
	(0.150)	(0.104)	(0.0454)
Property rights	-0.0291**	-0.0590***	-0.0439***
	(0.0132)	(0.0137)	(0.0117)
Government spending	-0.00264	0.00900	0.00166
	(0.00500)	(0.00639)	(0.00522)
Business freedom	0.00562	0.00901	0.00859
	(0.00953)	(0.00996)	(0.00987)
Monetary freedom	0.0115	0.00447	0.00741
	(0.00761)	(0.00563)	(0.00658)
Government integrity	0.0263*	0.0387***	0.0327**
	(0.0158)	(0.0146)	(0.0150)
Investment freedom	-0.0263***	-0.0285***	-0.0272***
	(0.00353)	(0.00436)	(0.00376)
Financial freedom	0.0277**	0.0187*	0.0245**
	(0.0112)	(0.0110)	(0.0104)
Constant	20.29***	20.02***	20.68***
	(0.284)	(0.364)	(0.294)
Observations	393,125	393,125	393,125
Exporter-time fixed effects	Yes	Yes	Yes
Importer-time fixed effects	Yes	Yes	Yes
Pseudo R-square	0.8200	0.8522	0.8495

*Source: Author's computation. Note: Robust standard errors in parentheses ***, **, and * denote 1%, 5%, and 10% level of significance respectively.*

Institutions and bilateral trade by level of income

In addition to the use of imports, exports and total trade to examine the heterogeneity of the effect of the institutions on bilateral trade, the African countries are further divided according to their income groups (emerging economies (EE) and low-income countries (LIC)). This enables an in-depth assessment of the impact of the institutions

and provides insights on the kind and components of institutions each group of countries should focus on to boost bilateral trade. However, only the total trade is used in this subsection because the analysis with the three flows of bilateral trade (imports, exports and total trade) shows the importance of the institutions regardless of the kind of bilateral trade.

Similar to the results of the previous baseline model, the result in table 5 indicates that distance is negatively related to trade flows in both emerging African economies and the low-income African economies while all the gravity variables included (Common Colonizer, Common Official Language, and RTA are positively related to bilateral trade of both groups of countries. This indicate the sufficiency of the sample used for the analysis.

Table 5: Baseline structural gravity model by income groups

	Dependent variable: Bilateral trade	
Variables	Emerging Economies	Low-income countries
Log of bilateral distance	-1.215***	-1.024***
	(0.0864)	(0.0389)
Common Colonizer	0.279***	0.227***
	(0.0471)	(0.0417)
Common Official Language	0.888***	0.527***
	(0.0383)	(0.0326)
RTA	0.765***	0.345***
	(0.0411)	(0.0209)
Constant	11.46***	7.402***
	(0.773)	(0.339)
Observations	106,080	283,662
Exporter Time fixed effects	Yes	Yes
Importer Time fixed effects	Yes	Yes

*Robust standard errors in parenthesis, *** denotes 1% level of significance*

Effects of political institutions on bilateral trade by income groups

Indicators of the quality of political institutions are introduced to the model and the result is presented in Table 6 (see Kaufmann, *et al*, 2011 for the measurement of the indicators of political institutions). The result shows that Government effectiveness, Regulatory Quality, and Voice and Accountability have significant positive effect on trade in EE. This suggests that effective and efficient public service, greater capacity of government to implement policies and nurtures private sector development, citizens' participation in democracy, press freedom and observance of human rights enhance trade in EE. Conversely, Control of Corruption and Rule of Law have significantly negative effect on trade of the EE. This affirms that corruption is a 'lubricant' of trading in the EE. Control of corruption in such countries creates trade frictions and hinders trade. Also, the trading partners take advantage of the weakness of rule of law in the African countries. So, strict compliance to rule of law hinders trade.

Government effectiveness and Voice and Accountability have positive effect on trade of both EE and LICs but greater effect for EE. Control of Corruption, Rule of Law and Regulatory Quality are insignificant for trade in LICs. Surprisingly, Political stability which is insignificant for trade in EE, has significant negative effect on the trade of LICs. This is an indication that trading partners often take advantage of Political violence, social unrest and armed conflicts in such countries. Also, political crisis necessitates greater government spending to forestall peace and provide basic needs of the people suffering the brunt of the political unrest. This leads to more purchases from trading partners. Congo, DR Congo, Liberia and Sudan are few examples.

Table 6: Effect of Political institutions on bilateral trade by income groups

	Dependent variable: Bilateral trade	
Variables	Emerging Economies	Low-income countries
Log of bilateral distance	-1.120***	-1.228***
	(0.248)	(0.288)
Common Colonizer	-0.00926	0.295*
	(0.170)	(0.177)
Common Official Language	0.661***	0.405***
	(0.130)	(0.153)
RTA	0.0556	0.860***
	(0.101)	(0.135)
Control of Corruption	-0.910***	-0.0998
	(0.293)	(0.185)
Government Effectiveness	0.639*	0.591**
	(0.339)	(0.295)
Political Stability	-0.116	-0.766***
	(0.125)	(0.140)
Regulatory Quality	1.530***	0.147
	(0.134)	(0.276)
Rule of Law	-3.526***	-0.107
	(0.323)	(0.272)
Voice and accountability	2.057***	0.659***
	(0.313)	(0.219)
Constant	-11.02***	8.839***
	(2.253)	(2.587)
Observations	106,080	283,662
Exporter Time fixed effects	Yes	Yes
Importer Time fixed effects	Yes	Yes

( ), ***, ** and * denote Robust standard errors, 1%, 5% and 10% level of significance respectively.

Effects of economic institutions on bilateral trade by income groups

The estimates of the effect of economic institutions on bilateral trade in table 7 show that business freedom and government spending positively affect trade with greater effect on EE than LICs. Similarly, property rights have significant positive effect on trade in LICs only. This indicates that, while entrenched property right is desirable for trade in LICs, favorable domestic business environment and expansionary fiscal policy propel bilateral trade in both economies. However, monetary freedom negatively affect trade in the LICs. With stable domestic prices, there will be no price-induced exports

and imports. This hampers bilateral trade in the LICs. Other components of economic freedom considered are insignificant for trade in the economies.

Table 7: Effect of Economic institutions on bilateral trade by income groups

	Dependent variable: Bilateral trade	
VARIABLES	Emerging Economies	Low-income countries
Log of bilateral distance	0.907	-1.380***
	(0.785)	(0.312)
Common Colonizer	0.465**	0.298
	(0.231)	(0.269)
Common Official Language	0.600***	0.413***
	(0.112)	(0.152)
RTA	0.564***	0.508**
	(0.170)	(0.215)
Property Right	-0.0261	0.0229**
	(0.0181)	(0.00994)
Government spending	0.0316***	0.0111**
	(0.0102)	(0.00556)
Business Freedom	0.0473*	0.0190*
	(0.0278)	(0.0102)
Labor Freedom	-0.0272	-0.00185
	(0.0213)	(0.00843)
Monetary Freedom	-0.0119	-0.0228***
	(0.0190)	(0.00849)
Investment Freedom	-0.0311	-0.00118
	(0.0220)	(0.00947)
Constant	-8.819	9.244***
	(7.169)	(2.543)
Observations	106,080	283,662
Exporter Time fixed effects	Yes	Yes
Importer Time fixed effects	Yes	Yes

( ), ***, ** and * denote Robust standard errors, 1%, 5% and 10% level of significance respectively.

4.5.2 Results of institutions and global value chains (GVC) participation

The baseline model includes only the structural and policy factors identified in the extant literature to be the drivers of GVC trade over time. Table 8 contains the result for backward participation, forward participation, GVC position (Upstreamness) and the total GVC participation presented in columns 1, 2, and 4 respectively.

Table 8: Result of the baseline model on drivers of GVC

VARIABLES	(1) Backward Participation	(2) Forward Participation	(3) GVC Position (Upstreamness)	(4) Total GVC
Capital per worker	5.379***	-5.901***	-0.0750***	0.0741***
	(12.85)	(-5.906)	(-10.03)	(10.93)
Log of land area	-1.356***	3.597***	0.0284***	0.0253***
	(-7.936)	(7.547)	(8.856)	(6.179)
Natural resources rents	-0.323***	0.257***	0.00529***	-0.00325***
	(-14.58)	(7.535)	(18.03)	(-7.125)
Log of distance	22.12***	-23.21***	-0.293***	-0.0605***
	(12.20)	(-9.714)	(-11.27)	(-3.269)
Log of real GDP	-6.426***	2.416**	0.0611***	-0.0672***
	(-14.55)	(2.405)	(8.422)	(-8.197)
Log of population	3.193***	-3.717***	-0.0433***	-0.0230**
	(6.973)	(-3.585)	(-5.679)	(-2.376)
Imports Tariffs	-0.0700**	0.829***	0.00398***	0.00163***
	(-2.074)	(13.13)	(7.121)	(3.125)
Log of FDI	1.080***	2.281***	0.00283	0.0258***
	(7.971)	(8.375)	(1.371)	(9.379)
Low-skilled Labor	0.171***	-0.623***	-0.00479***	-5.66e-05
	(5.521)	(-8.414)	(-9.100)	(-0.108)
Constant	-124.9***	216.7***	2.232***	9.805***
	(-6.850)	(8.636)	(8.911)	(48.95)
Observations	836	836	836	836
Number of countries	47	47	47	47
Number of Instruments	38	36	36	37
Wald statistic	313.98[0.000]	33.03[0.000]	362.56[0.000]	174.12[0.000]
Arellano-Bond AR(2)	0.95 [0.340]	-1.10[0.272]	1.56[0.119]	-1.64[0.101]
Sargan Test	28.06[0.462]	33.03[0.161]	30.78[0.237]	33.43[0.183]
Hansen test	14.02[0.232]	12.21[0.201]	29.71[0.235]	32.07[0.191]

*The z-statistics in parentheses***, **and* symbolize 1%, 5% and 10% level of significance respectively while P-values are in hard brackets, [ ].*

The result shows that capital-labor ratio (capital per labor) has significant positive effect on backward and total GVC participation but negatively affects backward participation and GVC position (upstreamness). The standard trade theories and empirical studies posit that capital-abundant countries produce and export capital-intensive goods while labor-abundant countries produce and export labor-intensive

goods. Similarly, firms largely locate the capital-intensive stages of production and labor-intensive components in the capital-abundant and labor-abundant countries respectively. Thus, countries with higher capital per labor tend to engage on backward GVC. Put differently, relative scarcity of capital hinders backward GVC participation (WDR, 2020). The relatively low performance of the African countries in GVC results from the relative scarcity of capital (both physical and skilled manpower) in the continent. Conversely, capital-labor ratio have negative association with forward participation and upstreamness.

Furthermore, the result indicates that land area (log) and natural resource rents have significant negative impact on backward participation but positively influence forward participation and upstreamness. The endowment of large expanse of arable land and the abundance of extractive (natural) resources strongly promote forward participation and deter backward participation in Africa. Countries with abundant natural resources such as crude oil, iron ore, gold copper and other minerals have greater share of domestic value added in their exports (WDR, 2020). Moreover, availability of vast arable land provides an avenue for the production and export of primary commodities such as cocoa, groundnuts, palm trees, rubber plans and a host of other cash crops. Likewise, large land area provides abundant forest products such as timber. All these serve as impetus for participation in the forward and upstream segment of the GVC. Therefore, the abundance of the natural resources and land explains the greater engagement of the African countries in forward GVC (as well as upstream position) and dismal performance in the backward GVC participation. However, land have strong positive correlation with total GVC participation while natural resource rents have negative effect on total GVC. The plausible reason for the negative association

between total GVC and the natural resource rents is not far-fetched. Most of the African countries primarily depend on the proceeds of the natural resources. Rather than adding value, they export the natural resources in their crude forms to sponsor large government spending. The more the dependence of the countries on natural resources as the main source of revenue, the less the engagement on GVC (WDR, 2020). For instance, Nigeria is relatively capital scarce and resource-dependent country. As a result, Nigeria records smaller backward participation relative to its forward GVC participation over the period considered. Therefore, the results confirm the importance of factor endowment as determinant of not only standard trade but also GVC trade.The low-skilled labor, measured by the percentage of workers with basic education, has positive association with backward participation, negative relationship with forward participation and upstreamness, and insignificant for the total GVC. This demonstrates that the abundance of large pool of low-skilled labor promotes backward participation. The availability of the low-skilled labor reduces labor cost and thus attracts efficiency-seeking firms (firms seeking for lower cost of production) to locate the downstream production process in low-skilled-labor-abundant countries. This conforms to the submission of the WDR (2020) that countries endowed with low-skilled work force are more likely to participate in backward GVC trade.

The result further shows that remoteness (log of average geographical distance to the major GVC hubs—United States, China and Germany) has negative association with forward participation, upstreamness and total GVC participation but positively related to the backward participation. By implication, geographical remoteness to the GVC hubs has negative impact on the forward participation, upstreamness and total GVC participation. The gravity model of trade posits that longer distances increase the cost

of trade and hinders smooth flow of final goods between countries. Similarly, The GVC hubs can easily supply countries located near them with finished goods but supplying finished goods to the remote countries implies higher cost of trade. This necessitates the sharing of the production processes with far countries (particularly by market-seeking firms) to capture the distanced market. This encourage the location of the downstream segments of the GVC (backward participation). In other words, proximity to the GVC hubs ease the movement of final goods and discourage backward participation. At the same time, the export of raw materials and intermediate goods from the Africa tends to reduce with longer distances. Instead of transporting raw materials and intermediate goods across longer distances, firms locate some of the production stages in the remote countries. Hence, forward participation and upstreamness decline with remoteness. This is in line with the finding of Pathinkonda and Farole (2017) that distance to final goods market propels GVC engagement. Therefore, the simultaneous availability of both raw materials and large market for final goods in Africa lead to the positive relationship between remoteness and backward participation and the negative relationship with the forward participation, upstreamness and total GVC in the continent.

Moreover, the result reveals a significant negative relationship between real GDP and backward participation and total GVC participation. This implies that large economies in Africa participates less in backward participation and total GVC. The intuition is that large economies tends to source inputs domestically for production and reduce demand for foreign intermediate inputs (Kolwaski et al, 2015). Hence, the countries with higher GDP participate less in backward and total GVC. In addition, large opened economies in Africa depends largely on import of final goods for domestic

consumption. This also confirms the hypothesis that small opened economies tends to participate more on backward GVC (Anna et al, 2019). On the other hand, real GDP is positively associated with forward participation and upstreamness.

Population is positively related to backward participation but inversely related to forward participation, upstreamness and total GVC participation. The plausible explanation for this association is that larger population provides abundance of low-cost labor and boost backward participation. The negative relationship with forward participation, upstreamness and total GVC participation results from the enhancement of the backward participation. The significant positive relationship between FDI and all the components of GVC participation reinforced this finding. FDI inflows strongly boost backward and forward GVC participation. Efficiency-seeking investment promotes backward participation while resource-seeking investment tends to increase forward participation. Foreign firms may also promote the transfer of new technologies and managerial skills to local firms and thereby stimulate the participation of domestic firms in GVC (WDR, 2020). Finally, the result indicates a negative association between import tariffs and backward GVC but positive relationship between the tariffs and forward and total GVC participation. High tariffs translate to high cost of trade and reduction in trade flows. This is also applicable to tariffs on imported intermediate input. Countries that impose high tariffs on imported inputs tends to record relatively small share of foreign value added inputs in their production. Consequently, they use more of domestic inputs and participate more on forward GVC than the backward GVC. Therefore, the results of the baseline model conforms to the submissions of the extant theoretical and empirical studies. Hence, the sample is adequate for further analysis in this study.

To ensure the validilidity of the estimatesreported in table 8, the disgnostic tests of all the models were conducted and the results are reported at the bottom of the table. The results of the tests indicates that the Wald statistic is highly significant for all the models. This showns that the models are fit and the variables are jointly significant. to test for serial correlation, the AR(2) tests was applied and the results indicates absence of serial correlation, because the AR(2) statistics are insignificant for all the models. Furthermore, the Sargan and Hasen test for overidentifying restrictions were conducted. The estimates show that the statistics of both tests are insignificant for all the models. This implies the validility of instruments used in all the models. thus, the estimates of all the models are valid for further analysis.

Table 9: Effects of economic institutions on GVC participation

VARIABLES	(1) Backward	(2) Forward	(3) Upstreamness	(4) Total GVC
Capital per worker	3.547***	-0.437	-0.0336***	0.0615***
	(5.507)	(-0.293)	(-2.710)	(5.304)
Log of land area	-1.522***	1.497*	0.0473***	0.0293***
	(-7.069)	(1.921)	(9.614)	(4.555)
Resource rents	-0.260***	0.419***	0.00427***	-0.000402
	(-7.780)	(7.388)	(8.274)	(-0.515)
Log of distance	8.671**	-9.998**	0.0739	-0.344***
	(2.376)	(-2.240)	(1.416)	(-7.780)
Log of real GDP	-6.961***	-3.431**	0.0451***	-0.100***
	(-8.732)	(-2.077)	(3.263)	(-7.796)
Log of population	4.239***	3.797**	-0.0393***	0.0140
	(5.618)	(1.985)	(-2.646)	(0.841)
Imports Tariffs	-0.0680	0.755***	0.00171*	0.00201**
	(-1.500)	(7.946)	(1.872)	(2.304)
Log of FDI	1.374***	3.031***	-0.00337	-0.00201
	(6.537)	(6.918)	(-0.859)	(-0.396)
Low-skilled Labor	0.102***	-0.469***	-0.00507***	-0.000946
	(2.585)	(-4.707)	(-6.330)	(-1.167)
Property rights	-0.0724**	0.0248	-0.000314	0.00453***
	(-2.491)	(0.334)	(-0.478)	(7.041)
Gov't integrity	0.315***	-0.0931	-0.00462***	0.00632***
	(6.749)	(-0.966)	(-4.962)	(6.249)
Gov't spending	-0.150***	0.0964**	0.00107***	-0.00204***
	(-8.794)	(1.984)	(3.214)	(-5.767)
Business freedom	-0.0114	0.0596	0.000141	-0.000706
	(-0.379)	(0.982)	(0.231)	(-1.077)
Labor freedom	0.0298	0.152***	-0.000107	-6.79e-05
	(1.221)	(2.701)	(-0.223)	(-0.124)
Monetary freedom	-0.112**	0.697***	0.00717***	0.00158*
	(-2.342)	(6.149)	(7.346)	(1.660)
Trade freedom	-0.0135	-0.381***	-0.00204***	0.000295
	(-0.505)	(-5.936)	(-4.074)	(0.487)
Investment freedom	0.0628**	0.273***	-0.000182	-0.00491***
	(2.400)	(5.676)	(-0.402)	(-10.51)
Financial freedom	0.172***	-0.390***	-0.00495***	0.00532***
	(5.051)	(-4.844)	(-6.595)	(7.195)
Tax burden	-0.169***	0.578***	0.00670***	0.00807***
	(-4.524)	(6.895)	(8.104)	(10.21)
Constant	16.91	0.612	-1.686***	12.25***
Observations	836	836	836	836
Instruments	37	43	36	32
Wald statistic	373.08[0.00]	3136.38[0.00]	8615.88[0.00]	66.20 [0.00]
AR(2)	-0.53 [0.596]	-1.56 [0.119]	-0.57 [0.569]	-1.13 [0.258]
Sargan Test	20.48[0.250]	17.83 [0.766]	26.11 [0.567]	9.23 [0.683]
Hansen test	20.41[0.202]	7.92 [0.161]	16.78 [0.114]	16.61 [0.165]

*The z-statistics in parentheses***, **and* symbolize 1%, 5% and 10% level of significance respectively while P-values are in hard brackets, [ ].*

Effects of economic institutions on GVC participation

The estimates of the effect of economic institutions on GVC participation are contained in table 9. The diagnostic tests presented at the bottom of the table show that all the estimates are valid for policy inferences. This is indicated by the Wald statistics, AR(2) test of higher-order serial correlation, the sargan and Hasen test of instrument validity. The Wald statistic is statistically significant at 1% for all the models, indicating a joint significance of the independent variables and fitness of the models. Also, the AR(2) test statistics are statistically insignificant for all the models. This means that there is no problem of serial correlation in all the models. similarly, the Sargan and Hasen test indicate the validilty of the instruments used in all the models. This is shown by the statistical insignificance of the estimates of both tests. Hence, all the models passed the diagnostic tests and their estimates can be used for policy analysis and recommendation.

First, the results indicate that property rights has negative association with backward participation, insignificant for forward participation and upstreamness, but positively affects total GVC participation. By implication, strong property rights that adequately protect the ownership of private property, promote intellectual property rights, strengthen the protection of investors, minimize risk of expropriation and ensure quality land administration tends to hinders backward GVC participation. The main channels of the negative association are transfer of technology and foreign direct investment. For instance, tighter intellectual property rights create monopolization of trade and technological transfer, leading to widespread competitive abuses. This finding is in line with the submission of Helpman (1993) who, applying the North-South theoretical framework, argues that strong (intellectual) property rights reduce

the flow of technology from developed countries (North) to developing countries (South) if the international production technology is transfer through imitation. This is the reality of the African countries. They simply imitate the technology of the developed economies or import it via FDI. In such case, stronger property rights increase cost of imitation and shift production back to the developed countries (Lai 1998).

Furthermore, the impact of the property rights on GVC depends on the market expansion and market power effects. According to the market expansion effect, strong property rights increases innovative businesses and reduces counterfeits, and thus encourages production and trade. On the other hand, market power effect inhibits production and trade by creating monopolies. The monopolists often reduce quantities to increase prices. However, Smith (1999) posits that the total effect of the property rights mainly depend on the imitation capacity of the importing countries. Since African countries currently have low capacity to imitate technology, the market power outweighs the market expansion effect. Hence, the negative relationship between property rights and backward participation. For the same reasons, the total GVC participation, largely dominated by the forward participation, has positive relation with the property rights. Similarly, low risk of expropriation of property and quality land administration enhances investment in the extractive industry and agriculture. This promote the extraction of raw materials and primary commodities, and hence expand total GVC. These findings corroborates the findings of Dollar and Kidder (2017) who submits that weak domestic neighbors' institutions are the main reasons for the dismal performance of African economies in total GVC participation.

Government integrity is another component of economic institutions considered. The results demonstrate that government integrity has significant positive effect on backward and total GVC participation but the relationship with upstreamness is negative while the association with forward participation is insignificant. This indicates that public trust in government, adequate control of corruption and efficient public service facilitates efficiency in resource allocation and create enabling environment for backward GVC participation. Systemic government corrupt practices such bribery, cronyism, nepotism, embezzlement; graft and patronage (lack of government integrity) lead to economic inefficiency and discourage backward GVC participation(Thede and Gustafson, 2012; Gil-Pareja, et al., 2019). As a result, corrupt governments often focus on the development of the extractive resources and upstream sector to source revenues needed for running the government. Therefore, improved government integrity decreases upstreamness.

Considering government spending as component of economic institution, the result reveals a significant negative effect of government spending on backward and total GVC participation. The effect on forward participation and upstreamness is positive. Meanwhile, it is important to first note that the African countries naturally have high scores of the government spending. Although low score of the government-spending component of the economic freedom means large government size (expenditure), the high scores for African countries do not necessarily mean ideal government size. Rather it indicates small government capacity. Thus, the negative association between government spending implies that limited government capacity hinders backward participation in African countries. The inability of the countries to provide necessary public capital (education, roads, public utilities, infrastructure etc.) discourages their

participation in the downstream sector of the GVC. Instead, the African countries engage more on the export of natural resources, primary commodities, raw materials and intermediate goods to finance government budget. This promotes forward participation and the participation in the upstream sector of the GVC. Hence, the positive effect of government spending on forward participation and upstreamness.

The business freedom component of the economic freedom is also included. It measures the conduciveness of the domestic business environment. The results indicates that the business freedom does not have significant impact on all the measures of GVC participation. The reason for the insignificant relationship is not far-fetched. First, the business environment in African is relatively hostile due to insurgency, cumbersome procedures of starting and operating businesses as well as lack of infrastructure. Second, the business freedom mainly captures issues concerning small and medium scale businesses, which lack the capacity to participate in GVC trade.

Furthermore**,** the coefficients of the labor freedom are statistically insignificant for all the GVC measures except forward participation. The result indicates a significant positive relationship between labor freedom and forward participation. The labor freedom captures regulations concerning the labor market. The positive relationship implies that flexibility of the labor rules, lack of restraints on hiring and working hours, free operations of labor union activities and abundance of employment opportunities promotes the development of the forward participation. In other words, favorable labor market regulations encourage forward participation but do not have significant effect on backward participation, total GVC participation and upstreamness. The larger percentage of labor force in African countries is employed in the public sector and thus

engage less in backward GVC oriented activities. Also, the government often results to the export of more natural resources and commodities to meet up with the demands of the workers. This makes labor freedom significant only for forward GVC participation.

Another component of economic freedom considered is the monetary freedom. This captures price stability and price controls. The results demonstrate that the coefficients of the monetary freedom is negative for backward participation but positive for forward participation, upstreamness and total GVC. This shows a significant positive impact of monetary freedom on forward participation, upstreamness and total GVC and negative effect on backward participation. Intuitively, stable prices and free market pricing will lead to increase in real wages and enhance national competitiveness (Shiozawa, Oka and Tabuchi, 2017). This raises the cost of labor and production and results to decline in backward GVC because the coordination cost will exceed specialization gain of the GVC (Baldwin, 2013). However, the price stability and increase in real wages will increase domestic consumption and promote the absorption of domestic value added. Hence, increase in forward participation and upstreamness of the GVC. Consequently, the higher monetary freedom leads to higher total GVC participation.

The impact of Trade freedom on GVC participation is also captured. The trade freedom, representing the extent of tariff and non-tariff barriers, has significant negative coefficient for forward participation and upstreamness. It does not have significant impact on backward participation and total trade. This implies that, the higher the level of trade freedom the lower the forward participation and upstreamness. By implication, absence of quantity, price, regulatory and customs restrictions, and or

lack of direct government interventions in international trade will reduce the participation in the upstream sector of the GVC in Africa. Absence of these restrictions will allow multinational corporations to invest in the downstream sector. This is consistent with gravity model of trade, which posits that tariffs and non-tariff trade cost hinders trade flows (Tinbergen, 1962). However, the insignificance of trade freedom for backward GVC may be due to the proliferation of preferential free trade agreements (FTAs) between African countries and their trade partness across the world, which leads to trade diversion.

The analysis captures the effect of investment freedom on GVC participation. The result reveals a significant positive relationship between the investment freedom and both forward and backward GVC participation. This means the more the investment freedom the higher the engagement in backward and forward GVC participation of the African countries. Investment freedom implies a conducive investment climate whereby investors are allowed to move their capital within and outside the country without or with limited restrictions. This enables investment in all sectors of the economy by international firms. Hence, investment freedom boost both backward and forward GVC participation via the participation of the domestic and international firms in the upstream and downstream sectors respectively. This results is in tandem with the with the finding of Antràs (2020) who observed that investment friendliness such as tax holiday for new foreign companies is likely to enhance GVC participation.

However, the result shows a significant negative effect of the investment freedom on total GVC participation. This implies that high levels of investment freedom lead to decline in total GVC participation in Africa. The reason for this seemingly contradicting result is that the investment climate in Africa is relatively less conducive

due to insecurity, insurgency, humanitarian crisis and lack of infrastructure. Therefore, in an investment free situation, investors prefer to invest outside Africa or foreign firms that do not operate in the continent. This brings about decline in the total GVC participation. However, the investment freedom is insignificant for the upstreamness (GVC position) of the African countries.

Financial freedom is not left out in the analysis. The result indicates that financial freedom has positive effect on backward participation and total GVC but negatively affects forward participation and upstreamness. Higher levels of financial freedom enables financial development by enhancing the efficiency of financial institutions and markets. This improves financial services render to both individuals and firms. Moreover, foreign financial institutions are allowed to freely operate in corroboration with the domestic financial institutions. Consequently, the strong financial system provides ample avenue for free flow of capital into the downstream component of the GVC. It also enables price stability, reduces Shoe-leather and menu costs and offers reasonable degree of protection against inflationary erosion (a situation where inflation erodes wealth). All these provide enabling environment for the rise in backward and total GVC participation. However, financial freedom exposes the domestic firms to international competition for capital. Thus, the upstream sector becomes less profitable and forward participation declines for the same reasons.

The results further show that tax burden is negatively associated with backward participation but have positive relationship with upstreamness, forward and total participation. Tax burden reflects the personal and corporate marginal tax rate. The negative relationship between backward participation and tax burden shows that, in one hand corporate marginal tax, reduce the profitability of firms especially in the

downstream component of the GVC and high personal marginal tax rates lead to decline in real incomes on the other hand. As a result, cost of production increases and demand declines. It also leads to decline in savings and investment. In such case, the extractive and agricultural sectors receive more attention. Hence, backward participation declines while forward participation and upstreamness increase. Since, forward participation dominates the GVC participation in Africa, increase in tax burden will lead to increase in total GVC participation.

Table 10: Effects of political institutions on GVC participation.

VARIABLES	(1) Backward participation	(2) Forward participation	(3) Upstreamness	(4) total GVC
Control of corruption	10.87***	6.670***	-0.0748***	0.145***
	(16.26)	(18.68)	(-17.62)	(22.07)
Government effectiveness	3.352***	10.61***	-0.0389***	0.142***
	(5.571)	(27.79)	(-8.512)	(20.23)
Political stability	0.769*	-6.122***	-0.0472***	-0.00645
	(1.761)	(-18.27)	(-12.10)	(-1.186)
Regulatory quality	2.470***	7.947***	-0.0357***	0.0818***
	(4.878)	(9.427)	(-4.136)	(8.505)
Rule of law	4.688***	0.714	-0.0992***	0.0494***
	(8.251)	(0.752)	(-12.93)	(4.779)
Voice and accountability	1.056*	3.399***	-0.0651***	-0.0246***
	(1.797)	(3.979)	(-9.473)	(-2.836)
Control variables	Included	Included	Included	Included
Constant	Included	Included	Included	Included
Observations	836	836	836	836
Number of countries	47	47	47	47

*Estimates of Control variables are reported in appendix to ensure brevity. Z-statistics in parentheses***, **and* symbolize 1%, 5% and 10% level of significance respectively.*

Effects of Political institutions on GVC participation

A pairwise correlation matrix shows that the indicators of the political institutions (governance indicators) are highly correlated and including all of them simultaneously in the model constitute a problem of multicollinearity. As a preliminary estimation (reported in appendix B), simultaneously including all the variables produce results that do not conform to the apriori expectations due to the problem of multicollinearity. To avoid the problem, each of the indicator is added into the model individually. That is, each is estimated in a separate regression. Nevertheless, to ensure brevity and clarity, the results are compactly presented in table 10. The coefficients of the control variables and the constant are not displayed here (the full results are reported in appendix). In addition, the results indicate that, albeit there are slight changes in the

magnitude, the signs of the coefficients of the control variables are consistent with the baseline results (see appendix).

Starting with the Control of corruption, the results indicate that the control of corruption has significant positive effect on backward, forward and total but negatively associated with upstreamness. This illustrates that successful anticorruption policy, which prevents irregular payments and other corrupt practices in public sector, reduces the cost of production and transaction. It reduces the coordination cost of the firms involve in global value chains and enhance efficiency of resource allocation. Consequently, high level of control of corruption would not only increase backward, forward and total GVC participation, it will also promote upgrading of the GVC involvement to the downstream sector. This will result in the decline in upstreamness of the GVC position. Further, the effect of the control of corruption is more on backward participation than other components of the GVC. This is an indication that minimal level of corruption triggers substantial increase in backward GVC participation in Africa.

Similarly, government effectiveness positively affects backward, forward and total GVC participation and negatively affect upstreamness. Intuitively, satisfactory public sector performance accessioned by reasonable degree of bureaucracy, credible government and quality infrastructure propel GVC involvement and reduce upstreamness. Efficient and effective public service delivery provides conducive environment for firms to locate components of their production process in the African countries. In short, the low level of GVC involvement in Africa can be attributed to government ineffectiveness. Notably, the result indicates that the impact of government effectiveness is highest on forward participation. This is a pointer to the

fact that government performance is conditioned on the exploitation of more extractive resources than participation in the downstream sector of production. This resonates with the reality of the governments in most African countries. Rather than expanding production capacity, most of the governments concentrates on exploitation of natural resources and primary products to sponsor public budgets. For instance, oil proceeds constitutes about 80% of government revenue in Nigeria (Alhassan and Kilishi, 2016).

Moreover, the results illustrate a positive and weakly significant impact of political stability on backward participation and highly significant negative effect on forward participation and upstreamness. Although, insignificant for total GVC participation, political stability (absence of violence) promotes backward GVC. The striking finding is the negative association between forward GVC and political stability. The plausible explanation for this finding is that, during crises, wars and civil unrest, the African countries exploit more resources, raw material and primary products for exports to procure weapons or sponsor military expenditure. This leads to the focus of attention on forward GVC. Thus, higher political stability leads to declining forward GVC participation. This findings is in tandem with the conclusion of Dollar and Kidder (2017) that the resource-rich African countries have lower imported value added in their exports. At the same time, the political instability makes the business environment unconducive for the establishment and operation of firms. Wars and civil unrest lead to destruction of productive capacity or compel the existing firms to close down operation and make the countries rely on final goods imports. These also scare away investors. This is the case in Nigeria, DR Congo, Sudan, Somalia, and Chad, Mali Central African Republic, Libya and among other African countries regarded as

hotspots. Thus, political stability and absence of violence enhances backward participation.

Similar to the indicator of government effectiveness, the rule of has positive impact on backward and total GVC participation but negatively related to upstreamness and insignificant for forward participation. This implies that strong judicial system brings about increase in GVC participation in Africa. Vibrant independent and effective judiciary eliminates the hold-up problem in the enforcement of contracts. It also strengthens property rights and enforcement of criminal laws. The cumulative effect of these is to impose confidence on the legal system and provide secured environment for investment and the operation of firms involved in the GVC. This is in tandem with the findings of some previous studies including Nunn (2007), Levchenko (2007) and Nunn and Trefler (2014) who acknowledged the importance of institutional quality on international trade and investment.

Regulatory quality also has similar effect on GVC participations. Greater regulatory quality promotes forward, backward and total GVC participation but hinders upstreamness. This is because, high government effectiveness curtails unhealthy competitive practices, improves ease of doing business and eliminate excessive protective measures. Thus, high government effectiveness will expand the capacity of the governments of the African countries to implement policies that foster private sector development, increase engagement in GVC and decrease upstreamness of the GVC position.

Another component of political institutions considered is the voice and accountability indicator. The results reveal that voice and accountability promotes both backward and

forward participation but hampers total participation and upstreamness. This implies that high levels of participatory democracy (participation of citizens in the choice of their government representatives), press freedom, respect for civil liberty and adherence to human rights provide ample environment for both backward and forward participation and decrease in upstreamness. However, the voice and accountability may give dissenting individuals and groups the latitude to easily portray negative image of the continent in the international community. It is a common occurrence in most African countries where individuals and groups with opposing political interests wage media war against one another. In the process, they paint the country black in the international community and create phobia for investment and operation of firms. Moreover, civil liberty guarantees public protests which often transmogrify to civil unrest leading to destruction of lives and properties. Therefore, as the results indicate, higher levels of voice and accountability might lead to decline in total GVC engagement.

Chapter 5

CONCLUSION

5.1 Summary

This thesis examines the effect of institutional quality on bilateral trade flows and GVC participation in Africa. The first part estimates the augmented structural gravity models using a state-of-the-art estimator, the Poisson Pseudo-Maximum Likelihood with High Dimensional Fixed Effect (PPMLHDFE) developed by Larch, *et al*., (2019). The findings indicate that, countries that have a common official language and those that involve in regional trade agreement engage in more trade. Geographical proximity equally facilitates bilateral trade flows.

In the case of the quality of economic institutions, Property rights and investment freedom have significant inverse effect on bilateral trade while government integrity and financial freedom positively influence bilateral trade. The study further evinces that government effectiveness, regulatory quality, freedom of speech, and accountability promote bilateral trade flows. This is an indication that the effectiveness and efficiency of public policies as well as the credibility of government increase development and encourage trade to bridge infrastructural deficit. Construction of roads, bridges, railways, airports, hospitals, et cetera, translates to more trade activity in capital goods and heavy equipment for construction. The findings further indicate that strict adherence to rule of law and control of corruption are undesirable for bilateral trade flows as the policies intimidate trading partners who exploit the African

nations by taking advantage of weak institutions. This confirms the greasing-the-wheel hypothesis that corruption lubricates trade and the control of corruption hampers bilateral trade flows. In addition, political instability is shown to be a catalyst for bilateral imports. It is expected that political terror and social unrest will hinder trade. However, this phenomenon of violence and fight necessitates the procurement of more military equipment for combating war. It equally destroys domestic production capacity and encourages the countries to increase imports for domestic consumption.

The second part of thesis evaluates the institutional quality-GVC nexus in Africa using GMM panel data technique. It contributes to the literature about the drivers of GVC participation, particularly in Africa. It evaluates the effect of different component of political and economic institutions on backward, forward and total GVC participation as well as GVC position (upstreamness).

The key findings show that both the structural (non-policy) factors and policy factors are significant determinants of GVC participation in Africa. Institutional quality plays vital role in determining the GVC engagement in the continent. Specifically, abundance of capital and low-skilled labor (factor endowment) and foreign direct investment promote backward and total GVC participation. On the other hand, the abundance of land and natural resources deters backward GVC but stimulate forward GVC participation and upstreamness. The institutional factors also have substantial heterogeneous effect on the GVC participation. Unlike the general conclusion in previous literature that institutions promote GVC, this study used the components of the institutional quality indicators (both political and economic institutions) and found that the effects of the institutional factors are diverse.

Regarding the economic institutions, property rights engender total GVC but discourages backward GVC participation in Africa. Africa countries often adopt new technology by imitating advanced economies or through FDI. Thus, strong property rights will promote monopolization and market abuses by the domestic firms. This could reduce the flow of technology from developed countries and thereby deters backward GVC. Tighter property rights can promote backward GVC only in the economies where GVC engagement is at the advanced stage (innovative GVC). Government integrity and financial freedom have similar effect on the GVC participation. Both are fundamental in stimulating backward and total GVC participation, and reducing upstreamness. Contrariwise, low government capacity (higher scores of government spending in the case of Africa) and tax burden stimulate forward GVC and impede backward and total GVC participation. Monetary freedom equally affects GVC in a similar manner. It promotes upstreamness, forward and total GVC but hinders backward GVC participation. Labor freedom also propels forward participation. Furthermore, trade freedom is significant in reducing forward participation and upstream GVC while investment freedom boosts both forward and backward GVC.

The political institutions are also vital determinants of GVC participation. Higher scores of all the six components of the governance indicators are associated with higher backward GVC and lower upstreamness. That is, better political institutions engender backward GVC participation and reduce upstreamness of the GVC position in Africa. Moreover, the better all other five components of political institutions except political stability indicator, the more forward GVC involvement. Similarly, political stability and higher level of voice and accountability reduces total GVC participation

while the control of corruption, rule of law, regulatory quality and government effectiveness are vital in boosting total GVC. It is important to note that political stability reduces both forward GVC and upstreamness. This is an indication that wars, political and social unrest warrants the export of natural resources (such as crude oil, minerals and commodities) in their crudest form (without value addition) to finance military budget and cater for the citizens who suffer the brunt of the political instability and terrorism (insurgency). Equally, the political instability and wars destroys productive capacity and discourage the inflow of FDI, thereby creating capital scarcity and promoting dependence on import of final goods. All these, explain the negative association between political stability and total GVC participation. In addition, the findings reveal that among the governance indicators, control of corruption and government effectiveness are the most important political institutional drivers of backward and forward GVC engagement respectively.

5.2 Conclusion

Given the findings, this thesis concludes that both political and economic institutions are significant determinants of bilateral trade in Africa. However, the impacts of the institutions on bilateral trade are multifaceted and asymmetric. Each component of the indicators of institutional quality has a different estimated effect on trade flows. Improvement is desirable in some components of institutional quality, while improvement of other components is undesirable for bilateral trade in the continent. Public trust in government officials, transparency in policy-making, government integrity and financial freedom promote bilateral trade. Control of corruption hampers bilateral trade flows while political instability destroys domestic production and promotes imports in Africa. In addition, economic institutions have greater impact than political institutions on bilateral trade in the continent.

Similarly, the thesis concludes that both political and economic institutions are vital determinants of GVC participation in Africa. Strong political institutions propel backward GVC participation and engagement in the downstream sectors of GVC in Africa. Moreover, better quality of control of corruption, government effectiveness, voice and accountability, regulatory quality and rule of law propels forward GVC participation. Further, improvement in political stability and voice and accountability leads to decline in total GVC participation while better control of corruption, rule of law, regulatory quality and government effectiveness boosts total GVC participation. Therefore, both political and economic institutions are fundamental determinants of bilateral trade and GVC participation in Africa.

5.3 Policy Recommendations

This study reveals that factors such as common official language regional trade agreements, geographical proximity and institutional quality are significant drivers of bilateral trade flows. Likewise, the structural factors, the policy factors and the institutional quality indicators are fundamental determinants of GVC participation in Africa. However, the African countries share common official language with many other countries across the world, engage in numerous trade agreements and some of the African countries are located near trade hubs. In the same vein, the African countries are less deficient in the structural and non-institutional policy factors. For instance, Dollar and Kidder (2017) acknowledged that most of the developing countries (including Africa) have sufficient low-skilled labor and attract reasonable inflow of efficiency and resource-seeking FDI to remedy capital scarcity. This is evident in the substantial amount of investments by foreign firms operating in the extractive industries in Africa. Moreover, African countries are engaged in numerous preferential trade agreement, which reduce tariffs barriers. Equally, improvement in

transportation and communication technology across the globe facilitates connectivity and cushion the effect of the structural factors. Yet, the performance of the continent in both bilateral trade and GVC participation is disappointing. Given the fact that the continent is deficient in good institutions, the quality of economic and political institutions are major determinants of the GVC participation in Africa. The insignificance of bilateral trade and low involvement of the continent in GVC (especially backward GVC) can be attributed to weak institutions. Thus, the recommendations of this study are centered on institutional factors. Generally, the African countries need to focus on the improvement of institutions─ However, across-the-board institutional improvement is a herculean task. Thus, this study provides specific institutional quality-promoting policies capable of encouraging bilateral trade and GVC involvement. This is equally imperative as post-Civid-19 measures for economic development in the continent.

First, the African countries should engage in deep trade agreements to benefit from spill-over effects of good institutions across borders. In addition to tariff reduction, the deep trade agreements include policy measures that cover investment policies, competitive strategies, judicial framework and protection of property rights. The agreements could also target specific components of the institutional factors such as contract enforcement, rule of law, labor laws, as well as removal of administrative bottlenecks in customs processes by enforcing the use of electronic system and harmonization of customs procedures. These can increase contract enforceability and provide even property rights protection. Consequently, the deep trade agreements will improve quality of both political and economic institutions in Africa and thus facilitate

bilateral and GVC trade in the continent. The African Continental Free Trade Agreement and all other FTAs should be in the form of deep trade agreements.

Second, the study reveals that control of corruption and government integrity significantly affect bilateral and GVC trade. Thus, African countries need to adopt, strengthen and regionalize anti-corruption measures. Trade partners should also be made to support the fight against corruption in the continents. Trade ties with the continent should be based on the commitment of trade partners in support of the fight. The partners should actively engage in the repatriation of stolen funds and visa restrictions against culprits. The regionalization of the anti-corruption policy and involvement of the international community is necessary because trade and geographical neighbors' institutional quality determines the level of bilateral trade and GVC integration (Dollar and Kidder, 2017). The African countries can take advantage of the abundance natural resources and raw materials to bargain for agreements enforcing trading partners to partake in the fight against corruption.

Third, given the findings on tax burden and GVC, tax discrimination can shift GVC from forward GVC and upstream sector to the downstream sectors and backward GVC. The African economies should run tax policies that impose more tax on extractive industries and grant tax incentives to the downstream GVC firms. The tax concessions will reduce tax burden on the firms, reduce their costs, attract more firms and promote GVC. On the other hand, tax increase will compel the firms in the extractive industry to shift to the downstream sector. The cumulative effect will be reduction in forward GVC and improvement in backward GVC participation, which is more beneficial to the African countries. Similarly, higher income tax for certain class of people and goods can also be used to discourage the consumption of certain final

goods imports and make their domestically produce or substitutes cheaper. This will encourage market-seeking firms that are engaged in the production of such goods to locate some stages of production of the products in African countries. This can enhance transparency and accountability and thereby enforce good governance by strengthening the social contract between the citizens and the government and thereby promote international trade.

Fourth, the African countries should provide stable investment climate by providing generous investment incentives and engaging in investment treaties with multinational firms. The investment incentives such as tax cuts for existing firms and tax holidays for new firms would attract investment into the GVC oriented firms and boost backward GVC and bilateral trade. In addition, proceeds from the exports of the natural resources and commodities should be channel to massive development of transport infrastructure. Favorable investment environment will attract foreign-owned firms into the manufacturing in Africa. The participation of the foreign firms in manufacturing will reduce export of natural resources and raw agricultural products and thereby facilitate international trade flows and GVC participation.

Finally, the African countries should grant reasonable autonomy to financial institutions and markets. The central banks or monetary authorities should only provide supervisory services and monetary policies that are favorable for smooth operation of the financial institution. This will pave way for financial development and strengthens financial and monetary freedom, which in turn allows easy access to credit and provide efficient financial services to both domestic and foreign firms and encourage GVC integration and bilateral trade. In addition, policymakers should factor in the heterogeneity and asymmetries of the impact of the institutions in designing

policies aimed at maximizing the benefits of the institutions-bilateral trade and GVC nexus.

5.4 Suggestions for further studies

Research linking institutions, bilateral trade and GVC participation is wide, nascent and growing. Therefore, this thesis opened some areas for further studies. First, the international trade-GVC-institutions nexus for individual African country can be considered. Although, the African countries have certain similar characteristics, each of them have some peculiarities that need to be captured in the analysis of the impact of their institutions on international trade and GVC participation.

Second, the research can be conducted for sectoral trade and GVC participation. Each African country has, at least, a sector with potential comparative advantage. Thus, the sectoral analysis of the effect of institution on international trade shall provide an insight on the relationship between each of the sectors and the components of institutional quality. Moreover, this analysis can be extended to the service trade. This becomes necessary given the growing importance of the service trade in recent times across the globe. Likewise, the internonection between international trade and technological development can also be considered. All these are potential research areas concerning the association between institutions and international trade.

Finally, there could be omission variable bias because of the estimation of the models with political and economic institutions separately. Hence, further studies, may include a subset or overall indices of both the political and economic institutions concurrently in the same models. This can solve the problem of omission variable bias (if any) and further verify the findings of this study.

REFERENCES

Acemoglu, D., & Robinson, J. A. (2012). The origins of power, prosperity, and poverty: Why nations fail. *Crown Business, New York NY*.

AfDB, OECD and UNDP (2014). *African Economic Outlook 2014: Global Value Chains and Africa's Industrialization*. Paris: OECD Publishing.

Aichele, R., Felbermayr, G. J., & Heiland, I. (2014). Going deep: The trade and welfare effects of TTIP.

Akhtaruzzaman, M., Hajzler, C., & Owen, P. D. (2018). Does institutional quality resolve the Lucas Paradox?. *Applied Economics*, *50*(5), 455-474.

Allard, C., Kriljenko, J. C., Gonzalez-Garcia, J., Kitsios, E., Trevino, J., & Chen, W. (2016). Trade integration and global value chains in sub-Saharan Africa: In pursuit of the missing link. *IMF Departmental Paper*, (16/05).

Álvarez, I. C., Barbero, J., Rodríguez-Pose, A., & Zofío, J. L. (2018). Does institutional quality matter for trade? Institutional conditions in a sectoral trade framework. *World Development*, *103*, 72-87.

Amendolagine, V., Presbitero, A. F., Rabellotti, R., & Sanfilippo, M. (2019). Local sourcing in developing countries: The role of foreign direct investments and global value chains. *World Development*, *113*(1), 73-88.

Anderson, J. E. (1979). A theoretical foundation for the gravity equation. *The American Economic Review*, *69*(1), 106-116.

Anderson, J. E., & Marcouiller, D. (2002). Insecurity and the pattern of trade: An empirical investigation. *Review of Economics and statistics*, *84*(2), 342-352.

Anderson, J. E., & Van Wincoop, E. (2003). Gravity with gravitas: a solution to the border puzzle. *American economic review*, *93*(1), 170-192.

Anderson, J. E., Borchert, I., Mattoo, A., & Yotov, Y. V. (2015a). Modeling Services Trade, Trade Costs, Borders and Output.

Angkinand, A. P., & Chiu, E. M. (2011). Will institutional reform enhance bilateral trade flows? Analyses from different reform aspects. *Journal of Economic Policy Reform*, *14*(3), 243-258.

Antràs, P. (2020). *Conceptual Aspects of Global Value Chains* (No. 9114). The World Bank.

Aslam, A., Novta, N., & Rodrigues-Bastos, F. (2017). Calculating Trade in Value Added. International Monetary Fund.

Aziz, N., Hossain, B., & Mowlah, I. (2018). Does the quality of political institutions affect intra-industry trade within trade blocs? The ASEAN perspective. *Applied Economics*, *50*(33), 3560-3574.

Balding, C. (2011). A re-examination of the relation between democracy and international trade. *The Journal of International Trade & Economic Development*, *20*(5), 585-603.

Baldwin, R., & Lopez-Gonzalez, J. (2015). Supply-chain trade: A portrait of global patterns and several testable hypotheses. *The World Economy*, *38*(11), 1682-1721.

Baldwin, R., & Venables, A. J. (2013). Spiders and snakes: Offshoring and agglomeration in the global economy. *Journal of International Economics*, *90*(2), 245-254.

Belloc, M. (2006). Institutions and international trade: A reconsideration of comparative advantage. *Journal of Economic Surveys*, *20*(1), 3-26.

Beverelli, C., Keck, A., Larch, M., & Yotov, Y. (2018). Institutions, trade and development: a quantitative analysis.

Casella, B., Bolwijn, R., Moran, D., & Kanemoto, K. (2019). Improving the analysis of global value chains: the UNCTAD-Eora Database. *Transnational Corporations*, *26*(3), 115.

Cheng, M. K. C., Rehman, S., Seneviratne, M. D., & Zhang, S. (2015). *Reaping the benefits from global value chains* (No. 15-204). International Monetary Fund.

Coase, Ronald H. (1937), "The Nature of the Firm," *Economica* 4, 386-405

Costinot, A. (2009). On the Origins of Comparative Advantage. *Journal of International Economics*, *77*(2). 255–64.

Da Rin, M., Di Giacomo, M., & Sembenelli, A. (2019). Trust and foreign ownership: Evidence from intra-European foreign direct investments. *Review of International Economics*, *27*(1), 313-346.

De Grauwe, P., Houssa, R., & Piccillo, G. (2012). African trade dynamics: is China a different trading partner?. *Journal of Chinese Economic and Business Studies*, *10*(1), 15-45.

De Groot, H. L. F., Linders, G.-J., Rietveld, P., & Subramanian, U. (2004). The institutional determinants of bilateral trade patterns. Kyklos, 57, 103–123.

De Jong, E., & Bogmans, C. (2011). Does corruption discourage international trade?. *European Journal of Political Economy*, *27*(2), 385-398.

Del Prete, D., Giovannetti, G., & Marvasi, E. (2018). Global value chains: New evidence for North Africa. *International economics*, *153*(1), 42-54.

Dollar, D., & Kidder, M. A. T. T. H. E. W. (2017). Institutional quality and participation in global value chains. *Global Value Chain Development Report: Measuring and Analyzing the Impact of GVC on Economic Development*.

Dollar, D., & Kidder, M., (2017). Institutional quality and participation in global value chains. *Global Value Chain Development Report: Measuring and Analyzing the Impact of GVC on Economic Development*.

Dollar, D., Ge, Y., & Yu, X. (2016). Institutions and participation in global value chains. *Global Value Chain Development Report Background Paper, World Bank, Washington, DC*.

Dreher, A., & Gassebner, M. (2013). Greasing the wheels? The impact of regulations and corruption on firm entry. *Public Choice*, *155*(3-4), 413-432.

Dutt, P., & Traca, D. (2010). Corruption and bilateral trade flows: extortion or evasion?. *The Review of Economics and Statistics*, *92*(4), 843-860.

Feenstra, R. C. (2015). *Advanced international trade: theory and evidence*. Princeton University press. Princeton, United States.

Feenstra, R. C., Markusen, J. R., & Rose, A. K. (2001). Using the gravity equation to differentiate among alternative theories of trade. *Canadian Journal of Economics/Revue canadienne d'économique*, *34*(2), 430-447.

Felbermayr, G., Teti, F., & Yalcin, E. (2019). Rules of origin and the profitability of trade deflection. *Journal of International Economics*, *121*(6), 103-248.

Fernandes, A. M., Kee, H.L. & Winkler, D., (2019). *Factors Affecting Global Value Chain Participation across Countries*. Policy Research Working Paper, World Bank, Washington, DC.

Foster-McGregor, N., Kaulich, F., & Stehrer, R. (2015). Global value chains in Africa. UNIDO/UNU-MERIT background papers for the UNIDO, Industrial Development Report 2016: IDR 2016 WP 2.

Gil-Pareja, S., Llorca-Vivero, R., & Martínez-Serrano, J. A. (2019). Corruption and international trade: A comprehensive analysis with gravity. *Applied Economic Analysis*, 27(29), 3-20.

Hummels, D., Ishii, J., & Yi, K. M. (2001). The nature and growth of vertical specialization in world trade. *Journal of international Economics*, *54*(1), 75-96.

Jansen, M., and Nordas, H.K. (2004). Institutions, trade policy and trade flows. Staff Working Paper ERSD, 2004-02. Geneva: World Trade Organization.

Jiang, Y., & Borojo, D. G. (2018). *The impacts of institutional quality and infrastructure on overall and intra-Africa trade* (No. 2018-75). Economics Discussion Paper.

Karam, F., & Zaki, C. (2018). Why don't MENA countries trade more? The curse of deficient institutions. *The Quarterly Review of Economics and Finance*.

Kaufmann, D., Kraay, A., & Mastruzzi, M. (2011). The worldwide governance indicators: methodology and analytical issues. *Hague Journal on the Rule of Law*, *3*(2), 220-246.

Kersan-Škabić, I. (2019). The drivers of global value chain (GVC) participation in EU member states. *Economic research-Ekonomska istraživanja*, *32*(1), 1204-1218.

Kharel, P. (2019). The effect of free trade agreements revisited: Does residual trade cost bias matter?. *Review of International Economics*, *27*(1), 367-389

Kilishi, A. A. (2017). *Institutional reforms and economic outcomes in Africa*. African Development Bank.

Koopman, R., Wang, Z., & Wei, S. J. (2014). Tracing value-added and double counting in gross exports. *American Economic Review*, *104*(2), 459-94

Kowalski, P., Lopez Gonzalez, J., Ragoussis, A., & Ugarte, C. (2015). *Participation of Developing Countries in Global Value Chains: Implications for Trade and Trade-Related Policies* (No. 179). OECD Publishing.

Kucharčuková, O. B., Babecký, J., & Raiser, M. (2012). Gravity approach for modelling international trade in South-Eastern Europe and the Commonwealth of Independent States: the role of geography, policy and institutions. *Open economies review*, *23*(2), 277-301.

Larch, M., Wanner, J., Yotov, Y. V., & Zylkin, T. (2019). Currency Unions and Trade: A PPML Re-assessment with High-dimensional Fixed Effects. *Oxford Bulletin of Economics and Statistics*, *81*(3), 487-510.

Levchenko, A. A. (2007). Institutional quality and international trade. *The Review of Economic Studies*, *74*(3), 791-819.

Linder, S. B. (1961). *An essay on trade and transformation* (pp. 82-109). Stockholm: Almqvist & Wiksell.

Linnemann, H. (1966). *An econometric study of international trade flows* (No. 42). North-Holland Pub. Co.

Lopez Gonzalez, J. (2016). *Using foreign factors to enhance domestic export performance: A focus on Southeast Asia* (No. 191). OECD Publishing.

Mauro, P. (1995). Corruption and growth. *The quarterly journal of economics*, *110*(3), 681-712.

McCallum, J. (1995). National borders matter: Canada-US regional trade patterns. *The American Economic Review*, *85*(3), 615-623.

Méon, P. G., & Sekkat, K. (2008). Institutional quality and trade: which institutions? Which trade?. *Economic Inquiry*, *46*(2), 227-240.

Méon, P. G., & Weill, L. (2010). Is corruption an efficient grease?. *World development*, *38*(3), 244-259.

Miller, T., Kim, A. B., & Roberts, J.M. (2019). *Index of economic freedom*, Heritage Foundation, 25th anniversary edition.

Miroudot, S., Rouzet, D. and Spinelli, F. (2013), Trade policy implications of global value chains, Trade Policy Papers 161, OECD

Nordås, H. K. (2018). What drives trade in services? Lessons from the Nordics. *Applied Economics*, *50*(33), 3532-3545.

North, D. (1990). *Institutions, institutional change and economic performance*. Cambridge: Cambridge University Press.

Nunn, N. (2007). Relationship-specificity, incomplete contracts, and the pattern of trade. Quarterly Journal of Economics, 122 (2), 569–600.

Nunn, N., & Trefler, D. (2014). Domestic institutions as a source of comparative advantage. *Handbook of international economics*, *4*, 263-315.

Osabuohien, E. S., Beecroft, I., & Efobi, U. R. (2018). Global trade and trade protection in a globalised world. *Transnational Corporations Review*, *10*(1), 43-52.

Pahan-Prasada, D. V. (2013). Domestic versus Multilateral Institutions in Bilateral Trade: A Comparative Gravity Analysis. *International Economic Journal*, *27*(1), 127-142.

Papaioannou, E. (2009). What drives international financial flows? Politics, institutions and other determinants. *Journal of Development economics*, *88*(2), 269-281.

Pathikonda, V., & Farole, T. (2017). The capabilities driving participation in global value chains. *Journal of International Commerce, Economics and Policy*, *8*(01), 1750006.

Rauch, J. E. (2001). Business and social networks in international trade. *Journal of economic literature*, *39*(4), 1177-1203.

Rodrik, D., Subramanian, A., & Trebbi, F. (2004). Institutions rule: the primacy of institutions over geography and integration in economic development. *Journal of economic growth*, *9*(2), 131-165.

Santos Silva, J. M., & Tenreyro, S. (2015). Trading partners and trading volumes: implementing the Helpman–Melitz–Rubinstein model empirically. *Oxford bulletin of economics and statistics*, *77*(1), 93-105.

Shiozawa, Y., Oka, T., & Tabuchi, T. (Eds.). (2017). *A new construction of Ricardian theory of international values: analytical and historical approach* (Vol. 7). Springer.

Siliverstovs, B., & Schumacher, D. (2009). Estimating gravity equations: to log or not to log?. *Empirical Economics*, *36*(3), 645-669.

Silva, J. S., & Tenreyro, S. (2006). The log of gravity. *The Review of Economics and statistics*, *88*(4), 641-658.

Silva, J. S., & Tenreyro, S. (2010). On the existence of the maximum likelihood estimates in Poisson regression. *Economics Letters*, *107*(2), 310-312.

Slany, A. (2019). The role of trade policies in building regional value chains–some preliminary evidence from Africa. *South African Journal of Economics*, *87*(3), 326-353.

Soeng, R., & Cuyvers, L. (2018). Domestic institutions and export performance: Evidence for Cambodia. *The Journal of International Trade & Economic Development*, *27*(4), 389-408

Souva, M., Smith, D. L., & Rowan, S. (2008). Promoting trade: The importance of market protecting institutions. *The Journal of Politics*, *70*(2), 383-392.

Staffan, B. L. (1961). *An essay on trade and transformation* (Doctoral dissertation, John Wiley, New York).

Thede, S., & Gustafson, N. Å. (2012). The multifaceted impact of corruption on international trade. *The World Economy,* 35(5), 651-666.

Tinbergen, J. J. (1962). Shaping the world economy; suggestions for an international economic policy.

Tinta, A. A. (2017). The determinants of participation in global value chains: The case of ECOWAS. *Cogent Economics & Finance*, *5*(1), 1389252.

Tukker, A., & Dietzenbacher, E. (2013). Global multiregional input–output frameworks: an introduction and outlook. *Economic Systems Research*, *25*(1), 1-19.

UNIDO (2016). *Industrialization in Africa and Least Developed Countries: Boosting Growth, Creating Jobs, Promoting Inclusiveness and Sustainability*. Vienna: United Nations Industrial Development Organization.

UNIDO. (2019). Global value chain and industrial development: Lessons from China, Southeast and South Asia. Retrieved from www.unido.org

United Nations Conference on Trade and Development. (2016). *Key statistics and trends in international trade, division on international trade in goods and services, and commodities*. Geneva

Van Biesebroeck, J., & Mensah, E. B. (2019). *The Extent of GVC Engagement in Sub-Saharan Africa*. The World Bank.

Van der Marel, E., & Shepherd, B. (2013). Services trade, regulation and regional integration: evidence from sectoral data. *The World Economy*, *36*(11), 1393-1405.

Westerlund, J., & Wilhelmsson, F. (2011). Estimating the gravity model without gravity using panel data. *Applied Economics*, *43*(6), 641-649.

Wilson, J. S., Mann, C. L., & Otsuki, T. (2003). Trade facilitation and economic development: A new approach to quantifying the impact. *The World Bank Economic Review*, *17*(3), 367-389.

Wilson, J. S., Mann, C. L., & Otsuki, T. (2005). Assessing the benefits of trade facilitation: A global perspective. *World Economy*, *28*(6), 841-871.

World Bank (2020), *World Development Report 2020: Trading for Development in the Age of Global Value Chains*, World Bank Publications

World Trade Organization (2018). World trade statistical Review

Yotov, Y. V., Piermartini, R., Monteiro, J. A., & Larch, M. (2016). *An advanced guide to trade policy analysis: The structural gravity model*. Geneva, Switzerland: World Trade Organization.

Zeynalov, A. (2017). The gravity of institutions in a resource-rich country: the case of Azerbaijan. *International Economics and Economic Policy*, *14*(2), 239-261.

APPENDICES

Appendix A: List of sampled countries

List of African (Exporter) countries (Part 1)

1. Angola	2. Eritrea	3. Madagascar	4. Seychelles
5. Benin	6. Eswatini	7. Malawi	8. Sierra Leone
9. Botswana	10. Ethiopia	11. Mali	12. South Africa
13. Burkina Faso	14. Gabon	15. Mauritius	16. Togo
17. Burundi	18. Ghana	19. Namibia	20. Uganda
21. Cameroon	22. Guinea	23. Niger	24. Zambia
25. Chad	26. Guinea-Bissau	27. Nigeria	28. Zimbabwe
29. Comoros	30. Kenya	31. Rwanda	
32. Cote d'ivoire	33. Lesotho	34. Sao Tome and Principe	
35. Equatorial Guinea	36. Liberia	37. Senegal	

List of trading partners (importer) countries

1. Afghanistan
2. Ecuador
3. Mexico
4. Slovenia
5. Albania
6. El Salvador
7. Micronesia
8. Solomon Islands
9. Antigua & Barbuda
10. Estonia
11. Mongolia
12. Spain
13. Argentina
14. Faroe Islands
15. Nauru
16. Sri Lanka
17. Armenia
18. Fiji
19. Nepal
20. Suriname
21. Aruba
22. Finland
23. Netherlands
24. Sweden
25. Australia
26. France
27. New Zealand
28. Switzerland
29. Austria
30. Georgia
31. Nicaragua
32. Syrian Arab Republic
33. Azerbaijan
34. Germany
35. Norway
36. Tajikistan
37. Bahrain
38. Gibraltar
39. Oman
40. Thailand
41. Bangladesh
42. Greece
43. Pakistan
44. Tonga
45. Barbados
46. Greenland
47. Palau
48. Trinidad and Tobago
49. Belarus
50. Grenada
51. Panama
52. Turkey
53. Belize
54. Guatemala
55. Papua New Guinea
56. Turkmenistan
57. Bermuda
58. Guyana
59. Paraguay
60. Tuvalu
61. Bhutan
62. Haiti
63. Peru
64. Ukraine
65. Bolivia
66. Honduras
67. Philippines
68. United Arab Emirates
69. Bosnia & Herzegovina
70. Hong Kong
71. Poland
72. United Kingdom
73. Brazil
74. Hungary
75. Portugal
76. Uruguay
77. Brunei Darussalam
78. Iceland
79. Qatar
80. Uzbekistan
81. Bulgaria
82. India
83. Romania
84. Vanuatu
85. Cambodia
86. Indonesia
87. Russian Federation
88. Yemen
89. Canada
90. Iran
91. Samoa
92. Chile
93. Iraq
94. San Marino
95. China
96. Ireland
97. Saudi Arabia
98. Colombia
99. Israel
100. Singapore
101. Costa Rica
102. Italy
103. Lebanon
104. Croatia
105. Jamaica
106. Lithuania
107. Cuba
108. Japan
109. Luxembourg
110. Cyprus
111. Jordan
112. Macedonia
113. Czech Republic
114. Kiribati
115. Malaysia
116. Denmark
117. Korea
118. Maldives
119. Dominica
120. Kuwait
121. Malta
122. Dominican Republic
123. Latvia
124. Marshall Islands

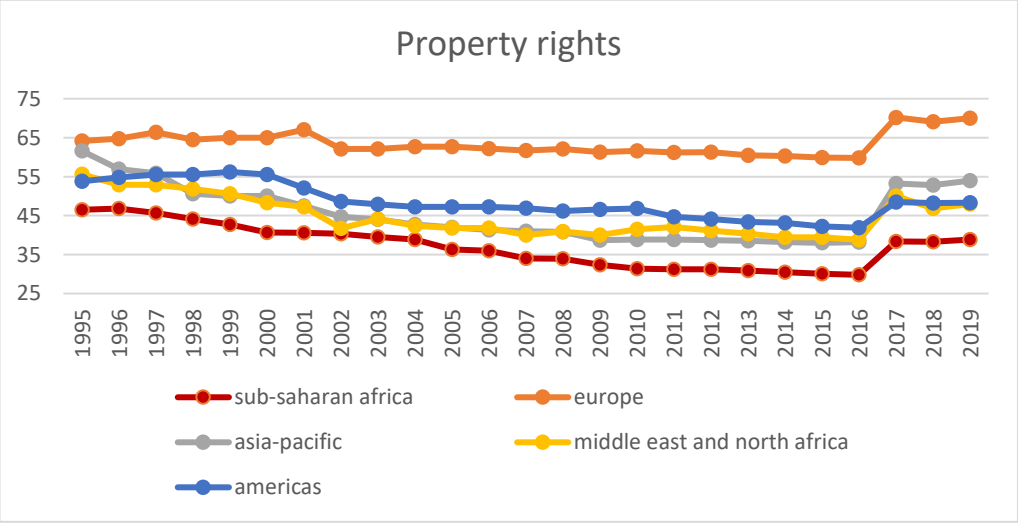
List of African Countries (part 2)

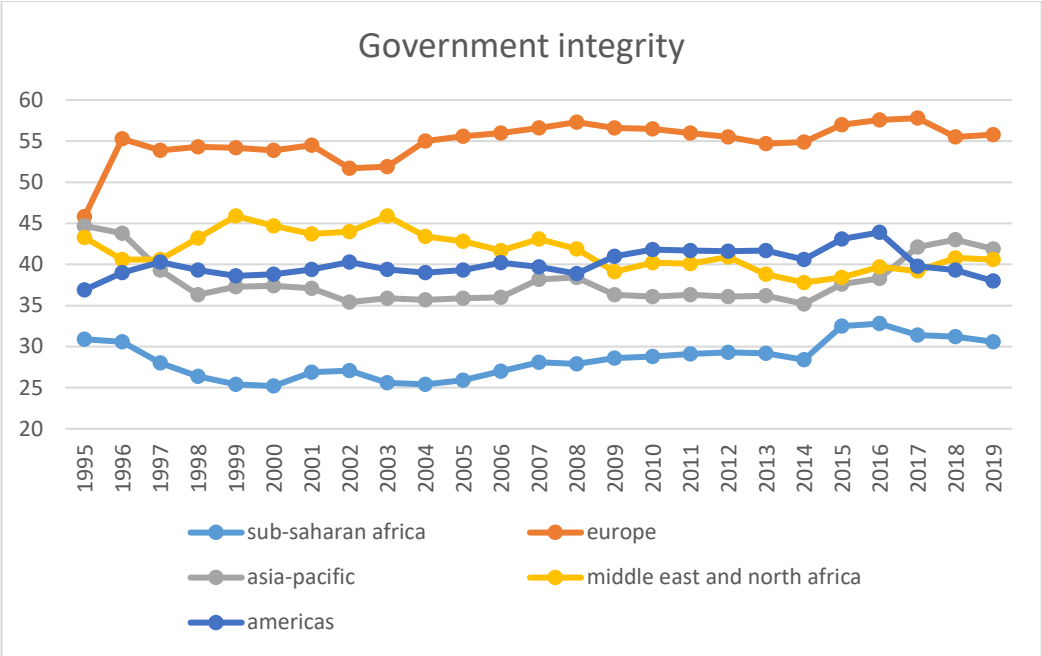
1. Algeria
2. Angola
3. Benin
4. Botswana
5. Burkina Faso
6. Burundi
7. Cabo Verde
8. Cameroon
9. Central African Republic
10. Chad
11. Comoros
12. Djibouti
13. Equatorial Guinea
14. Eritrea
15. Ethiopia
16. Gabon
17. Ghana
18. Guinea
19. Guinea-Bissau
20. Kenya
21. Lesotho
22. Liberia
23. Libya
24. Madagascar
25. Malawi
26. Mali
27. Mauritania
28. Mauritius
29. Morocco
30. Mozambique
31. Namibia
32. Niger
33. Nigeria
34. Rwanda
35. Sao Tome and Principe
36. Senegal
37. Seychelles
38. Sierra Leone
39. Somalia
40. South Africa
41. Sudan
42. Tanzania
43. Togo
44. Tunisia
45. Uganda
46. Zambia
47. Zimbabwe

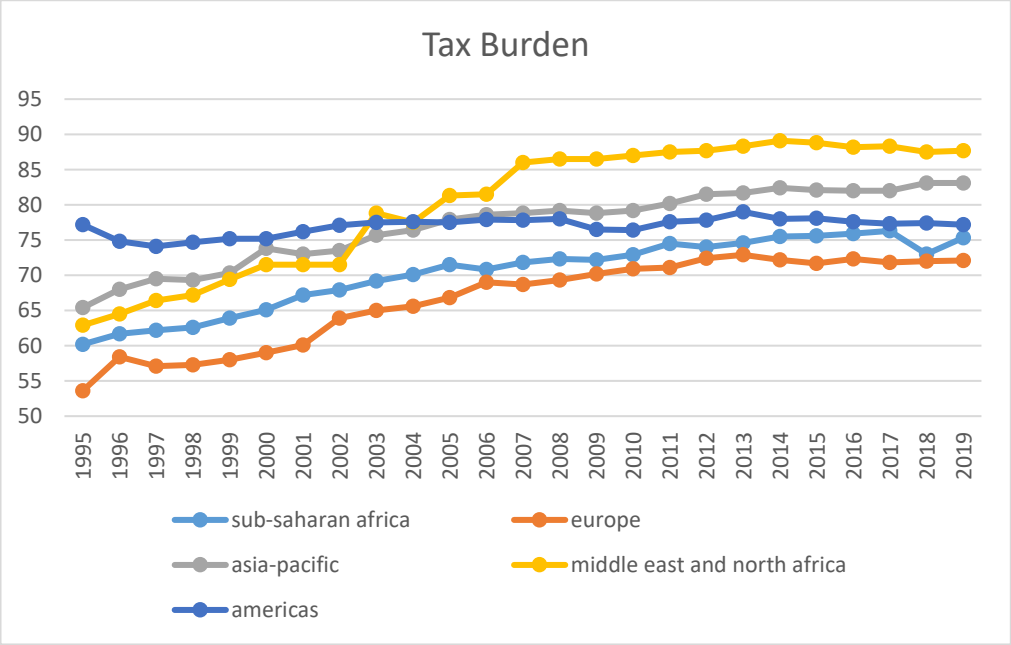
Appendix B: Additional results

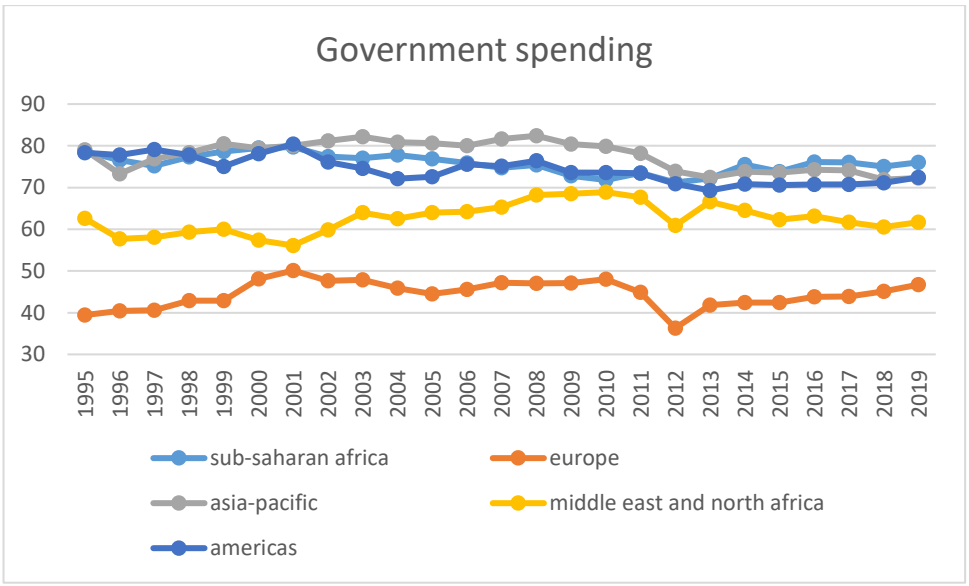
Correlation Matrix

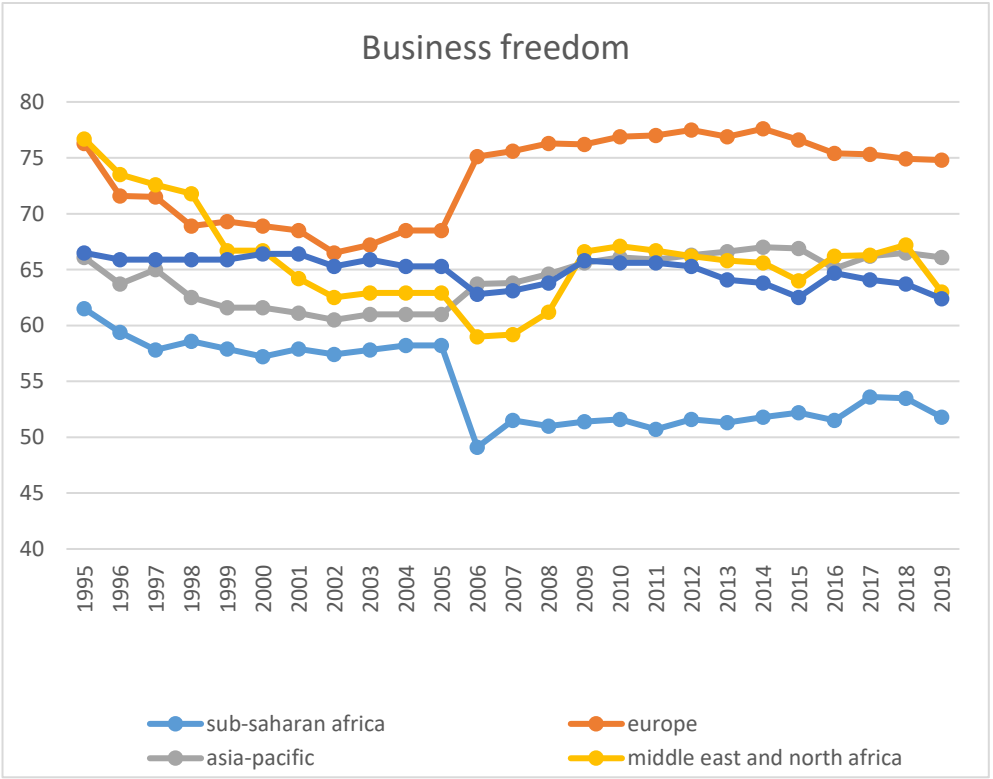
	cc	Ge	Pv	rq	rq	Rl	va	
cc	1.0000							
ge	0.8502	1.0000						
pv	0.6729	0.6401	1.0000					
rq	0.7470	0.8740	0.6195	1.0000				
rq	0.7470	0.8740	0.6195	1.0000	1.0000			
rl	0.8827	0.9121	0.7459	0.8772	0.8772	1.0000		
va	0.7166	0.7090	0.6221	0.7591	0.7591	0.7974	1.0000	
	pr	Gi	tb	Gs	bf	lf	Mf	if	ff
pr	1.0000								
gi	0.6686	1.0000							
tb	0.0055	0.0078	1.0000						
gs	0.0365	-0.1929	-0.0479	1.0000					
bf	0.5132	0.4112	0.2650	0.0350	1.0000				
lf	0.2293	0.1529	0.2823	-0.0542	0.3792	1.0000			
mf	0.2868	0.1677	-0.0608	0.2905	0.2234	0.0681	1.0000		
invf	0.5403	0.4812	0.1015	0.1346	0.4323	0.1672	0.4482	1.	
finf	0.5913	0.4377	0.0884	0.1414	0.3814	0.2551	0.3416	0.6354	1

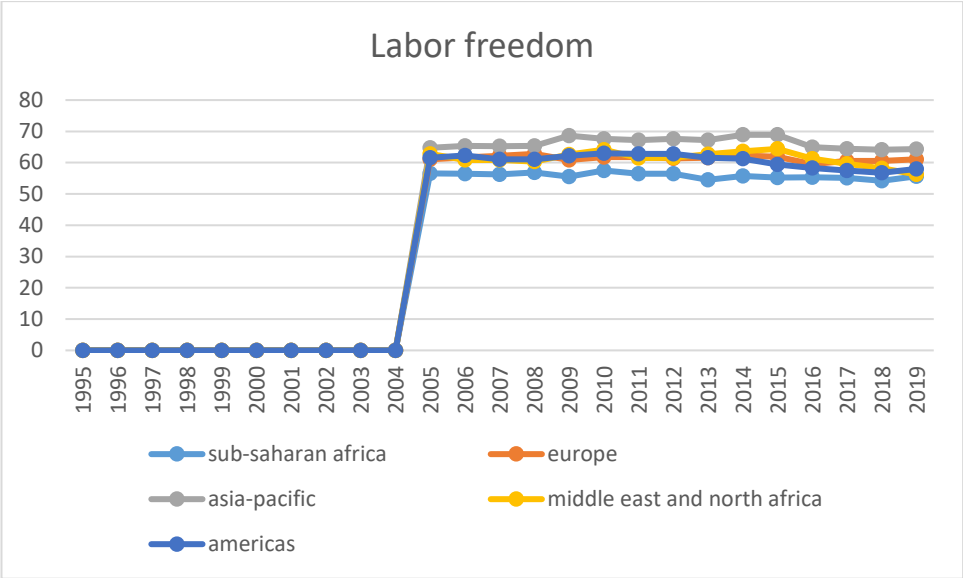


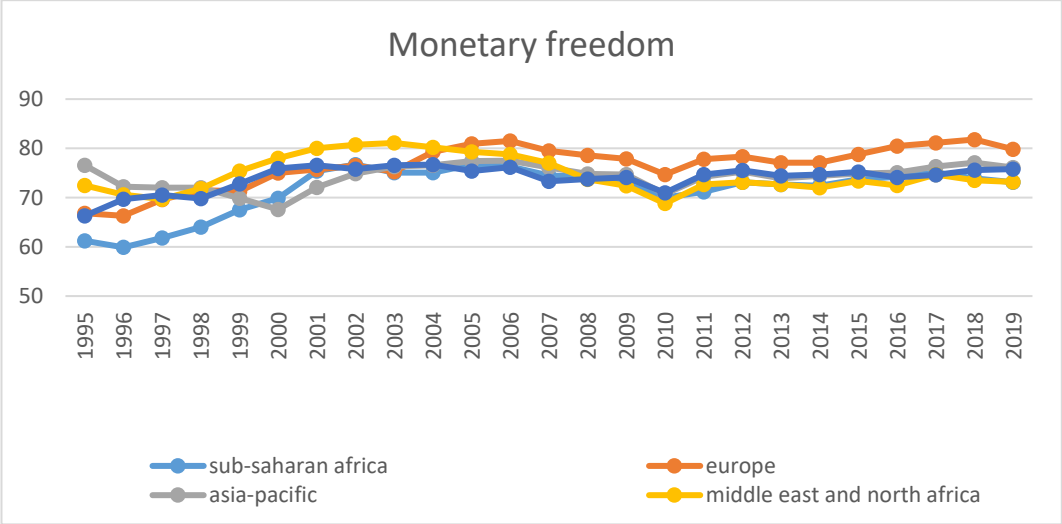

Government integrity
60
55
50
45
40
35
30
25
20
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
sub-saharan africa
europe
asia-pacific
middle east and north africa
americas

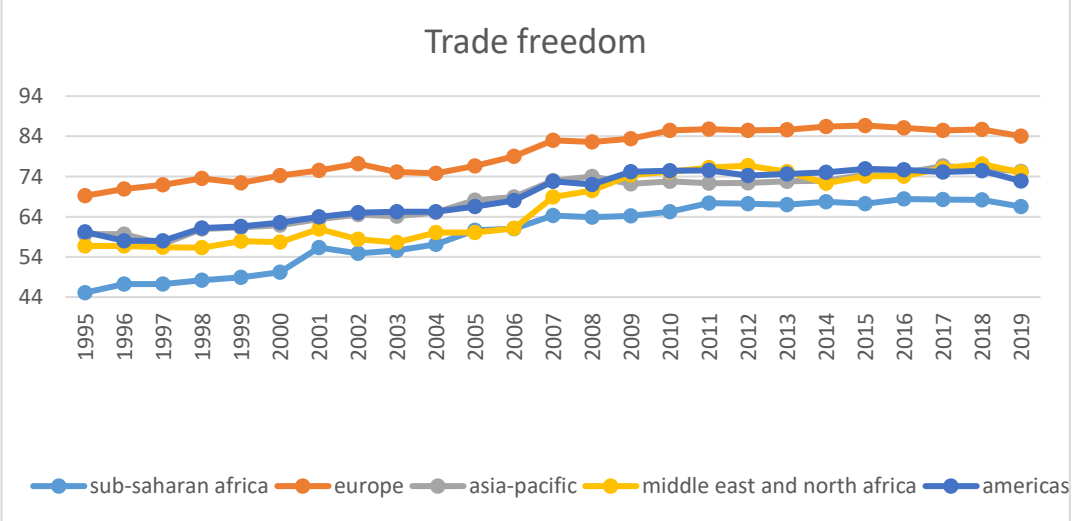

Tax Burden
95
90
85
80
75
70
65
60
55
50
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
sub-saharan africa
europe
asia-pacific
middle east and north africa
americas

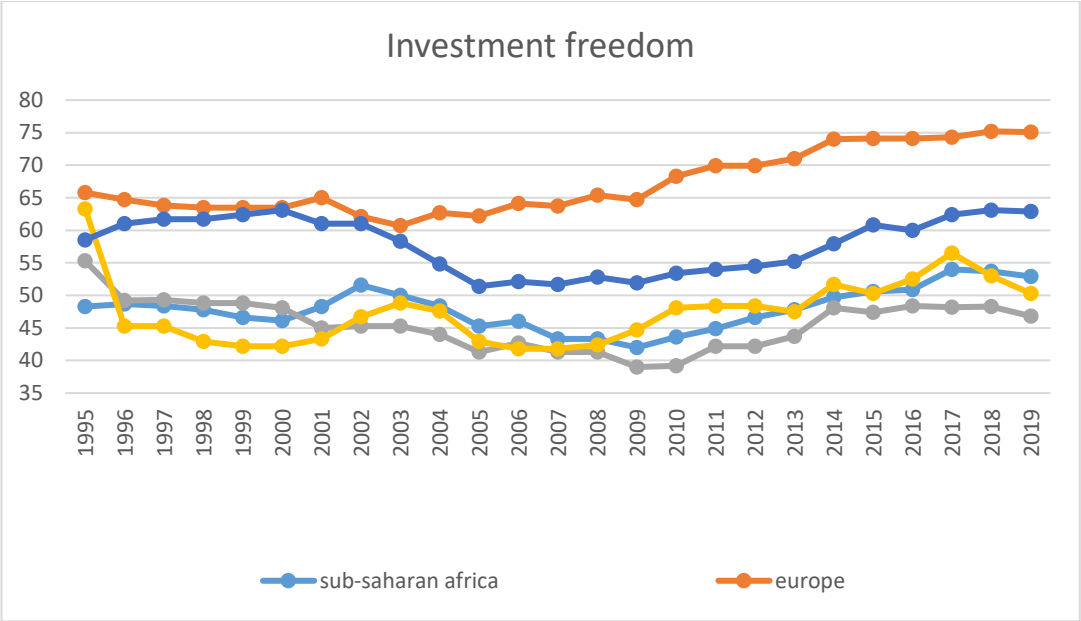

Government spending
90
80
70
60
50
40
30
1995 1996 1997 1998 1999 2000 2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014 2015 2016 2017 2018 2019
sub-saharan africa
europe
asia-pacific
middle east and north africa
americas

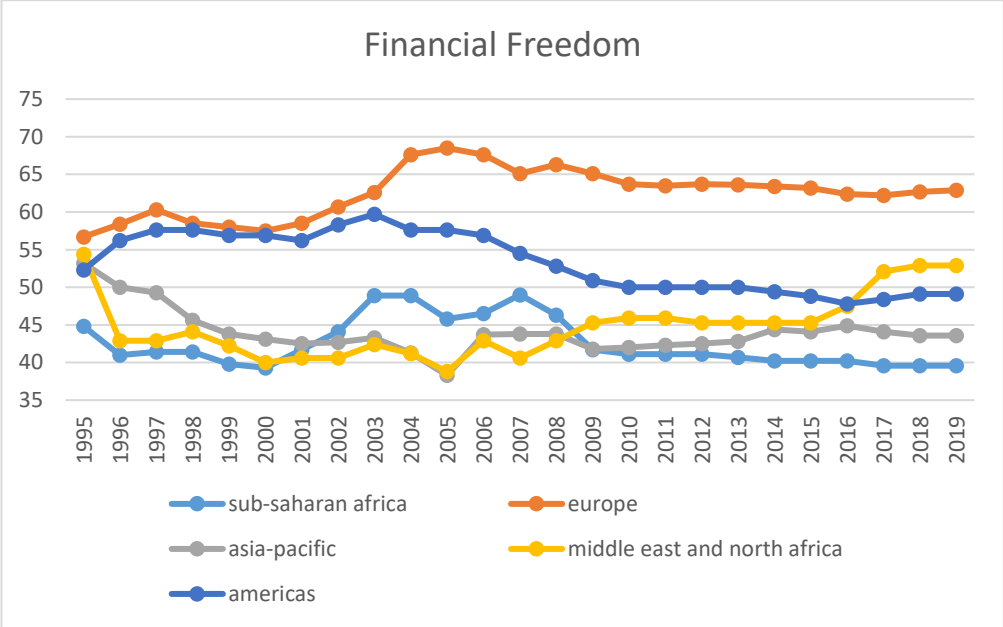

Business freedom
80
75
70
65
60
55
50
45
40
1995 1996 1997 1998 1999 2000 2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014 2015 2016 2017 2018 2019
sub-saharan africa
europe
asia-pacific
middle east and north africa


Labor freedom
80
70
60
50
40
30
20
10
0
1995 1996 1997 1998 1999 2000 2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014 2015 2016 2017 2018 2019
sub-saharan africa
europe
asia-pacific
middle east and north africa
americas


Monetary freedom
90
80
70
60
50
1995 1996 1997 1998 1999 2000 2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014 2015 2016 2017 2018 2019
sub-saharan africa
europe
asia-pacific
middle east and north africa


Trade freedom
94
84
74
64
54
44
1995 1996 1997 1998 1999 2000 2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014 2015 2016 2017 2018 2019
sub-saharan africa
europe
asia-pacific
middle east and north africa
americas


Investment freedom
80
75
70
65
60
55
50
45
40
35
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
sub-saharan africa
europe


Financial Freedom
75
70
65
60
55
50
45
40
35
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
sub-saharan africa
europe
asia-pacific
middle east and north africa
americas

bwdgvc VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)
Capital per worker	5.894***	5.589***	5.374***	5.034***	5.325***	5.183***
	(14.16)	(13.60)	(13.12)	(12.44)	(14.04)	(12.46)
Log of land area	-2.204***	-1.456***	-1.430***	-1.270***	-1.375***	-1.356***
	(-12.44)	(-8.669)	(-8.291)	(-7.770)	(-8.887)	(-8.279)
Natural resources	-0.0906***	-0.250***	-0.309***	-0.280***	-0.215***	-0.291***
	(-3.455)	(-9.860)	(-13.35)	(-12.22)	(-8.988)	(-10.40)
Log of distance	3.100	16.25***	21.34***	18.34***	15.04***	20.79***
	(1.446)	(7.886)	(11.67)	(9.703)	(8.115)	(11.01)
Log of real GDP	-6.566***	-7.319***	-6.352***	-6.347***	-6.772***	-6.246***
	(-14.99)	(-15.89)	(-14.62)	(-15.09)	(-16.83)	(-14.35)
Log of population	6.335***	4.313***	3.427***	3.095***	3.858***	3.148***
	(12.84)	(8.788)	(7.329)	(7.097)	(9.129)	(7.157)
Imports Tariffs	-0.162***	-0.113***	-0.0754**	-0.0935***	-0.0765**	-0.0550*
	(-4.780)	(-3.342)	(-2.273)	(-2.878)	(-2.500)	(-1.646)
Log of FDI	-0.00512	0.918***	0.978***	0.926***	0.790***	1.017***
	(-0.0341)	(6.776)	(6.770)	(6.985)	(6.191)	(7.563)
Low-skilled Labor	0.189***	0.180***	0.165***	0.170***	0.130***	0.158***
	(6.158)	(5.945)	(5.432)	(5.775)	(4.592)	(5.198)
Control of corruption	10.87***					
	(16.26)					
Government effectiveness		3.352***				
		(5.571)				
Political stability			0.769*			
			(1.761)			
Regulatory quality				2.470***		
				(4.878)		
Rule of law					4.688***	
					(8.251)	
Voice and accountability						1.056*
						(1.797)
Constant	31.84	-64.75***	-119.9***	-85.92***	-53.32***	-113.2***
	(1.554)	(-3.107)	(-6.631)	(-4.498)	(-2.857)	(-6.071)
Observations	836	836	836	836	836	836
Number of cid	47	47	47	47	47	47

fwdgvc VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)
Capital per worker	1.193***	0.940***	1.242***	-4.492***	-4.439***	-4.065***
	(6.064)	(4.684)	(5.658)	(-5.873)	(-5.083)	(-4.695)
Log of land area	0.857***	1.272***	0.891***	2.254***	2.889***	2.827***
	(12.55)	(17.79)	(11.65)	(6.173)	(7.017)	(7.026)
Natural resources rents	0.248***	0.328***	0.00191	0.426***	0.265***	0.325***
	(21.51)	(28.02)	(0.191)	(12.88)	(6.955)	(9.015)
Log of distance	-10.95***	-12.33***	-2.504***	-26.37***	-20.46***	-20.95***
	(-22.58)	(-24.72)	(-3.806)	(-13.95)	(-9.982)	(-10.49)
Log of real GDP	-2.081***	-3.900***	0.00917	1.970**	2.230**	2.325***
	(-10.06)	(-17.31)	(0.0374)	(2.542)	(2.498)	(2.678)

Log of population	3.506***	3.845***	-0.624**	-1.699**	-2.184**	-1.776**
	(16.74)	(18.16)	(-2.215)	(-2.142)	(-2.348)	(-1.976)
Imports Tariffs	0.353***	0.294***	0.404***	0.696***	0.832***	0.843***
	(22.20)	(17.96)	(22.37)	(13.36)	(14.72)	(15.01)
Log of FDI	0.227***	0.153**	1.001***	1.224***	1.631***	1.109***
	(3.316)	(2.199)	(12.42)	(5.831)	(6.865)	(4.116)
Low-skilled Labor	-0.141***	-0.123***	-0.154***	-0.409***	-0.508***	-0.506***
	(-9.327)	(-7.962)	(-9.139)	(-7.109)	(-7.934)	(-7.979)
Control of corruption	6.670***					
	(18.68)					
Government effectiveness		10.61***				
		(27.79)				
Political stability			-6.122***			
			(-18.27)			
Regulatory quality				7.947***		
				(9.427)		
Rule of law					0.714	
					(0.752)	
Voice and accountability						3.399***
						(3.979)
Constant	106.3***	154.8***	28.56***	243.4***	178.2***	182.9***
	(21.61)	(28.39)	(4.450)	(12.58)	(8.522)	(9.059)
Observations	704	704	704	836	836	836
Number of cid	47	47	47	47	47	47

Gvcpos VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)
Capital per worker	-0.000785	-0.00542**	-0.0105***	-0.0566***	-0.0586***	-0.0570***
	(-0.343)	(-2.406)	(-4.518)	(-8.790)	(-10.70)	(-9.837)
Log of land area	0.0130***	0.0121***	0.0143***	0.0229***	0.0236***	0.0228***
	(16.58)	(15.08)	(17.52)	(8.142)	(9.644)	(8.845)
Natural resources rents	-5.98e-08	0.000877***	0.00111***	0.00465***	0.00317***	0.00370***
	(-0.000449)	(6.566)	(10.37)	(15.59)	(11.24)	(12.63)
Log of distance	-0.0856***	-0.0914***	-0.0474***	-0.280***	-0.236***	-0.308***
	(-15.37)	(-16.51)	(-6.546)	(-11.99)	(-11.49)	(-14.72)
Log of real GDP	0.00742***	0.0123***	0.0156***	0.0528***	0.0608***	0.0467***
	(3.167)	(5.018)	(6.064)	(8.626)	(11.50)	(8.257)
Log of population	0.00754***	0.0123***	-0.00570*	-0.0250***	-0.0373***	-0.0303***
	(3.209)	(5.351)	(-1.912)	(-3.887)	(-6.690)	(-5.183)
Imports Tariffs	0.00270***	0.00302***	0.00328***	0.00441***	0.00287***	0.00343***
	(14.50)	(16.54)	(16.95)	(8.713)	(6.294)	(7.220)
Log of FDI	0.00727***	0.00550***	0.00805***	0.00234	0.00417**	0.00604***
	(9.091)	(7.030)	(9.272)	(1.234)	(2.545)	(3.370)
Low-skilled Labor	- 0.00209***	-0.00197***	- 0.00165***	- 0.00428***	- 0.00374***	- 0.00395***
	(-12.19)	(-11.67)	(-9.294)	(-9.166)	(-9.158)	(-9.186)
Control of corruption	-0.0748***					
	(-17.62)					
Government effectiveness		-0.0389***				
		(-8.512)				
Political stability			-0.0472***			
			(-12.10)			
Regulatory quality				-0.0357***		
				(-4.136)		
Rule of law					-0.0992***	
					(-12.93)	
Voice and accountability						-0.0651***
						(-9.473)
Constant	0.344***	0.277***	0.0212	1.947***	1.477***	2.339***
	(6.108)	(4.547)	(0.302)	(8.615)	(7.471)	(11.68)
Observations	836	836	836	836	836	836
Number of cid	47	47	47	47	47	47

z-statistics in parentheses*** p<0.01, ** p<0.05, * p<0.1

lngvcpart variables	(1)	(2)	(3)	(4)	(5)	(6)
Capital per worker	0.0506***	0.0524***	0.0675***	0.119***	0.131***	0.135***
	(14.35)	(15.10)	(20.93)	(16.58)	(17.77)	(18.52)
Log of land area	-0.00920***	-0.00423***	-0.0108***	-0.0187***	-0.0197***	-0.0197***
	(-7.584)	(-3.425)	(-9.533)	(-5.965)	(-5.981)	(-6.056)
Natural resources rents	0.00377***	0.00355***	0.000345**	0.00110***	0.000902**	-0.000652*
	(18.38)	(17.26)	(2.325)	(3.315)	(2.375)	(-1.764)
Log of distance	-0.218***	-0.224***	-0.181***	0.0203	0.0383	0.0698***
	(-25.34)	(-26.21)	(-17.90)	(0.779)	(1.386)	(2.649)
Log of real GDP	-0.0458***	-0.0673***	-0.0403***	-0.103***	-0.113***	-0.115***
	(-12.68)	(-17.87)	(-11.24)	(-15.12)	(-15.92)	(-16.10)
Log of population	0.0477***	0.0446***	0.0287***	0.0753***	0.0886***	0.0839***
	(13.16)	(12.56)	(6.913)	(10.51)	(11.79)	(11.40)
Imports Tariffs	0.000698**	6.69e-05	0.000135	0.00165***	0.00253***	0.00144**
	(2.431)	(0.238)	(0.501)	(2.932)	(4.120)	(2.409)
Log of FDI	-0.0149***	-0.0135***	-0.00872***	-0.00437**	-0.00261	0.00101
	(-12.08)	(-11.21)	(-7.208)	(-2.071)	(-1.183)	(0.445)
Low-skilled Labor	-0.000567**	-0.000538**	-0.00105***	-0.00193***	-0.00230***	-0.00195***
	(-2.142)	(-2.066)	(-4.242)	(-3.718)	(-4.172)	(-3.594)
Control of corruption	0.145***					
	(22.07)					
Government effectiveness		0.142***				
		(20.23)				
Political stability			-0.00645			
			(-1.186)			
Regulatory quality				0.0818***		
				(8.505)		
Rule of law					0.0494***	
					(4.779)	
Voice and accountability						-0.0246***
						(-2.836)
Constant	10.98***	11.50***	10.61***	9.305***	9.080***	8.770***
	(126.2)	(122.8)	(108.7)	(36.94)	(34.12)	(34.74)
Observations	836	836	836	836	836	836
Number of cid	47	47	47	47	47	47

z-statistics in parentheses *** p<0.01, ** p<0.05, * p<0.1

Appendix C: Data and STATA commands

```
*SETTING DIRECTORY AND MEMORY
cd "C:\Users\User\Desktop\THESIS\Draft of paper\Final data"
 **********Clear memory and set parameters***************
        clear all
        set more off
        clear matrix
        set memory 500m
        set matsize 9000
        set maxvar 32767
*****************************LOADING DATA**********************
cd "C:\Users\sabim\Desktop\COMPLETE BACK UP
        FILES\Users\User\Desktop\THESIS\Draft of paper\Final data"
        use thesisdata2, clear
keep if year == 2000 | year == 2004 | year == 2008 | year == 2012 | year == 2016
compress
*****************GENERATING
        VARIABLES*****************************
egen aveexport1 = mean ( export1), by ( exporter)
egen aveimport1 = mean ( import1), by ( exporter)
egen avetrade1 = mean (trade1), by ( exporter)
gen logaveexport1 = log( aveexport1)
gen logaveimport1 = log( aveimport1)
gen logavetrade1 = log( avetrade1)
egen aveecoins = mean ( ecoins ), by ( exporter)
```

```
gen avepolinst = (coc + goveff + polstab + regq + rol + voa)/6

********Generation of fixed effect dummies********************

xi i.exporter*i.year , noomit pre(F_1)

xi i.importer*i.year , noomit pre(F_2)

*********generating remoteness indexes for importer and
        exporter*******************

bysort exporter year: egen REM_EXP = total( dist / ( gdp_exporter / gdptotal ))

generate ln_REM_EXP = ln(REM_EXP)

bysort importer year: egen REM_IMP = total(dist / ( gdp_importer / gdptotal2 ))

generate ln_REM_IMP = ln(REM_IMP)

****************rescaling of variables*******************************

gen export1 = export/1000000000

gen import1 = import/1000000000

gen trade1 = trade/1000000000

gen  ln_REM_EXP1 = ln_REM_EXP/10

gen  ln_REM_IMP1 = ln_REM_IMP/10

gen  lngdp_exporter1 = lngdp_exporter/10

gen  lngdp_importer1 = lngdp_importer /10

**GROUPING VARIABLES***************

global econs pright govint govspen busfree labfree monfree tradefree invfree finfree

global pol coc goveff polstab regq rol voa

global gravar lngdp_exporter1 lngdp_importer1 lndist comcol comlang_off  rta
        ln_REM_EXP1

***PRELIMINARY ANALYSIS**

********Descriptive statistics************************
```

```
outreg2 using decriptives, word sum (log) keep ($pol $econs export1 import1
        lngdp_exporter lngdp_importer distw trade1) replace
********Graphs************************
use useddata1, clear
****************Relationship between Economic institutions and bilateral
        trade***************
quietly aaplot logaveexport1 aveecoins, mlabel(exporter) name (escatexport, replace)
qui aaplot logaveimport1 aveecoins, mlabel(exporter) name (escatimport, replace)
qui aaplot logavetrade1 aveecoins, mlabel(exporter)name (escattrade, replace)
****************Relationship between Political  institutions and bilateral
        trade***************
qui aaplot logaveexport1 avepolinst, mlabel(exporter) name (pscatexport, replace)
qui aaplot logaveimport1 avepolinst, mlabel(exporter) name (pscatimport, replace)
qui aaplot logavetrade1 avepolinst, mlabel(exporter) name (pscattrade, replace)
graph combine escatexport pscatexport
graph combine escatimport pscatimport
graph combine escattrade pscattrade
graph combine pscatexport pscatimport pscattrade


***********************************************
***********************Estimations************************************
        *******
**********ppmlhdfe  trade1 $gravar, a(code#year pcode#year)
global econs pright  coc govspen busfree labfree monfree  govint invfree finfree
global pol coc goveff polstab regq rol voa
```

```
global gravar  distcap  comlang_off  comcol  rta
**********estimations**********
global gravar  distw  comlang_off  colony comcol  rta
ppmlhdfe  export1 $gravar, a(code#year pcode#year)
outreg2 using thesisbasic, word replace label
ppmlhdfe  import1 $gravar, a(code#year pcode#year)
outreg2 using thesisbasic, word append label
ppmlhdfe  trade1 $gravar, a(code#year pcode#year)
outreg2 using thesisbasic, word append label
**********Good estimates for pol
global pol coc goveff polstab regq rol voa
ppmlhdfe  import $gravar $pol, a(imp#year  i.imp   ) cluster (exp#imp exp#year )
outreg2 using thesispol, word replace label
ppmlhdfe  export $gravar $pol, a(imp#year  i.imp   ) cluster (exp#imp exp#year )
outreg2 using thesispol, word append label
ppmlhdfe  trade $gravar $pol, a(imp#year  i.imp   ) cluster (exp#imp exp#year )
outreg2 using thesispol, word append label
***Good estimates for components of econonomic institutions
global econs pright coc govspen busfree  monfree  govint invfree finfree
global gravar  distw  comlang_off  colony comcol  rta
ppmlhdfe  import $gravar $econs , a( i.imp i.exp) cluster (exp#year imp#year i.year)
outreg2 using thesisecoins, word replace
ppmlhdfe  export $gravar $econs , a( i.imp i.exp) cluster (exp#year imp#year i.year)
outreg2 using thesisecoins, word append
ppmlhdfe  trade $gravar $econs , a( i.imp i.exp) cluster (exp#year imp#year i.year)
```

```
outreg2 using thesisecoins, word append

***Good estimates for overall econonomic institutions
ppmlhdfe  import $gravar ecoins , a( i.imp i.exp  ) cluster (exp#year imp#year i.year)
 outreg2 using overallcoins, word replace label
ppmlhdfe  export $gravar ecoins , a( i.imp i.exp ) cluster (exp#year imp#year i.year)
 outreg2 using overallcoins, word append label
ppmlhdfe  trade $gravar ecoins , a( i.imp i.exp ) cluster (exp#year imp#year i.year)
 outreg2 using overallcoins, word append label

ppmlhdfe  import1 $gravar $pol, a(pcode#year) cluster (code#year )
ppmlhdfe  export1 $gravar $pol, a(pcode#year) vce(robust)
ppmlhdfe  trade1 $gravar $pol, a(pcode#year) vce(robust)

ppmlhdfe  export $gravar $pol, cluster(code#year pcode#year code#pcode)
 ppmlhdfe  import1 $gravar $pol, cluster(code#year pcode#year code#pcode)
 ppmlhdfe  trade1 $gravar $pol, cluster(code#year pcode#year code#pcode)

 ppmlhdfe  import $gravar $pol, a(imp#year    ) cluster (exp#imp i.imp i.exp
        exp#year )

 ppmlhdfe  trade1 $gravar $pol ,  a( pcode#year ) cluster(code#year) separation(fe ir
        mu) exposure(code)
```

```
ppmlhdfe  import1 $gravar $pol ,  a( pcode#year ) cluster(code#year) separation(fe
        ir mu) exposure(code)
ppmlhdfe  export1 $gravar $pol ,  a( pcode#year ) cluster(code#year) separation(fe ir
        mu) exposure(code)

**********************************************************************
        **********************************************************
**********
**********GVC and institutions in africa**********
cd "C:\Users\sabim\Desktop\THESIS\ONGOING PAPERS\GLOBAL VALUE
        CHAIN\SELECTED ARTICLES\DATA"
use "C:\Users\sabim\Desktop\THESIS\ONGOING PAPERS\GLOBAL VALUE
        CHAIN\SELECTED ARTICLES\DATA\compileddata.dta"
**********estimations

******xtabond2 gdp L.gdp fdi gfcf iq hc fd ele inf, gmm(L.gdp fdi gfcf inf,
        laglimits(2 2) eq(level) collapse) gmm(L.gdp fdi gfcf inf, laglimits(0
        0)eq(diff) collapse) iv( ele hc iq fd, eq(level)) twostep robust nodiffsargan
*use "C:\Users\sabim\Desktop\THESIS\ONGOING PAPERS\GLOBAL VALUE
        CHAIN\SELECTED ARTICLES\DATA\latestdata.dta"
xtset cid year
global control lncapratio lnland nrent lnavedist lnrgdp lnpop tariff lnfdi  lskill
global ecoinst pr gi gs bf lf mf tf invf finf tb
global polinst cc rl pv rq va ge
pwcorr $ecoinst
```

```
pwcorr $polinst

*******Baseline models tests

*xtabond2 bwdgvc  $control ,  gmm( l.bwdgvc, laglimit (7 7) eq(level))  gmm(
        l.bwdgvc, laglimit (0 0) eq(diff) ) twostep

*outreg2 using baseline, word ctitle(Backward participation) stats(coef tstat) replace
        label

*xtabond2 fwdgvc  $control ,   gmm( l.fwdgvc, laglimit (1 1) eq(level))  gmm(
        l.fwdgvc, laglimit (3 3) eq(diff) ) twostep

*outreg2 using baseline, word ctitle(Forward participation) stats(coef tstat) append
        label

*xtabond2 gvcpos  $control ,   gmm( l.gvcpos, laglimit (1 1) eq(level))  gmm(
        l.gvcpos, laglimit (3 3) eq(diff) ) twostep

*outreg2 using baseline, word ctitle(Upstreamness) stats(coef tstat) append label

*xtabond2 gvcpart  $control ,   gmm( gvcpart, laglimit (1 1) eq(level))  gmm(
        l.gvcpart, laglimit (2 2) eq(diff) ) twostep

*outreg2 using baseline, word ctitle(total GVC) stats(coef tstat) append label


***xtabond2 bwdgvc  $control ,  gmm( bwdgvc, laglimit (0 0)) gmm( l.bwdgvc,
        laglimit (1 1) collapse eq(diff) ) twostep

xtabond2 bwdgvc  $control ,  gmm( l1.bwdgvc, laglimit (12 1))

outreg2 using baseline, word ctitle(Backward participation) stats(coef tstat) replace
        label

*xtabond2 fwdgvc  $control ,  gmm( l.fwdgvc, laglimit (1 1)) gmm( l.fwdgvc,
        laglimit (0 0) collapse eq(diff) ) twostep

xtabond2 fwdgvc  $control ,  gmm( l1.fwdgvc, laglimit (12 1))
```

```
outreg2 using baseline, word ctitle(Forward participation) stats(coef tstat) append
        label
*xtabond2 gvcpos  $control ,  gmm( l.gvcpos, laglimit (1 1)) gmm( l.gvcpos, laglimit
        (0 0) collapse eq(diff) ) twostep
xtabond2 gvcpos  $control ,  gmm( l1.gvcpos , laglimit (12 1))
outreg2 using baseline, word ctitle(Upstreamness) stats(coef tstat) append label
*xtabond2 lngvcpart  $control ,  gmm( l.lngvcpart, laglimit (0 0)) gmm( l.lngvcpart,
        laglimit (0 0) collapse eq(diff) ) twostep
xtabond2 lngvcpart  $control ,  gmm( l1.lngvcpart, laglimit (12 1))
outreg2 using baseline, word ctitle(total GVC) stats(coef tstat) append label

*******Models with economic institutions
*xtabond2 bwdgvc  $control $ecoinst ,  gmm( l1.bwdgvc, laglimit (0 0))gmm(
        l1.bwdgvc, laglimit (1 1) collapse eq(diff) ) twostep
xtabond2 bwdgvc  $control $ecoinst ,  gmm( l1.bwdgvc, laglimit (12 1))
outreg2 using ecoinst, word ctitle(Backward participation) stats(coef tstat) replace
*xtabond2 fwdgvc  $control $ecoinst,   gmm( l.fwdgvc, laglimit (6 6))   gmm(
        l.fwdgvc, laglimit (0 0) eq(diff) ) twostep
xtabond2 fwdgvc  $control $ecoinst,  gmm( l1.fwdgvc, laglimit (12 1))
outreg2 using ecoinst, word ctitle(Forward participation) stats(coef tstat) append
*xtabond2 gvcpos  $control $ecoinst,   gmm( l.gvcpos, laglimit (3 3))   gmm(
        l.gvcpos, laglimit (1 1) eq(diff) ) twostep
xtabond2 gvcpos  $control $ecoinst,  gmm( l1.gvcpos , laglimit (12 1))
outreg2 using ecoinst, word ctitle(Upstreamness) stats(coef tstat) append
```

```
*xtabond2 lngvcpart  $control $ecoinst,   gmm( l.lngvcpart, laglimit (3 3))   gmm(
        l.lngvcpart, laglimit (1 1) collapse eq(diff) ) twostep
xtabond2 lngvcpart  $control $ecoinst,  gmm( l1.lngvcpart, laglimit (12 1))
outreg2 using ecoinst, word ctitle(total GVC) stats(coef tstat) append


**********Backward GVCs participation
**********Political institutions
global control lncapratio lnland nrent lnavedist lnrgdp lnpop tariff lnfdi  lskill
xtabond2 bwdgvc  $control cc,  gmm( l1.bwdgvc, laglimit (12 1))
outreg2 using bwdgvcpol, word ctitle(Control of corruption) stats(coef tstat) replace
xtabond2 bwdgvc  $control ge,  gmm( l1.bwdgvc, laglimit (12 1))
outreg2 using bwdgvcpol, word ctitle(Governmet effectiveness) stats(coef
        tstat)append
xtabond2 bwdgvc  $control pv,  gmm( l1.bwdgvc, laglimit (12 1))
outreg2 using bwdgvcpol, word ctitle(Political stability) append stats(coef tstat)
xtabond2 bwdgvc  $control rq ,  gmm( l1.bwdgvc, laglimit (12 1))
outreg2 using bwdgvcpol, word ctitle(Regulatory quality) append  stats(coef tstat)
xtabond2 bwdgvc  $control rl ,  gmm( l1.bwdgvc, laglimit (12 1))
outreg2 using bwdgvcpol, word ctitle(Rule of law) append  stats(coef tstat)
xtabond2 bwdgvc  $control va ,  gmm( l1.bwdgvc, laglimit (12 1))
outreg2 using bwdgvcpol, word ctitle(Voice and accountability) append  stats(coef
        tstat)
******Forward participation
**********Political institutions
xtabond2 fwdgvc  $control cc, iv(  L3.$control) gmm( l1.fwdgvc)
```

```
outreg2 using fwdgvcpol, word ctitle(Control of corruption) replace stats(coef tstat)
xtabond2 fwdgvc  $control ge, iv(  L3.$control) gmm( l1.fwdgvc)
outreg2 using fwdgvcpol, word ctitle(Governmet effectiveness) append stats(coef
        tstat)
xtabond2 fwdgvc  $control pv, iv(  L3.$control) gmm( l1.fwdgvc)
outreg2 using fwdgvcpol, word ctitle(Political stability) append stats(coef tstat)
xtabond2 fwdgvc  $control rq ,  gmm( l1.fwdgvc)
outreg2 using fwdgvcpol, word ctitle(Regulatory quality) append stats(coef tstat)
xtabond2 fwdgvc  $control rl ,  gmm( l1.fwdgvc)
outreg2 using fwdgvcpol, word ctitle(Rule of law) append stats(coef tstat)
xtabond2 fwdgvc  $control va ,  gmm( l1.fwdgvc)
outreg2 using fwdgvcpol, word ctitle(Voice and accountability) append stats(coef
        tstat)


**********Upstreamness
**********Political institutions
xtabond2 gvcpos  $control cc, iv(  L3.$control) gmm( l1.gvcpos)
outreg2 using gvcpospol, word ctitle(Control of corruption) replace stats(coef tstat)
xtabond2 gvcpos  $control ge, iv(  L3.$control) gmm( l1.gvcpos)
outreg2 using gvcpospol, word ctitle(Governmet effectiveness) append stats(coef
        tstat)
xtabond2 gvcpos  $control pv, iv(  L3.$control) gmm( l1.gvcpos)
outreg2 using gvcpospol, word ctitle(Political stability) append stats(coef tstat)
xtabond2 gvcpos  $control rq ,  gmm( l1.gvcpos)
outreg2 using gvcpospol, word ctitle(Regulatory quality) append stats(coef tstat)
```

```
xtabond2 gvcpos  $control rl ,  gmm( l1.gvcpos)
outreg2 using gvcpospol, word ctitle(Rule of law) append stats(coef tstat)
xtabond2 gvcpos  $control va ,  gmm( l1.gvcpos)
outreg2 using gvcpospol, word ctitle(Voice and accountability) append stats(coef
        tstat)

**********GVC participation
**********Political institutions
xtabond2 lngvcpart  $control cc, iv(  L3.$control) gmm( l1.gvcpos)
outreg2 using gvcpart1, word ctitle(Control of corruption) replace stats(coef tstat)
xtabond2 lngvcpart  $control ge, iv(  L3.$control) gmm( l1.gvcpos)
outreg2 using gvcpart1, word ctitle(Governmet effectiveness) append stats(coef tstat)
xtabond2 lngvcpart  $control pv, iv(  L3.$control) gmm( l1.gvcpos)
outreg2 using gvcpart1, word ctitle(Political stability) append stats(coef tstat)
xtabond2 lngvcpart  $control rq ,  gmm( l1.gvcpos)
outreg2 using gvcpart1, word ctitle(Regulatory quality) append stats(coef tstat)
xtabond2 lngvcpart  $control rl ,  gmm( l1.gvcpos)
outreg2 using gvcpart1, word ctitle(Rule of law) append stats(coef tstat)
xtabond2 lngvcpart  $control va ,  gmm( l1.gvcpos)
outreg2 using gvcpart1, word ctitle(Voice and accountability) append stats(coef tstat)
```