The impact of international trade on economic growth in Sub-Saharan African countries.

An empirical study examination of the correlation between economic growth and international trade.

By: Sami Ezzaher & Yasin Ahmed Farah

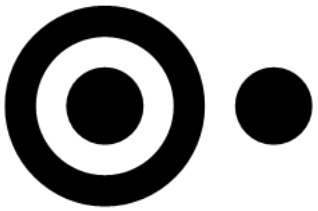
Supervisor: Johanna Palmberg

Södertörn University | School of Economics

Bachelor's essay 15 hp

Bachelor Thesis/C-uppsats | Spring Semester 2022

(Economics and Business, Bachelor´s Programme, Specialisation Economics, 180 credits)



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Sammanfattning

Denna forskningsstudies syfte är att undersöka sambandet mellan internationell handel och ekonomisk tillväxt och effekten som internationell handel har på ekonomisk tillväxt i afrikanska länder söder om Saharaöknen (Subsahariska Afrika). Majoriteten av tidigare studier och forskning inom detta område hävdar att det finns ett positivt korrelation mellan dessa två variabler men ändå så finns det fortfarande vissa som ifrågasätter hur pass stor påverkan dessa två variabler egentligen har, om den effekten verkligen är tillräckligt signifikant för att anses vara betydelsefullt samt viktig. Informationen och datan som använts i denna studie är tagna från World Bank Group (Världsbanken), Human Development Reports och Fraser Institute.

Studiens teoretiska referensram använder sig av tillväxtteorier, vilket bestod av Solow-modellen, endogen tillväxtteori och institutionell teori samt handelsteorier, som bestod av den Ricardianska modellen och Heckscher-Ohlin modellen för att bättre förklara konceptet av ekonomisk tillväxt och hur internationell handel kan komma att påverka processen till att uppnå ekonomisk tillväxt. Inom denna undersökning utfördes en panel-data studie med stöd av en regressionsanalys för att kunna mäta korrelationen mellan internationell handel och ekonomisk tillväxt. Den beroende variabeln för denna forskningsstudie var ekonomisk tillväxt i form av den *årliga BNP per capita-tillväxten* medan de oberoende variablerna innehöll bland annat *internationell handel, utbildning, kapital, befolkningstillväxt, arbetskraft, korruption och ekonomisk frihet*. Dessutom inkluderar undersökningen 36 utav de totala 48 möjliga länder i Subsahariska Afrika och är avgränsad till en tioårsperiod mellan 2009–2019.

Slutresultatet av denna studies forskning visar att det finns ett signifikant positivt korrelation mellan ekonomisk tillväxt och internationell handel och kommer då fram till slutsatsen att internationell handel faktiskt har en viktig effekt/påverkan och är därför nödvändig för att uppnå ekonomisk tillväxt.

Nyckelord: Internationell handel, ekonomisk tillväxt, BNP per capita-tillväxt, subsahariska afrika, tillväxtteorier, handelsteorier.

Abstract

The purpose of this research study is to examine the relationship between international trade and economic growth and the effect that international trade has on economic growth in sub-Saharan African countries (Sub-Saharan Africa). The majority of previous studies and research in this area claim that there is a positive correlation between these two variables, yet there are still some who question how much these two variables actually have influenced each other and if that effect is really significant enough to be considered significant as well as important. The information and data used in this study are taken from the World Bank Group, Human Development Reports and Fraser Institute.

The study's theoretical framework uses growth theories, which consisted of the Solow model and endogenous growth theory, and trade theories, which consisted of the Ricardian model, the Heckscher-Ohlin model, and institutional theory to better explain the concept of economic growth and how international trade can affect the process of achieving economic growth. Within this research, a panel dataset study was carried out with the support of a regression analysis in order to measure the correlation between international trade and economic growth. The dependent variable for this research study was economic growth in the form of *annual GDP per capita growth, while the independent variables included international trade, education, capital, population growth, labor force, corruption and economic freedom*. Additionally, the study includes thirty-six out of a total of forty-eight possible countries in sub-Saharan Africa and is limited to a ten-year period between 2009-2019.

The final result of this study's research shows that there is a significant positive correlation between economic growth and international trade and concludes that international trade actually has a very important effect/impact and is essential to achieving economic growth.

Keywords: International trade, economic growth, GDP per capita growth, sub-Saharan Africa, growth theories, trade theories.

Acknowledgements

We would like to express our gratitude to all the teachers who have helped us throughout the course of the study, including our supervisor Johanna Palmberg who helped guide us with her feedback and support on how we could further improve the essay.

Special thanks to our parents, who we are deeply grateful to for their continued support, encouragement and appreciation in our academic endeavours throughout everything and especially through these three university years.

Lastly, thanks to our fellow students who also helped improve the quality of this research paper!

Sami Ezzaher *Yasin Ahmed Farah*

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1. Introduction

Within this chapter the background to the chosen subject, the study's purpose, problem formulation and methods are presented. Also, the study´s boundaries and the outline of the essay are explained.

To find the answer to the reason why some countries are poor and their people live in poverty while other countries are rich and live in wealth is and has always been an important topic to research about in economics. Thomas Robert Malthus, who was an economist known for his "population growth philosophies" even stated in a letter to David Ricardo (who is known for the Ricardian model) that: "...the causes of the wealth and poverty of nations - [is] the grand object of all enquiries in political economy" (Landes 1999, p. 8). Ultimately alot of the research and previous studies in this economic field have investigated different variables and reasons as to what actually results into achieving economic growth, and most if not all of them come to find out and conclude that recurring variables/factors such as international trade, capital, labor force, population growth, education, corruption and economic freedom all have a role in the process of reaching economic growth. Which is also why these variables were included in this study as they were found to be relevant to our research (Antwi et al. 2013; Cieślik & Goczek 2017; Gorlach & Roux 2015; Klasen & Lawson 2007; Sachs & Warner 1997; Yanikkaya 2003).

1.1 Background

Therefore, understanding the concept of economic growth is of great importance in order to be able to minimize a country's poverty and increase the quality of life in developing countries such as Sub-Saharan African countries. Economic growth can create several new opportunities in society (from education to job opportunities) that ultimately lead to prosperity. A high level of economic growth related to job opportunities helps improve the incentives for parents to invest in their children's education by sending them to school and motivating their children to complete their education. This in turn can lead to laying the foundation for the creation of a growing group of individuals consisting of entrepreneurs thanks to there being a higher rate of more educated individuals that completed their education, which often end up generating a larger pressure for improved governance. Which

is why usually the pursuit of economic growth leads to creating even more economic growth in the sense that it helps further advance the human development in a country in the first place, which results in achieving economic growth (Jobs, 2008).

Even today, this topic remains just as relevant and important because there are still developed countries that benefit more from international trade than the developing countries, which indicates that there are large economic gaps and differences between each country (inequality). The differences can be seen by measuring a countries economic growth with the help of several different measures such as GDP, where the welfare of a country is measured or also GDP per capita, where the economic output of each person is measured in order to gauge the prosperity/living standard of a country, but regardless of the measures used, it can be seen that inequalities between countries are relatively high whether you look at it from a health or economic perspective. For comparison, at the beginning of the 2000s "the average developed countries per capita income is seven times that of the average still developing country, in other words an average American from a developed country has an income that surpasses that of twenty-one average Africans combined" (Frieden, 2001).

However, in the recent decade of the 2010s, the Sub-Saharan continent of Africa has managed to develop and sustain a fast-growing economic growth with the help of investments during the later stages of the 2000s. But still much of this newly gained wealth did not result in helping nor combating the average low incomes or the lack of job opportunities and inequality which still remains high while also still being a recurring problem. Furthermore, other complications in the region such as for example lack of access to capital and poor infrastructure and institutions, also not to mention the instances where corruption occurs, continues to interfere and thwart economic growth/development, which is continually outpaced by their own rapidly growing population. Social, historical and political challenges including conflict, instability, poor political leadership and the remains of former colonialism, also hold the region back economically (World101, n.d.). And on top of that, events such as the global financial crisis that occurred in 2008 and a crash in the price of commodities (ex. palm oil, crude oil, iron ore and copper) which affected the whole continent of Africa and did not help whatsoever, led to further stalling their ongoing economic growth (World Bank 2016). Additionally, globalization has raised some concerns regarding the benefits it has on developing countries especially African countries. Sub-Saharan countries can gain from globalization just the same as all the other countries in other continents (Asia

and Middle East) have, and which are now growing faster in terms of economic aspects than the Sub-Saharan countries in Africa. If globalization is managed in the right way, which would mean that they would have to start taking advantage of the different channels of globalization such as trade, capital flows, migration, communication and technology, then African countries can expand their export and manufacturing industry capability through improved technologies and communication which leads to foreign attractions in terms of capital which in turn will result in new ideas and technology. A higher engagement in international trade will increase investment whereby a lot of job opportunities will be created and thus improve the Sub-Saharan African countries economic growth and the living standard in those countries (Barry, 2010).

1.2 Purpose

The aim of the study is to determine and analyse the effect that international trade has on economic growth in specifically Sub-Saharan African countries.

The study's research question:

How does international trade affect the economic growth of Sub-Saharan African countries?

1.3 Limitations

This research paper is limited in the sense that there are limitations both when it comes to the time period and the countries that will be included in the research that is being carried out. The research will focus on the sub-Saharan part of Africa where there are 48 countries in total, but since only 36 of these 48 countries had sufficient enough data in the very variables that this research paper will be based on, the remaining 12 countries were chosen to be excluded as they had insufficient data (shown in Appendix A). Furthermore, the time period has also been determined to be based on a ten-year period because the data that will be examined will be in recent years, 2009-2019 in order to look at the current state of the Sub-Saharan African countries.

1.4 Method

To investigate the chosen problem statement, a panel-dataset study has been performed using one regression analysis. This is to examine how international trade affects economic growth in particularly Sub-Saharan African countries. The data used is secondary data obtained from the World Bank, Human Development Reports and Fraser Institute websites. However, one should keep in mind that the statistical systems in many developing countries still have some shortcomings. There are large differences for each country's level in how they use statistical methods and how they define different indicators and concepts. Furthermore, parts of the World Bank data on some Sub-Saharan countries are incomplete due to conditions that affected the collection as for example, prior or ongoing conflicts in the countries concerned. The regression analysis will be used as a method in this study which will help us to examine the relationship or the covariation between different variables in order to answer our research question. Since the study is based on the impact international trade has on economic growth, the dependent variable in this study will be economic growth which in this study is defined as the annual GDP per capita growth (Sachs & Warner 1997), and the independent variable is international trade which is defined as the total sum of exports and imports of goods and services measured as a part of GDP (Sun & Heshmati 2010). Other variables that might affect the economic growth such as education, capital, population growth, labor force, corruption and economic freedom will be added in order to understand how precisely the variable international trade affects the economic growth compared to other variables. These variables that will be applied in this research paper are according to previous studies believed to be the main contributors to achieving economic growth and is the sole reason why they are used in this study.

1.5 Disposition

The next upcoming section deals with multiple previous studies explaining the principles of *international trade* and *economic growth*, how handling it in different ways affects economic growth. This will fulfil the purpose of providing a useful background into the chosen subject. This is later followed by the third section that contains a review of relevant theories involving a range of economic growth theories and trade theories. The fourth section presents the regression model, and this part also includes a description of the data used and a further detailed specification of selected variables. Section five deals with the result and contains a

regression as well as correlation analysis which with the help of the theory aims to contribute with some understanding of the problem area. Finally, the essay is summarized in the last section and the conclusion presented in an approach to answer the essay's originally stated research question.

2. Previous Studies

In the upcoming section the previous studies are presented and goes on to explain how international trade and economic growth are linked and affect one another.

The following studies have been selected because they explain the aspects of both international trade and economic growth, historically from the 1990s to the 2010s and how they are related to each other by explaining how international trade leads to economic growth. Furthermore, these studies explore and further explain how economic growth is generated, through various variables whereas some help stimulate economic growth and others instead obstruct it from happening at all.

2.1 Impact of international trade on economic growth in Nigeria

According to Adeleye, J. O., et al. (2015), global/international trade can be explained as simple as an exchange of goods and services between different countries around the world. At least two parties should be involved in the activity, that is all activity that involves trade across the country's own borders. Both parties/countries in trade engage in these economic activities in order to achieve the profit maximization created by the differences between the countries' international economic environment. Furthermore, it is also explained that the most important thing about the existence of international trade comes from the fact that no current country can produce all kinds of goods and services that its own population needs or wants to consume, largely due to resource differences and constraints each individual country has. As a result of this fact, the trade relationship between countries suggests that their economies need to export goods and services in order to generate sufficient revenue to finance the imported goods and services that cannot be produced domestically.

2.2 Sources of slow growth in African economies

Following the study made by Sachs & Warner (1997), Africa in general, including the Sub-Saharan countries, has historically had relatively low economic growth. If one were to compare Africa with other developing countries such as the ones in Asia, one would find, according to Sachs & Warner (1997), that Africa is lagging behind in the demographic transition towards factors such as lower fertility and reduced mortality. They conducted their study with the help of a cross-country regression model with a time period from 1965 to 1990. Their dependent variable for the study was growth per capita of ppp-adjusted GDP while their independent variables were institutional quality index, central government saving, average inflation, average national saving ratio, natural resource exports, life expectancy and population growth. Furthermore, Sachs & Warner explain that Africa, compared to other developing countries, has a relatively lower willingness to engage more in trade (in other words, lower rate of trade openness). Also, from a geographical point of view, Africa can be seen having a number of natural barriers that hinder economic growth: e.g. a large proportion of countries in Africa do not have access to the coast, an unfavourable tropical climate (which has complications such as soil quality, tropical diseases etc.) and highly dependent on natural resources (Sachs & Warner, 1997) believe that trade openness has a fairly significant role for economic growth because it affects, among other things, the income balance level within a country through several different factors (e.g. more job opportunities, higher knowledge dissemination, etc.). A higher willingness to become more involved in trade improves competition in the market and thus reduces the possibility of monopolies and promotes a more efficient use of limited resources and capital. International trade is often associated as a means of importing technological innovations and development that one does not have oneself, thus increasing a country's overall economic productivity. However, Africa still has a problem when it comes to the fact that their main export product is specifically specialized in raw materials, which in itself can be a disadvantage for achieving economic growth. Because the price of raw materials is in the long run declining in comparison with the price of other manufactured goods, which in turn leads to impairing/weakening their ability to exchange with other countries - in other words, Africa ends up having a weaker bargaining power (Bleaney & Greenway, 2001). But in the end, Sachs & Warner (1997) conclude that despite Africa's unfavourable natural starting point, it is still not impossible to achieve high economic growth through, for example, increased trade openness/involvement in international trade.

2.3 International trade and its effects on economic growth

Other previous studies in other regions of the world, like the one made by Sun & Heshmati (2010) which conducted a panel data study and used a regression model to examine China's 31 provinces/regions over a six year-period (2002 to 2007) and the variables that were used were real GDP, real capital stock, labor, R&D investments and international trade factors, such as net export ratio and high-tech exports ratio. The authors explain that these variables were used in their study because they were believed to all have an effect on economic growth. They go on to argue that, empirically, there seems to be evidence that international trade has a positive impact on a country's economic growth by facilitating technological progress, upgrading industrial structure, capital accumulation and institutional progress. More specifically, an increased import of capital and input products, which are not available on the domestic market, lead to an increase in productivity in manufacturing/production. Further active participation in the international market by promoting exporting in a more intense competition market among companies, will eventually lead to improvements in terms of productivity and technological innovations. Also learning by seeing others do what you want to learn can be faster in the export industry thanks to the knowledge and the technical dissemination effect that comes with it .

2.4 Trade openness and economic growth

Yanikkaya (2003) explored the connection between growth and a number of different measures of trade transparency. According to Yanikkaya (2003), there are basically two types of measures of transparency, such as those used where one group focuses on trading volume and the other on trading intensity. The research concludes that trade liberalization does not have a direct correlation with economic growth, but rather that according to the results based on the regression analysis for trade volume, shows that trade stimulates growth through a number of variables/factors such as economies of scale, technology transfers and comparative advantages. Yanikkaya (2003) also explained that the concept of trade openness, applied to trade policy, could be synonymous with the concept of neutrality. Neutrality simply means that the incentives are neutral between saving a unit on foreign exchange through import substitution and earn one unit of foreign exchange through export. Furthermore, it is explained how a strongly export-oriented economy can no longer be considered neutral in this sense, especially if it shifts incentives in favour of export production instruments such as export subsidies. Furthermore, it is also entirely possible for a regime to be neutral on

average, and yet intervene in specific sectors. Even previous studies and literature in this field is said to have been focusing too much on exports and too little on imports, which is why Yanikkaya (2003) argued that based on the theory of comparative advantage which states that international trade leads to a more efficient utilization of a country's resources through the import of goods and services which otherwise would be too expensive to produce within the country. Thus, it is probably quite safe to assume that imports are just as important as exports for economic performance within a country and therefore very essential to include both import and export to the trade variable in order to measure international trade correctly. In fact, import and export should be seen as two components that should be considered complementary to each other (ibid 2003).

2.5 Impact of foreign direct investment on economic growth

Another research study made by Antwi et al. (2013), that focused on the influence of foreign direct investment on economic growth in Ghana. The authors used a simple ordinary least square (OLS) regression model and examined the time period 1980 all the way to 2010. Their dependent variable was foreign direct investment, and the explanatory variables were GDP, GDP growth rate, Gross national income, GDP per capita, manufacturing value added, inflation consumer prices, industry value added and trade. They found out that investment plays an important key role in economic growth for Ghana, as it takes into account factors such as capital investment, new technological innovations and new management of knowledge needed for economic growth. In their study, the conclusion was that direct investment has played a significant role in strengthening Ghana's economic growth. The result of the study was that there is a positive relationship between direct investment and economic growth.

2.6 The impact of population growth on economic growth and poverty reduction

Other factors that can also affect economic growth are addressed by Klasen & Lawson (2007) where they looked at Uganda's economy and examined the type of influence the population has on economic growth. The study conducted a panel data study using different types of variables that might affect the economic growth of the country and the study concluded that the growth of population had a negative relationship with the growth of the economy, but it also depended on which specification was used according to ibid (2007).

In conclusion, the previous studies addressed how different variables may affect economic growth differently. The factors that positively affect economic growth are international trade, education, capital and labor, according to previous studies. While the negative factor was precisely population growth because previous studies showed that the higher the fertility rate was in a country, the smaller the proportion of women given the chance/opportunity to go out and work which led to less economic growth.

2.7 Corruption, international investment, institutions and economic growth

Corruption is another factor that can also come to influence a countries economic growth and according to Cieślik & Goczek (2017) who did a panel data study where they investigated what effect a variable such as corruption had on economic growth and international investment, in a sample of 142 countries around the time period of 1994-2014. The study later discovered that corruption results in directly hindering economic growth by obstructing international investments. Cieślik & Goczek (2017) meant that the uncertainty that comes with corruption often acts as a tax on productive action and entrepreneurship as it becomes a deterrent for potential investments which in turn affects economic growth negatively.

Vaal & Ebben (2011) further adds that the effect corruption has on economic growth is majorly affected by the institutional setting in a country, because whereas corruption is clearly seen to have negative effect thanks to what it brings to the table such as stealing of public goods and self-serving rent-seeking, there is also evidence that shows corruption having a positive effect and is explained being because of the fact that institutions not being well developed yet making corruption serve in their place instead and making economic growth possible, as a result of their study that conducted a two-layer model in order to account for both direct and indirect effects of corruption on economic growth.

2.8 The impact of economic freedom on economic growth

Gorlach & Roux (2015) examined the relationship between economic freedom and economic growth, by using the data for 13 Southern African Development Community countries from the period 2000-2009 and applying a dynamic panel-data model. In their results, they concluded that economic freedom actually correlates positively with economic growth and that the relationship is even positively significant in their study, but they also found out that the measurement of economic freedom index had different indicators that each had their own

level of significance to economic growth, whereas some indicators were less significant than others.

Economic freedom is about there being basic rights in society that every individual is entitled to, these can include being able to freely decide on their own choices, everyone having the right to private ownership of things that belongs to them and be able to engage in marketplaces without interference or coercion. Economic freedom motivates and creates incentives for productivity and efficiency in a country and tend to generate a higher rate of economic growth (Gorlach & Roux 2015).

3. Theoretical Framework

This segment's purpose is to simplify the understanding of the subject by presenting and explaining theories that deal with economic growth and international trade.

In order to examine the effect international trade actually has on economic growth, there needs to be a complete understanding of the concept of what actually drives countries to achieving economic growth. This leads to also having to explain the effects that this study's chosen variables which were education, capital, population growth and labor force has on economic growth, which is possible with the help of the macroeconomic growth theories such as the Solow Growth model and Endogenous Growth theory and are therefore included and presented in this research. Furthermore, trade theories are used to examine how exactly international trade affects or leads to economic growth, which benefits/incentives come with international trade and what encourages countries to trade with each other internationally.

3.1 Growth theories

3.1.1 The Solow Growth model

The Solow Model, or also called Solow-Swan model, is a neoclassical exogenous economic model of economic growth made by Robert Solow (1956) and Trevor Swan (1956), which uses a Cobb-Douglas production function to account for changes in the level of production in

an economy over time as a result of changes in the savings ratio, the rate of technological progress and the rate of population growth. The model also describes how economic growth occurs as a result of labor and capital accumulation. The production function in the model clarifies the connection between the labor and physical capital - output/production per worker and capital per worker (Mankiw, 2018).

The production function for Solow Model, that concludes that output is affected by the labor force and capital stock (Mankiw, 2018)

$$Y = F(K, L)$$

(1) Where Y stands for production and is a function of K which is capital stock, L for labor and A is level of technology/advancement.

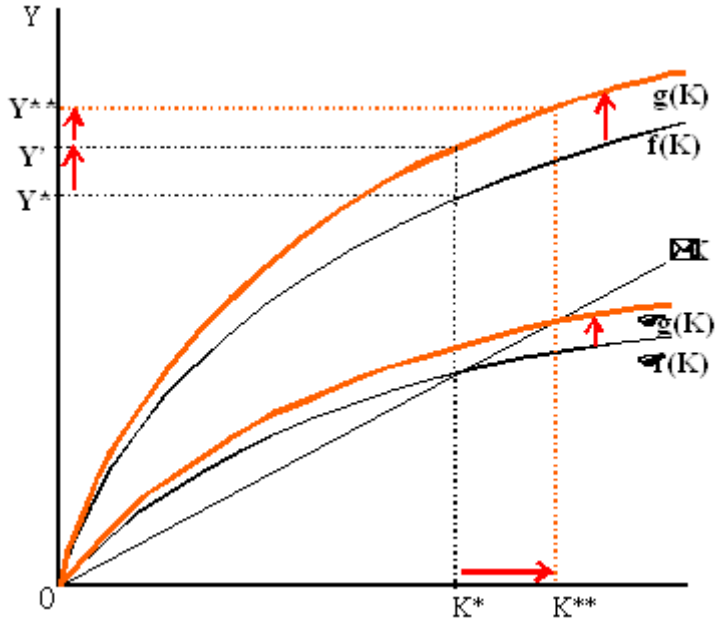
$$Y = F(K, L) = AK^{\alpha} L^{(1-\alpha)}$$

(2) Moreover, this equation also includes α which stands for share of output from capital and $(1 - \alpha)$ indicates the share of output from labor.

Simply explained according to the model, labor force is one if not the only factor that makes up production in an economy and it is necessary in order to make things work with the given amount of physical capital. Usually, a bigger population means a bigger labor force which is what makes labor and population similar with each other in these circumstances. Whenever there is enough labor and physical capital to match each other, they come together to form a level of GDP per capita, which is called a "steady state". At this steady state, there is a standard of living in the country which is stable even without there being any economic growth. Furthermore, savings and investments is where physical capital originates from, which is why the Solow model assumes a closed off economy, where these variables are counted as factors. This is because investments are made by the money, which is collected and saved by the households, the state and even other companies. If a company were to start an investment in order to gain new innovations, that would result in making the production for that company more efficient than what it originally were, then this will of course lead to an increase in GDP and also into more savings and investments in the long term.

According to what the Solow model states, factors such as a higher rate of engagement in international trade which leads to knowledge spillover and technology/innovation transfers, an increased savings quota and there being a high return in quality of education among other things would be beneficial in order to reach economic growth because all these factors help improve the overall productivity of a country. While an increase in population growth and a high depreciation rate will result in a lower level of GDP in equilibrium because capital per individual decreases. Also worth mentioning is that a country's savings ratio decreases when a larger share of the capital goes to necessary investments, as predicted by the Solow model.

Graph 1. International trade's effect according to the Solow Growth Model



(Source: Own production)

Graph 1 showcases the effect of trade on output according to the Solow Growth model. With the addition of trade into the model, there is an effect which shows that the value of output increases from Y to $Y' = g(K^*)$ and this is due to having more expanded international trade which helps further increase productivity. Moreover, in a given constant saving rate, the saving function shifts up to the production level while initial K* increases into K**. In accordance to the Solow growth model it therefore demonstrates that trade leads to transitional growth as we can see from graph 1, the economy thanks to this newfound transitional growth adjusts into a new steady state equilibrium at K** and Y**=g(K**) (Gundlach, 2007). According to this model, the accumulation of labor and capital will result

in achieving economic growth because it is the only factors which creates production in an economy, and this is the reason why the expected outcome for these factors is to be positive on economic growth (Mankiw, 2018). In other words, if the labor force is made up of a large amount of the population, then it is expected to have a positive impact on economic growth as the higher the amount of the population working the better and the higher the production will be for that specific country. On the other hand, the population growth factor is negative according to previous studies, even though it can be considered synonymous with the labor force, since if the population increases, it also means that the labor force will increase and lead to increased productivity, but according to previous studies, this is not often what happens but Sachs & Warner (1997) and Klasen & Lawson (2007) states that population growth will affect the GDP per capita negatively because a higher rate of population growth leads to a lower level of GDP since the capital per person decreases and also a higher fertility rate leads to a decline in women available to join the labor force.

3.1.2 Endogenous growth theory

Endogenous growth theory is a concept that was developed to challenge the neoclassical view of the Solow Model by introducing the idea that economic growth is caused due to internal factors affecting the economy and not the external factors. It further goes to explain that improving factors/variables such as human capital, technology/innovations and knowledge will lead to an increase in productivity which in turn positively affects the economic outlook. To simplify, it all starts from the point that technological progress can be observed taken form through innovations, such as newly developed processes, products and markets which are mostly a result of economic activities. As an example, firms use past experience as a way to learn how to produce more efficiently, by having a higher pace of economic activity the pace of process innovation can also be raised in order to give firms more production experience. Furthermore, because innovations are a result of R&D expenditures that are done by profit-seeking firms, things such as competition, education, taxes, intellectual property and also economic policies with respect to trade can come to affect the rate of innovation by having an effect on the private costs and benefits of doing R&D (Mankiw, 2018).

Explanation of the equation´s function for the endogenous growth theory:

$$Y = AK$$

(1) To get a deeper understanding of the theory, one must observe and understand that the production function where Y is production (output), K is capital and A is a constant that measures how much is produced for each unit of capital. If K increases by one unit, we get A units of production, no matter how much capital we have. What distinguishes this theory from the Solow model is precisely that the production function does not show the properties of decreasing return to capital. To better understand what this particular model says about economic growth, we assume that a part of the income is saved to later be invested. This is denoted by s (Mankiw, 2018).

$$\Delta K = sY - \partial K.$$

(2) Then furthermore in this part it is explained that the change in the amount of capital (ΔK) is equal to the difference between investments (sY) and return (∂K). This can be combined with the earlier mentioned equation and will be rewritten into:

$$\Delta Y/Y = \Delta K/K = sA - \partial$$

(3) This equation shows what determines the growth rate of production. Assuming that sA> ∂, even without the assumption of exogenous technological development, the income of the economy could grow eternally (Mankiw, 2018).

The endogenous theory states that education will have a positive outcome on economic growth as it leads to new knowledge being learnt and adapted into more efficient production in form of technological progress and new ideas occurring.

3.1.3 Institutional theory

In accordance with Valeriani & Peluso (2011) several previous academic studies and economic literatures have argued that the answer to achieving economic growth lies in the effective use of institutions and having a legal framework in order to encourage growth and facilitating economic transitions and social reforms. Also, institutions affect factors such as political, social or economic agreements for instance contracts or policymaking, market access and taxes. As an example, policies made by the governing authority help influence the economic system and lead to economic growth in a society. They go on to explain that there

are two types of institutions, informal and formal institutions. First and foremost, informal institutions are “transactions that occur between two parties originating to the same group based on ethnic, linguistic and cultural bonds (ex. norms) while contracts become implicit and personal”. If someone ends up breaking the contract they agreed on, then other members are able to punish that person who broke it in the first place with “social sanctions”. Secondly, there are formal institutions which are based upon laws and rules and here contracts are instead protected by the “authorities with high cost in terms of application, legislation and regulation” (ibid, 2011).

Additionally, Vitola & Senfelde (2015) goes on to further explain that there is three different categories of institutions in a well-developed economy: political institutions, value institutions and economic institutions. These three institutions are all needed in order to fully utilize the potential of institutions helping achieve economic growth in a economy because for example political institutions help create rights and obligations that must be followed by everyone in society to preserve and promote political stability, which in turn encourages long-term investment when there is enough trust between buyers and traders to enter into contracts. While the economic institutions contribute to giving incentives to actually invest into physical and human capital. The whole purpose of institutions is basically to remove uncertainty and create stability in society. However, the real problem is when corruption comes into the picture which has negative effects and can destroy the purpose of the institutions to maintain balance and order and instead lead to pure injustice which causes the members of the society to lose trust in each other and the system that has been created which leads to a significant lower incentive to want to invest back into society. In the long term, this leads to economic growth coming to a halt (Vitola och Senfelde, 2015). According to this theory, corruption will have a negative outcome on economic growth because it hinders international investment and leads to mistrust in society. While economic freedom has a positive outcome according to previous studies and this theory which claims that economic freedom allows economic growth to flourish as individuals gain access to rights such as property rights and institutions that contribute to more economic activities can take place within society.

3.2 Trade theories

3.2.1 The Ricardian model

The Ricardian model made by David Ricardo (1817) claims that countries should produce and export goods which they have a comparative advantage in and by doing this, both countries will gain from trade. There will be specialization in producing the goods that each country has a comparative advantage in producing and the countries will no longer produce the goods that they have less comparative advantage in producing and they will instead import the goods from the countries that have a comparative advantage in producing the goods. This means that each country will specialize in the goods they have comparative advantage in producing and with the efficient use of the factor of production labor each country will increase its production and consumption, and both countries will trade with each other and increase their profitability in trade (Ruffin, 2002). According to this theory and previous studies such as Yanikkaya (2003), Sun & Heshmati (2010) and Adeleye, J. O, et al. (2015) mean that international trade will be expected to affect economic trade positively because each country will specialize in the goods that they are best at producing, which gives incentives for countries to trade with each other when they want other products that they are less good at producing and are not available in the domestic market.

3.2.2 The Heckscher-Ohlin Theory

The Heckscher-Ohlin theory is a theory of comparative advantage developed by Eli Filip Heckscher (1919) and Bertil Ohlin (1933), that states that countries which have a scarce amount of capital but a large amount of labor force will generally end up exporting labor-intensive products and import capital-intensive products meanwhile, countries with a large amount of physical capital but a scarce amount of labor force will instead end up exporting capital-intensive products while importing labor-intensive products (Jones, 1987).

According to the theory, all included countries gain from trading with each other because each country benefits from applying this practice, for example some countries have access to more capital which leads to them exporting the goods or products (that are more capital-intensive) which they can produce with more efficiency compared to other countries. While the less fortunate countries instead import the products or goods that they themselves cannot produce from the other more fortunate countries. But in order to gain from the trade there has

to be an open trade policy between the countries, and this is because that policy will help stimulate and ease trade between the countries (Harrison, 1996).

This means that following what the theory states there should be no such thing as tariffs, and trade protectionism because these factors will end up affecting the amount of goods and products that a country can import and export, furthermore these will affect the demand and supply of the goods/products in the country. This also resembles how “open economies” operate with openness and free trade with no restraints or limits in order to grow and build a stronger economic performance by opening up to more possibilities (more work and investment opportunities etc.) than they would have being a closed off economy. This would also help explain why relatively open economies often grow much faster than closed economies. Countries that do apply trade protectionism in the shape of tariffs are called “closed economies” and often characterized as having much higher prices on their goods and products compared to more “open economies” which eventually results in a decrease in the demand of the products and goods, and this will slow down the international trade between countries as well as their potential economic growth will be halted (Harrison, 1996; Mankiw, 2018).

To summarize the theoretical part, the growth theories explained how economic growth is achieved depending on how high or low the total factor productivity in a country is, which is determined by the degree of technological progress achieved through innovation (research and development), the total available labor force, institutions (economic & political institutions) and investments in human capital. (education, knowledge, skills). While trade theories explained how additionally, it is to the great advantage of a country to produce products where it has an absolute comparative advantage, while it should import the goods that it has a less comparative advantage in producing from another country. This way both countries will gain from engaging in international trade with each other and encourage more future trading but also lead to knowledge spillover and technology transfers for these countries which ultimately affects economic growth.

4. Research Methodology

This section goes on to present and further explain the variables we used for our regression, the collected data and the expected results.

4.1 Regression Model

In this examination, a panel-data study will be used where a ten-year period (2009-2019) will be examined in Sub-Saharan African countries. Out of the total 48 countries that make up Sub-Saharan Africa only 36 made the list. The other twelve countries are left out because of incomplete data and these countries are South Sudan, Eritrea, Ethiopia, Somalia, Sao Tome, Liberia, Malawi, Seychelles, Zambia, Sudan, Equatorial Guinea and Comoros (also shown in Appendix A).

As shown in equation 1, the dependent variable is the economic growth which is the same as the real GDP growth while the other variables are independent. The other variables are chosen based on the previous studies conducted by Adeleye, Sachs & Warner, Barry, Mankiw, Cieślik & Goczek and Gorlach & Roux.

Equation 1

$$\text{GDP growth} = \beta 0 + \beta 1[TRAD] + \beta 2[POP] + \beta 3[LogCAP] + \beta 4[LAB] + \beta 5[EDU] + \beta 6[COC] + \beta 7[EF] + \varepsilon$$

GDP growth = Economic Growth
β0 = Intercept
TRAD = Trade
POP = Population Growth
LogCAP = Capital
LAB = Labor Force
EDU = Education
COC = Control of Corruption
EF = Economic Freedom
ε = Error Term

Table 1. Variables

The Variables	Source	Theory	Definition	Expected Value
GDP per capita growth	World Bank (2022)		GDP per Capita Growth (annual percentage)	Dependent variable
Trade	World Bank (2022)	The Ricardian Model/The Heckscher-Ohlin Theory	The total sum of exports and imports of goods and services measured as a part of gross domestic product (in percentage)	Positive (+)
Population growth	World Bank (2022)	The Solow Growth Model	Annual population growth as part of GDP (in percentage)	Negative (-)
LogCapital	World Bank (2022)	Endogenous Growth Theory/The Solow Growth Model	Average gross capital formation as a percentage of GDP	Positive (+)
Labor force	World Bank (2022)	The Solow Growth Model	The amount of population that makes up the labor force (percentage out of the total population ages from 15 up to 64 years old)	Positive (+)
Education	Human Development Reports (2022)	Endogenous Growth Theory	The expected amounts of years spent in school (index)	Positive (+)
Control of Corruption	World Bank (2022)	Institutional Theory	Measures the extent to which public power is used for private benefit, including both minor and grand forms of corruption, also includes the state of the government by influences of elites and private interests. Uses percentile rank in order to indicate	Negative (-)

			each country's rank.	
Economic Freedom	Fraser Institute (2022)	Institutional Theory	The average of all the components of the economic freedom index consisting of Size of government, Legal Systems & Property rights, Sound money, Freedom to trade internationally and Regulations.	Positive (+)

(Source: Own production)

4.2 Description of the selected variables and collected data

GDP growth

The dependent variable in this study is the real GDP per capita growth in percentage form. GDP is a suitable measurement because it gives us information on how a country's economy is performing, and the real GDP is often used as an indicator. It has even been used in previous studies before by Robert J. Barro and Robin M. Grier. The data is collected from the World Bank database (2022) and it is inflation adjusted.

Trade

This variable will be calculated by using export plus import to get an estimation of the average trade level and is given as a part of the GDP. Previous studies such as Yanikkaya (2003) used this variable as a measurement of trade and it's defined as the export plus import as part of the GDP. This variable is expected to have a positive effect and is in line with what previous studies such as before mentioned Sun & Heshmati (2010), Adeleye, J. O, et al. (2015) and Yanikkaya (2003) all conclude in their research. However, a disadvantage with this chosen measure is how much a country trades to some extent depends on the country's size. In principle, small countries are more dependent on trade than larger countries. This can be explained by the fact that large countries with larger scope can buy and manufacture the goods they need within the country. This further means that getting a high value in this specific variable can thus be partially explained by the fact that the country or countries in question is small. The data in this paper is collected from the World Bank database (2022) as the total trade of GDP as a percentage form.

Population growth

The data for this variable is collected from the World bank Database (2022) and the variable represents the average percentage change in the population for the countries that the study is interested in between 2009-2019. This variable was included to distinguish it from the labor force in order to see and only measure the size of the entire population within a country. It has been shown in previous studies such as Sachs & Warner (1997) and Klasen & Lawson (2007) that population growth correlates negatively with the economic growth of a country, but it also depends on which specifications (Klasen & Lawson 2007). Fertility rate is a concerning factor in developing countries especially African countries and by reducing it, many new opportunities will be created such as for example a higher ratio of females getting a education, female employment, greater female bargaining power at the household level, higher incomes and it will even lead to lower services in the society for everyone ibid (2007). The outcome of this variable is expected to be negative and according to previous studies that are named above we believe the population growth correlates negatively with the economic growth.

Log Capital

The data for this variable is collected from the World bank Database (2022), measures the average gross capital formation as a percentage of GDP and we have taken the log of those values. In order to explain this variable, first and foremost capital includes factors such as net changes in inventories, which are goods that are in companies' inventories and there due to the sole purpose of handling “temporary or unexpected fluctuations in production or sales, or other ongoing projects”. Secondly it also factors in the economy's fixed assets in a country that includes infrastructure such as “roads and railways or also machinery and equipment purchases and furthermore construction of important institutions such as schools, offices, hospitals, commercial and industrial buildings”. Taking the endogenous growth model into consideration, it is naturally expected to be undiminishing returns on capital (Mankiw, 2018). Most countries' economies all around the world wouldn't be able to function without this variable and which is why this variable is expected to have a positive influence on economic growth because capital is a key factor to managing and sustaining production (World Bank Database 2022).

Labor Force

The variable is taken from the World Bank Database (2022) which measures the proportion of employed between 15-64 years, in order to find out how large a part of the population have a job or are looking actively for a job and thus contributes to the country's production factor. This variable, unlike population growth, measures only actively working people who can produce goods and services that contribute to the potential workforce. The difference here is that the labor force variable excludes the very young and the very old, as well as the physically or mentally disabled while the population growth variable includes everyone. In so doing this the two variables end up having two different expected outcomes. According to Solow's models, labor leads to economic growth because it is the only factor which creates production in an economy (Mankiw, 2018). Meaning if the labor force is made up of a large amount of the population then it is expected to have a positive impact on economic growth as the higher the amount of the population working the better and the higher the production will be for that specific country.

Education

This variable's data has been taken from the Human Development Reports (2020) and shows both the children's expected amount of years to get educated but also the average of the adult population. The measure focuses on the average mean years of schooling of the adult population and expected years of schooling for children that met the age requirements of entering school. The type of education that leads to new knowledge is assumed to contribute to long-term economic growth according to endogenous growth models (Mankiw, 2018), thus it is also assumed that the education variable has a positive impact on economic growth. However, the problem with this variable is the fact that it does not necessarily take into account the quality of education and instead only measures educational attainment in terms of level of education attained, in other words the amount of years of schooling.

Control of Corruption

This variable had its data taken from the World Bank Database and its purpose is to measure the extent to which public power is being used for private benefit, including both minor and grand forms of corruption, also captures the state of the government by other influences such as elites and private interests. This variable uses percentile rank in order to indicate each country's rank among other countries covered by the aggregate indicator, with 0 corresponding to lowest rank, and 100 to highest rank. Cieślik & Goczek (2017) used the

same type of measure for their study in order to measure corruption and its effects and explained that corruption results in directly hindering economic growth by obstructing international investments and is why this variable is expected to show a negative effect on economic growth.

Economic Freedom

This variables data was collected from Fraser Institute (2022) and is the average of all the components of the economic freedom index, which consists of the indicators that are all part of economic and political institutions framework: Size of government, Legal Systems & Property rights, Sound money, Freedom to trade internationally and Regulations (Fraser Institute 2022). This variable measures the degree of economic freedom in a given country and is also an adequate measure to measure a country's financial freedom. Each year the index presents a global ranking of economic freedom which the study has used. Moreover, the degree of freedom that individuals have in society plays a significant role in a country's economic growth and is therefore expected to have a positive effect on economic growth (Gorlach & Roux 2015).

4.3 The Results of Descriptive Statistics

Table 2 shows the result of the descriptive statistics, and it summarizes each variable. It contains the mean value, standard deviation, the minimum and the maximum values for each variable and finally the number of observations that were made.

Table 2. Summary of the descriptive statistic

Variables	Obs	Mean	Std. Dev.	Min	Max
GDP	396	1.640112	4.135974	-36.55692	18.06588
TRAD	396	69.77004	27.10246	20.72252	158.9001
POP	396	2.431969	0.8729013	0.03224	3.907317
LogCAP	396	1.34954	0.171204	0.826012	1.899826
LAB	396	68.34942	10.5014	46.42	90.34
EDU	396	0.4541313	0.1202345	0.15	0.739
COC	396	31.42143	22.86349	0.9478673	80.95238

EF	396	6.145328	0.7854539	4.41	8.2

(Source: Own production)

4.4 The Correlation Matrix

Table 3 showcases how the different variables that were used in the study correlates with each other. In other words, it shows the correlation between the dependent variable and the independent variables, but it also indicates how the independent variables correlates with one another. The results further shows that there is no risk of a multicollinearity problem occurring between the variables since the highest correlation between the variables is the ones found in control of corruption and economic freedom index which is only measured at a value of 0.6427.

Table 3. Correlation matrix

	GDP	**TRAD**	**POP**	**LogCAP**	**LAB**	**EDU**	**COC**	**EF**
GDP	1							
TRAD	0.0658	1						
POP	-0.0347	-0.4319	1					
LogCAP	0.0951	0.4408	0.1762	1				
LAB	0.0188	-0.2132	0.1573	-0.0536	1			
EDU	-0.0002	0.3150	-0.5200	-0.0447	-0.1097	1		
COC	0.0968	0.3257	-0.5208	0.1961	-0.1821	0.3905	1	
EF	0.0892	-0.0197	-0.3358	0.0403	-0.0736	0.4579	0.6427	1

(Source: Own production)

The variables that correlate strongly with each other with a positive value are economic freedom index and control of corruption with a value of 0.6427, education and economic freedom with a value of 0.4579 and finally capital and trade with a positive value of 0.4408 compared to the other variables. All these variables trade, capital, labor, control of corruption and economic freedom correlates positively with GDP and this indicates that the variables have a positive impact on the economic growth which in this case is the dependent variable. However, the education variable correlates negatively with the dependent variable which is the GDP growth and it differs from what is explained by the endogenous growth theory. The

endogenous theory states that improving factors such as human capital, innovation and knowledge will improve productivity which in turn will improve the economic growth of a country. Other variables that seem to correlate even more with each other but with a negative value are education and population with a value of -0.5200, this shows that the higher the population growth of a country, the lower the education level in that specific country. Furthermore, population is the independent variable that has the biggest negative impact on our dependent variable which was economic growth with a negative value of -0.0347 and this has been shown in previous studies such as Klasen & Lawson (2007) which states that high population growth rate affects the economic growth of a country negatively as high fertility rate undermines the chances of women working and obtaining higher education.

5. Results

This part of the study showcases and further explains the results of the conducted research that will be shown in different tables and later analysed by taking into account what previous studies also stated.

5.1 The Regression Model

Table 4 below showcases the regression model and the acquired results.

Table 4. Regression model

Dependent Variable: GDP			
Variables	**Coefficient**	**Std. Err.**	**t value**
Intercept	- 21.49738 (0.109)	13.36559	- 1.61
TRAD	0.0593023*** (0.006)	0.0214187	2.78
POP	2.548156** (0.031)	1.176356	2.17
LogCAP	8.118657*** (0.001)	2.336542	3.47

LAB	0.0676209 (0.650)	0.1488582	0.45
EDU	- 3.926984 (0.598)	7.450509	- 0.53
COC	4.274171 (0.291)	4.042578	1.06
EF	- 0.3799649 (0.661)	0.8651244	- 0.44
R^2	0.1124		
Prob > F	0.0000		
Amount of observations	396		
Amount of countries	36		

The number within the parentes is the p value.
**** means that the coefficient is on 1 percent significance level. (P < 0.01)*
*** means that the coefficient is on a 5 percent significance level. (P < 0.05)*
** means that the coefficient is on a 10 percent significance level. (P < 0.1)*

The F-test for this study showed that Prob> F = 0.0000 which means that the model is significant at 1%. Moreover, the regression model shows a relatively fairly low R squared with a value of only 0.1124, which means that the model has only managed to explain 11.24% of all factors that affect economic growth. This shows that not all factors/variables that actually affect economic growth have been successfully included in this study as 88.76% remain.

GDP

The GDP per capita growth in percentage form is included in the regression model because it represents the dependent variable. The intercept of the regression has a negative value and it's not statistically significant. The value of the intercept indicates the default predicted value of the GDP per capita growth when all other variables are held constant at the value of zero.

TRADE

The result of the regression model shows that trade, which is the main variable in this research paper, has a positive impact on the GDP per capita growth with a positive value of (0.0593023) and it is statistically significant at the level of 1%. One unit increase in trade will lead to 0.0790301 increase in the GDP per capita growth holding all other variables constant. The result is in line with the expected value and what previous studies such as Yanikkaya (2003) and trade theories have concluded regarding the effect of international trade on economic growth. It was shown in previous studies such as the one Yanikkaya (2003) conducted that trade has a positive impact on economic growth but the shortcomings of this variable as a measurement is that it does not account for what will happen if a country's export is dominant. This variable is better suited for looking at smaller countries that are still developing countries and don't completely rely only on exporting, such as African countries which still benefit from also importing goods from each other in order to satisfy the need for trading with one another.

POPULATION

The population variable in the regression model correlates highly with the GDP per capita growth with a positive value of (2.548156) and it is statistically significant at the level of 5%. It indicates that the GDP per capita growth will increase by (2.548156) percent holding all other variables constant at zero. The result of this variable is not in line with the expected value and previous studies. Sachs & Warner (1997) and Klasen & Lawson (2007) conclude in their research that the population growth will affect the GDP per capita negatively because a higher rate of population growth leads to a lower level of GDP since the capital per person decreases.

LogCAPITAL

The variable of LogCapital correlates positively with the GDP per capita growth with a positive value of (8.118657) and it is statistically significant at the level of 1%. The positive value indicates that the GDP per capita growth will increase by 0.08 percentage points when capital increases by 1%. The result of the variable is in accordance with what previous studies and Solow growth model, which states that improving factors such as capital will improve productivity which in turn will have a positive impact on the GDP growth (Mankiw, 2018).

LABOR

It shows that labor has a positive impact on the dependent variable which is GDP per capita growth with a positive value of (0.0676209). However, the value is not statistically significant since the p-value is higher than 10%. The positive value is in alignment with what was expected following previous studies, even though it is not statistically significant. The Solow model states that labor force is one if not the only factor that makes up production in an economy and it is necessary in order to make things work with the given amount of physical capital (Mankiw, 2018).

EDUCATION

The education value shows a negative effect on the GDP per capita growth, but the value is not statistically significant since the p-value is higher than 10%. Education variable was expected to have a positive impact on the GDP growth according to the endogenous theory, but instead the result ended up showcasing a negative value which is not in line with what previous studies have concluded.

CORRUPTION

The result from the regression model shows that the corruption value has a positive value on the economic growth but not statistically significant since the p-value is higher than 10%. The expected value of this variable was negative in accordance with what previous studies such as Cieślik & Goczek (2017) concluded in their study. Although, as stated in the research study made by Vaal & Ebben (2011) there's also an explanation as to why corruption can be linked to positively influencing economic growth and that reason is that in certain situations where a country´s institutions have not fully developed yet enough to sustain proper economic growth, corruption is assumed to be conducive to economic growth as it overtakes the role of institutions that have not been properly developed and makes economic growth possible.

ECONOMIC FREEDOM

The variable economic freedom has a negative value which means that it correlates negatively with economic growth but it’s not statistically significant since the p-value is much higher than 10%. According to previous studies such as Gorlach & Roux (2015) the

economic freedom variable was originally expected to have a positive effect on economic growth as it’s supposed to enable for higher productivity and efficiency which in turn results in economic growth thanks to economic freedom bringing with it things such as being able to freely decide on their own choices, everyone having the right to private ownership of things that belongs to them and be able to engage in marketplaces without interference which is also in line with what the institutional theory states is important to achieve with the establishments of institutions. But as institutional theory also states there is also an explanation as to why this variable can end up having a negative correlation with economic growth and that would have to do with the fact that the amount of economic freedom in a society is affected positively or negatively depending on how effective the institutions in a country are.

6. Discussion

In the following segment, the contents of this research's findings will be discussed in order to highlight its meaning. Any previously encountered problems or implications will be taken into account in order to provide some further assistance for future research.

First, and foremost it is important to take into account that this research paper could only include a ten-year period based on the amount of time there was to complete this research which automatically meant that the results would be limited to only that specific ten-year period and mean that the time intervals used could end up being too brief for this study to be able to observe the full effect international trade has on economic growth. But already knowing this fact from the very start, even before conducting the research in hand, is what made the focus of this research paper go on to look at the previous ten years which was thought to be of more relevance, because those previous years have a bigger effect on the upcoming years than looking further back into time. Additionally, some data was missing in several countries which made it impossible to examine and include all 48 countries of Sub-Saharan Africa. This led to limiting this study's results as it was only able to provide an overview of international trade's effect on economic growth in a specific time period, over the majority of Sub-Saharan Africa but not all of it.

This study found out that trade has a significant positive impact on economic growth, which is what was to be expected and also consistent with what previous studies and trade theories

stated. The reason behind this could be because the more trade interactions that take place between countries, the higher the spread of knowledge and technology transfers that affects the country's production output and efficiency which ultimately lead to economic growth (Yanikkaya, 2003). Furthermore, trade is a significantly important variable as it not only leads to economic growth, but it's also needed in order to fulfil the purpose of bringing in the imported goods and products that cannot normally be produced domestically, but also to sustain and generate sufficient revenue to finance further costs of importing and exporting endeavours (Adeleye, J. O, et al. 2015).

In addition, the results showed that population growth had a significant positive relationship with economic growth, which was an unexpected result and did not correspond with what previous studies had concluded. This may be due to the fact that a larger population is often associated to there being a larger total consumption which automatically becomes beneficial in that specific country because the higher a country's consumption, the more demand there is which will create a need for increasing the production output and efficiency which in itself leads to both technological innovations and creating more job opportunities and as more people establishes a stable income, more spending and investing back into the economy occurs. This now larger market end up allowing the economy of a country to exploit this fact to the maximum, by having a greater/larger population willing to work and being able to choose from a bigger pool of candidates which in turn leads to lower costs of producing the good or product in high demand.

Finally, capital also showcased a significant positive relationship with economic growth and was in alignment with what both previous studies stated but also the Solow growth model, which was that economic growth is created as a result of both capital accumulation but also labor matching each other with enough resources at both sides, that ultimately lead to form a “steady state”. In this steady state, even without there being any type of economic growth, a stable standard of living existed. The reason behind this positive result could be due to capital being made up of savings and investments of the society whether it be from individuals/households, companies or government, it always comes back full circle in a way and also benefits everyone involved due to the fact that investments help both companies for example their production output and efficiency which further benefits the customers (which are individuals/households) buying the goods, products or services to satisfy their needs and governments get some of this revenue from taxes, which later leads into there being a

incentive to invest some of that newly collected tax funds into new projects (expenditures) that help and benefits both companies and households who now have more job opportunities available while companies have a larger available labor force to choose from to employ and in turn raise the production efficiency and increase the economic growth.

7. Conclusion

In this final chapter, the research question will be reflected upon again in order to arrive at an answer through the study's final results. Possible limitations that occurred in this study will also be discussed, in order to provide recommendations that will help future research.

The main purpose of this research study was to investigate how international trade affects economic growth, especially in sub-Saharan African countries during the recent ten years (2009-2019). The results of the regression model showed that international trade has a positive significant effect on economic growth which was also validated by previous studies. Additionally, the variables such as population growth and capital also had a positive significant relationship with economic growth according to our results. Furthermore, the remaining variables such as labor force had a positive relationship with economic growth but a non-significant effect, while education seemed to have a statistically non-significant negative effect on economic growth in the examined Sub-Saharan African countries.

In addition, according to our study's results there were some variables that did not agree with or were in line with what previous studies had assumed or estimated the effects to be on economic growth. Those four variables that were not in line with what previous studies had previously stated were population growth, which should actually have had a negative effect on economic growth (Klasen & Lawson 2007: Sachs & Warner 1997) and education which would have had a positive effect on economic growth according to the growth theories (Mankiw 2018). Also, corruption was supposed to have a negative effect on economic growth (Cieślik & Goczek 2017: Vaal & Ebben 2011) and economic freedom which was originally stated to have a positive effect on economic growth (Gorlach & Roux 2015). That this study differed from what other previous studies had assumed in these four variables may be due to a lot of different reasons, but some explanations that can be thought of at the moment are that different quantitative models were used to measure the effect of these variables in previous

studies and this research study. Or also that the time periods that were used by previous studies and this study are so far apart that the data collected from these different time periods has ultimately gone through large differences between what it actually looked like back then and now in present time. Another reason may be that previous studies did not consider, factors such as that a higher population also means a larger labor force as the number of people to employ is larger and the labor force was a variable that proved to have a positive effect on economic growth even if it was not statistically significant. Furthermore, education was also not in line with previous studies and could be explained in the same way as population, that previous studies disregarded the fact that the variable education may be too skewed to measure it properly by just using one simple variable because no matter how many expected average school years a country has, it does not necessarily translate into meaning that the quality of the education is high or even to the fact that the knowledge that is taught during all those years is really taken up by the students, which make education a rather difficult variable to properly measure in such instances as this. The same can be said about the corruption and economic freedom variable which has been previously stated and also shown in this study to have different effects on economic growth depending on circumstances and conditions, as previously said both the corruption and economic freedom variable are dependent on whether how effective the established institutions in a country are. Economic freedom can in circumstances where the institutions are weak, not surmount into much because the foundation is not strong enough and lead to having a negative effect on economic growth as its not sufficient enough to create any kind of economic growth whereas corruption can instead take over and be shown to positively influence economic growth when institutions are weak as corruption is conducive to economic growth in these circumstances.

Ultimately, in the end, we would like to think that this study managed to answer its research question, but not completely flawlessly nor without shortcomings. These flaws that this study encountered would be recommended for future research in the same field or similar subject to avoid as much as possible, by for example counteracting it, by taking in a much larger time period than just a ten-year time-period that this study used. Because when it comes to trying to examine GDP which is such a broad measure of a country's economic activities and progress, it helps to have a wider time period with several number of years included into the study, because the greater number of years, the better and more detailed the results you can get from the collected data. Additionally, variables such as economic freedom and corruption that used more than one indicator as part of their measurement, could in future studies instead

try testing and measuring each indicator by themselves in more than one regression model in order to be able to better see and understand how its effect can look differently and change depending on how it is taken into the data research. Also worth mentioning, is that some variables such as research and development expenditure that were originally of interest and were actually intended to be included in this study ended up after further investigation having too much incomplete data within several different countries and also within the specific time period that this article has chosen to examine and therefore in order not to compromise the quality of the research study too much, these variables were not included because the remaining countries to investigate would have been far less if these variables were included in the study but they are still variables that are interesting enough to be considered in future research in this field to get a greater overview of what really affects economic growth. Lastly, its also worth considering applying dummy variables into the regression model in order to get a higher R square than what this study got, so that in turn it gets easier to get exactly which factors really end up directly affecting/influencing economic growth. For example, this study did not account for what Sachs & Warner (1997) previously also stated about the fact that country-specific factors (tropical climate leading to tropical diseases, geographical circumstances such as having access to trading through maritime trade) can have a big impact on economic growth that are not captured by the variables in this research study and could have been used as dummy variables.

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Appendices

Appendix A: The Sub-Saharan African Countries

Angola - Benin - Botswana - Burkina Faso - Burundi - Cabo Verde - Cameroon - Central African Republic - Chad - ~~Comoros~~ - Democratic Republic of Congo - Republic of Congo - Cote d'Ivoire - ~~Equatorial Guinea~~ - ~~Eritrea~~ - Eswatini (Former Swaziland) - ~~Ethiopia~~ - Gabon - Gambia - Ghana - Guinea - Guinea-Bissau - Kenya - Lesotho - ~~Liberia~~ - Madagascar - ~~Malawi~~ - Mali - Mauritania - Mauritius - Mozambique - Namibia - Niger - Nigeria - Rwanda - ~~Sao Tome and Principe~~ - Senegal - ~~Seychelles~~ - Sierra Leone - ~~Somalia~~ - South Africa - ~~South Sudan~~ - ~~Sudan~~ - Tanzania - Togo - Uganda - ~~Zambia~~ - Zimbabwe

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In total 36 out of 48 Sub Saharan African countries got included into this study, (Source: Own production, World Databank)

(Source: [Global Trade Outlook: Sub-Saharan Africa | Michigan Business]())

Appendix B: Regression Model

Fixed-effects (within) regression — Number of obs = 396
Group variable: Id — Number of groups = 36

R-sq:
within = 0.1124
between = 0.0200
overall = 0.0055

Obs per group:
min = 11
avg = 11.0
max = 11

F(7,353) = 6.38
corr(u_i, Xb) = -0.8323 — Prob > F = 0.0000

GDP	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
TRAD	.0593023	.0213131	2.78	0.006	.0173857	.1012189
POP	2.548156	1.176356	2.17	0.031	.2346082	4.861703
LogCAP	8.118657	2.336542	3.47	0.001	3.523364	12.71395
LAB	.0676209	.1488582	0.45	0.650	-.2251395	.3603814
EDU	-3.926984	7.450509	-0.53	0.598	-18.57995	10.72598
COC	4.274171	4.042578	1.06	0.291	-3.676395	12.22474
EFI	-.3799649	.8651244	-0.44	0.661	-2.081411	1.321481
_cons	-21.49738	13.36559	-1.61	0.109	-47.78357	4.788814
sigma_u	3.6187119					
sigma_e	3.8273932					
rho	.47199643	(fraction of variance due to u_i)				

F test that all u_i=0: F(35, 353) = 2.79 — Prob > F = 0.0000

Appendix C: Correlation Matrix

	GDP	TRAD	POP	LogCAP	LAB	EDU	COC	EFI
GDP	1.0000							
TRAD	0.0658	1.0000						
POP	-0.0347	-0.4319	1.0000					
LogCAP	0.0951	0.4408	0.1762	1.0000				
LAB	0.0188	-0.2132	0.1573	-0.0536	1.0000			
EDU	-0.0002	0.3150	-0.5200	-0.0447	-0.1097	1.0000		
COC	0.0968	0.3257	-0.5208	0.1961	-0.1821	0.3905	1.0000	
EFI	0.0892	-0.0197	-0.3358	0.0403	-0.0736	0.4579	0.6427	1.0000

Appendix D: Summary of the descriptive statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
GDP	396	1.640112	4.135974	-36.55692	18.06588
TRAD	396	69.77004	27.10246	20.72252	158.9001
POP	396	2.431969	.8729013	.03224	3.907317
LogCAP	396	1.34954	.171204	.826012	1.899826
LAB	396	68.34942	10.5014	46.42	90.34
EDU	396	.4541313	.1202345	.15	.739
COC	396	.3142143	.2286349	.009479	.809524
EFI	396	6.145328	.7854539	4.41	8.2