Government Policies, Exports and Economic Growth in African Countries

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Abstract

Countries that have experienced rapid economic growth have done so on the back of well-implemented policies and institutions. Today's advanced countries instituted different policies to extract the growth benefits of exports and achieve competitive advantage with their exports from key institutions. However very little evidence exists regarding the contribution of government policies to the export-growth relationship. Hence, the research question in this paper is: To what extent does government policies and exports influence economic growth in Africa countries? Using an augmented Cobb-Douglas production function and data for 37 African countries from 1994-2017, this paper first tests for the growth effect of merchandise exports in African countries. Secondly, the paper tests the hypothesis that where selective government policies are implemented, the growth benefits of exports - be they primary or manufacturing merchandise exports - can be extracted. The key contribution of this paper is determining the extent to which government policies and exports influence economic growth of African countries. Policies aimed at improving institutional quality, enforcing the role of the state and protecting industries are considered in this paper. Using panel econometric techniques, the paper first finds evidence that both primary and manufacturing merchandise exports do not have a statistically significant effect on economic growth in African countries. Instead, population growth, fixed capital investment and certain key government policies are found to have a statistically significant influence on economic growth in African countries. Secondly, the paper finds that policies such as government effectiveness, regulatory quality and the rule of law interact with the share of manufacturing merchandise exports and show a positive and significant influence on economic growth of African countries. The results imply that economic growth of African countries depends on certain government policies, exports, fixed capital investment and population growth.

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1 Introduction

Most countries that have experienced rapid economic growth have done so on the premise of strong industrialization and well-implemented policies (Szirmai 2012). From a structuralist perspective, economic growth has been shown as being heavily influenced by the dynamic properties that industrialization offers through the manufacturing sector. In such literature, it has been argued that manufacturing acts as an engine of growth and significantly influences economic growth (Szirmai 2012, Szirmai & Verspagen 2015, Su & Yao 2017). Also, additional literature has shown that the relationship between manufacturing and economic growth is most useful in the promotion of exports. In that sense, the literature has argued that the export-led growth approach used by developed countries of today, contributed to their rapid economic growth in the past. The literature makes two main arguments. Firstly, the literature has shown that exports have a positive effect on economic growth (Michaely 1977, Tyler 1981, Balassa 1985). Secondly, the literature has shown that the effect of exports on growth in developing countries is different depending on the type of exports, be they manufacturing or primary exports (Fosu 1990*a*,*b*, 1996, Xu 2000). However, there is not much literature that examines the contribution of governnment policies to the relationship between exports and economic growth. This essay attempts to contribute to the literature by examining whether government policies and exports have an influence on economic growth in African countries.

This essay aims to answer one key research question: To what extent does government policy and exports influence economic growth in African countries? To do this, the essay first examines the growth- effect of two main types of exports - primary and manufacturing merchandise exports. The first hypothesis is that between primary and manufacturing exports, it is manufacturing exports, which has a significant effect on economic growth in African countries. Having tested this, the next part of the essay then tests the second hypothesis that both government policies, and exports - be they primary and manufacturing exports - influence economic growth in African countries significantly.

The conceptual framework of this paper is motivated by studies such as Fosu (1990*a*,*b*) and Sheridan (2014). These studies have already looked at the relationship between export composition and economic growth for developing countries. However, what this essay contributes is evidence which suggests that both government policy and exports have a significant influence on economic growth in African countries. The interest in the role of government policy is that history has shown evidence of a strong role of the state in the growth patters of countries like Japan, South Korea and China. The experiences of these countries are usually referred to as epitomes of sustainable economic growth. Indeed, the literature shows that these countries experienced rapid growth only came after these states had implemented specific government policies aimed at promoting exports, *ceteris paribus*. While there There may have been several other public policies in some of these countries, it can be argued that certain fundamental government policies geared at promoting exports helped to grow these economies. Hence, this essay argues that where the effect of such fundamental policies on exports and economic growth are examined in the African context, some lessons can be learned.

Therefore, in the conceptual framework of this paper, the relationship between the type of exports - primary and manufacturing merchandise exports - and economic growth is conceptualized as a direct one. It is this relationship that is tested in the first hypothesis. Further, this essay argues that instead of only exports, government policies and exports influence economic growth of African countries. In other words, government

policies have a mediating role and enhance the influence of exports on economic growth of African countries. Based on the availability of data, this essay focuses on policies that aim to enhance governance and institutional quality as well as provide capital or credit. Specifically, the essay examines the influence of governance and institutional quality policies such as the control of corruption, government effectiveness, regulatory quality and the rule of law. Furthermore, other capital or credit policies like capital account flexibility (capital controls) and private sector credit from banks are considered.

This essay makes its contribution in two main ways. First, it determines whether merchandise exports, specifically primary and manufacturing merchandise exports, have an influence on economic growth in African countries. Whereas earlier studies like Sheridan (2014) analyze the influence of both types of exports for a large sample of developing countries, this paper examines the extent of these type of exports in a restrictive sample made up of African developing countries. As part of this contribution, the technological progress function is expressed as an exponential function of exports, which other studies like Sheridan (2014) do not do. Testing the relationship between both types of exports and economic growth is important because the results could provide evidence in favour of manufacturing exports, which have been argued to have growth-pulling properties for developing countries, based on the theory that manufacturing acts as an engine of growth.

Secondly, the paper determines the extent to which government policies and both types of exports influence economic growth in Africa. This is based on theoretical and empirical research by earlier studies such as Michaely (1977), Balassa (1978), Tyler (1981), Fosu (1990*a*,*b*), Xu (2000), Hausmann et al. (2007) among others, that have shown that although exports influence economic growth positively, manufacturing exports have a stronger growth effect. However, these studies have not acknowledged the role of government policies in the relationship between exports and economic growth. Where the role of government policies are recognized, a formal econometric test might show a different outcome. Hence this paper tests the relationship between government policies, exports and economic growth in African countries. The focus on African countries is relevant becuase it is evident that African countries rank low in the world economy, in terms of per capita income, and despite recent economic recovery, some scholars are pessimistic about the sustainability of this growth in Africa (Rodrik 2018).

The rest of this paper is structured in the following order: The next section reviews both theoretical and empirical literature that argues in favour of growth-effect of exports and government policy. Section three presents the methodology adopted while Section four presents the results of the study. Finally, Section five presents conclusions and implications of the findings.

2 Literature Review

This section begins with a review of theories that explain the relationship between exports, goverment policy and economic growth. The first section reviews the literature on exports and economic growth whereas the second section reviews the literature on policy, exports promotion and economic growth.

Export-led Growth vs Growth-led Exports

The theoretical arguments for export-led growth started in the early 1970s, following the experience of Asian countries such as Japan, South Korea, China, Singapore and Taiwan

among others. These countries recorded remarkable growth due to export promotion policies, which were implemented after years of implementing import substitution policies. This approach had also been used by early industrializers like Britain and the United States, who also focused on export promotion after many years of import substitution policies. Once these countries started promoting exports, they climbed the ladder of development and are today known as developed countries based on the levels of per capita income that they have (Chang 2002, Reinert 2007).

However, while the Asian economies were expanding rapidly during the 1970s, Britain was struggling with low demand and high imports, compared to other countries around them. Indeed, the research of Kaldor (1970) and Dixon & Thirlwall (1975) had been focused on investigating the relationship between exports and output with the hopes of finding an answer that could turn the British economy around. Kaldor (1970) hypothesized a causal link between exports and growth through manufacturing, which he argued was the lead transmission mechanism because it resulted in technical and allocative efficiency, learning by doing and knowledge spillovers. This was in line with the Kaldor/Verdoon laws. However, Thirlwall (1997) mentioned that the export-led growth model developed by Kaldor had not made any consideration for balance of payment constraints, meaning that growth that resulted from export promotion at the time would be unsustainable. In his seminal paper, Thirlwall accounts for balance of payment constraints in what has now come to be known as "Thirlwall's law" (Thirlwall 1979). The balance of payment constrained model follows the Neo-Kaldorian tradition, which emphasizes that an export-led growth approach is feasible and sustainable. This is because, where balance of payment constraints are considered, resources have to be allocated efficiently so that exports can be promoted to earn enough foreign exchange to overcome the fiscal constraints that result from imports. The promotion of exports also leads to competitive advantage and productivity growth, both of which influence output and growth for an open economy that relies on imports of goods and services from the rest of the world, holding all other influences constant[1].

A second strand of the literature, however, disagrees with the export-led approach and argued that growth-led exports was rather the suitable and sustainable path. This created a debate on whether the export-led growth model or the growth-led exports model was ideal. This strand of literature began with the seminal work of Krugman (1989). The central argument for the growth-led exports hypothesis is that growth of an economy contributes to faster export growth through total factor productivity (Araujo et al. 2015, p .111). This strand of literature follows the Neoclassical school and argues that as the economy expands or grows, the increase in total factor productivity influences productive capacity and results in increased participation in international trade, through exports.

In other words, Krugman aruged that the increase in growth would stimulate exports based on the income elasticity of imports and exports. However, Thirlwall rebutted the arguments of Krugman. Thirlwall argued that Krugman was misled and that growth could be slowed down by balance of payment constraints which resulted from high income elasticity of demand for imports (Thirlwall 1991). This meant that the differences in income elasticities of export and import could cause the balance of payments to put a constraint on growth. Where the balance of payments negatively influenced growth, total factor productivity would slow down and the effect on output would be lower than

[1]Thirlwall's law is still a subject of interesting research. Recent studies include Fasanya & Olayemi (2018), Romero & McCombie (2018), Contreras-Alvarez (2017), Podkaminer (2017), Blecker (2016), Nassif et al. (2016), Romero & McCombie (2016).

expected.

The export-led growth theory suggests that export-oriented policies result in resource allocations based on comparative advantage, provide an opportunity for technological improvements, contribute in developing a competitive edge and offer employment opportunities for labour to develop new skills. Therefore, promoting exports was helpful because exports generated foreign exchange which could be used to purchase imports of goods and services. This would then remove the demand constrain the balance of payments would have imposed in the event that a country had very little foreign exchange reserves.

Some studies have empirically tested the validity of both the export-led growth and growth-led export hypothesis and the main conclusions suggest that the validity of either hypothesis depends on country specific factors (Araujo et al. 2015)[2].

However, from the late 1960s through to the 1980s, other studies began to look at the relationship between exports and economic growth for both developed and developing countries. These studies did not place a focus on balance of payment constraints but argued that pursuing policies that promoted exports would accelerate the growth of the economy through the exploitation of comparative advantage. As a result, production costs will be reduced, technical competencies for labour and capital will be developed and countries can earn foreign exchange. Some of the notable studies include Emery (1967), Michaely (1977), Balassa (1978), Tyler (1981) and Feder (1983)[3]. These studies found a positive effect of exports on economic growth and argued that the effect of exports is stronger for countries that have industrialized, achieved a certain level of per capita income or have a higher share of manufactured exports. The main criticism of the results of some of the studies was that exports formed part of total output, hence it was not be surprising to find a positive effect of exports on economic growth.

In that light, another strand of the literature emerged and focused on export composition and its effect on economic growth. Notable among this strand of literature are Fosu (1990*a*,*b*, 1996), Xu (2000) and Hausmann et al. (2007). Some of these studies, like Fosu (1990*a*,*b*), are notable because they disaggregate total exports into primary and manufacturing exports while others like Xu (2000) and Hausmann et al. (2007) are notable because they analyse exports in light of technology intensity. These studies have argued that where exports are disaggregated into primary and manufacturing exports, the growth effect of manufacturing exports is stronger. These studies follow the Kaldorian view that manufacturing strongly influences growth due to backward and forward linkages, knowledge spillovers, productivity gains and competitive advantage.

Additional contributions to the literature on the export-led growth hypothesis have been made by Sheridan (2014), who argues that although manufacturing exports matter for growth, developing countries need to achieve a certain level of human capital in order to reach a stage where manufacturing exports actually influence growth. This strand of literature closely links to that in the next section, which provides a practical view of the growth pattern that developing countries should follow, based on the experience of Japan.

[2]See the following studies for country based studies on both hypothesis: Bahmani-Oskooee & Economidou (2009), Gagnon (2008), Muhammad Adnan Hye (2012).

[3]Additional studies include: Maizels et al. (1968), Ram (1987), Syron & Walsh (1968), Kravis (1970), Heller & Porter (1978), Kavoussi (1984).

The Wild Geese Flying Model

The model developed by Akamatsu (1961, 1962) describes the relationship between policy, export promotion and foreign direct investment, which leads to economic growth for a developing country. This theory is known as the "flying geese" model and was written as an explanation for how Japan developed in its days of structural transformation, after it was translated from the initial versions that were published in Japanes (Akamatsu 1935, 1937). Two students of Akamatsu later built on the theory and extended the theory to cover regionalization and industrial upgrading (Kojima 2000, Ozawa 2007). Akamtsu's model was inspired by Vernon's product cycle theory, which focused on the stages of product development from innovation and infancy, maturation, exports and expiration (Vernon 1979). However, according to Rapp (1975), Akamtasu's model differed because it focused more on how a country could achieve competitiveness by importing a product, learning to produce it, making it for its domestic market and exporting to other countries. The flying geese model assumed a strong role of the state, in terms of protective policy, which helps the country to develop the production capacity and export.

According to the flying geese model, a developing country must progress through three basic stages in order to reach a level where it is regarded as an advanced country. Once advanced, the fourth stage of development sees the advanced coutnry extending its development approach to less developed countries. The developing country will begin in the first stage, where it imports technology and essential goods from advanced countries (Korhonen 1994, p .96). In the second stage, the developing country uses the technology and inputs to produce consumer goods for its domestic markets, with the aim of harnessing the domestic demand and earning profit to sustain production and further investment (Kojima 2000, p.377). In the third stage, the developing country would have advanced and begins exporting consumer goods produced domestically after it has captured its domestic markets. In this stage, the advanced country leads others and begins to homogenize its exports with further advanced nations while differentiating its exports to nations that are at lower stages of development (Ozawa 2007, p .10). Finally in the fourth stage, the country would begin exporting sophisticated capital goods or manufactures, having gained homogeneity in the production of consumer goods with other advanced countries. The advanced country will use its exports of capital goods to support production of consumer goods in less-advanced countries, who will be following the lead country and who can produce homogeneous goods (Kojima 2000, Furusawa 2010).

Akamatsu emphasizes the need for institutional and protective policies from governments of developing counties in order to support their domestic industries for export promotion. He argued that the essence of such policies is to ensure that the domestic industries of a developing country can compete in international markets after they have developed the capacity to meet the domestic demand (Akamatsu 1962, p .13). Akamatsu's position on the role of policy shows that he understood clearly the role of the government in initiating policies that can develop a country. In this case, it was Japan. The central government of Japan implemented several policies to ensure that outcomes were achieved as expected. A notable organization that resulted from government policy action is the Ministry of International Trade and Industry (MITI), which was set up to develop a strategic framework that could help selective Japanese industries to compete internationally and earn income for Japan. Japan developed through all the four stages of the "flying geese" model and today is one of the leading countries in terms of per

capita income[4].

Furthermore, the stages described above constitute the basic pattern of development that Akamatsu originally wrote about. The literature assumes that government policies are adequate at further stages where the basic pattern is expanded to cover multiple products and industries. This means that although the basic pattern describes the progression of a country in the development of competitive advantage for consumer and capital goods, it does not limit the application of the pattern to other types of goods, such as crude, complex or refined goods (Akamatsu 1961, p .208). This is referred to as the varied pattern of diversification. Where the basic pattern is applied to other goods, there are two more patterns that can evolve (Kojima 2000, p .379). The first is the intra-industry pattern which results from the creation of new products from an existing resource within an industry. In this pattern, new products emerge from existing resources which are already being produced domestically. For example, steel can be used to produce utensils, iron rod, and other kinds of machinery. The second varied pattern is the inter-industry pattern, where industries collaborate and develop an input-output relationship such that the outputs of one industry can serve as the inputs to another industry process which adds value. Of course, each industry continues to follow the basic pattern of development, suggesting that an industry can collaborate a lot more with others when it has reached an advanced stage of development and can handle supplying both the domestic sectors and exporting to advanced countries. For instance, instead of only producing steel products, the steel industry can contribute steel to the making of automobiles and other heavy duty equipment. In this sense, the interactions between industries that are following a similar basic pattern of development contribute towards industrial development and help an economy develop the efficient and competitiveness it would need in the global economy.

The flying geese pattern of development was further built on by Kojima (2000) and Ozawa (2007) to capture additional aspects of variation to the basic pattern, such as regionalization and industrial upgrading. Literature that tested the validity of the model did not consider the role of government policies in the pattern but focused on whether the pattern was still applicable to industrial progress of developing countries (Cutler et al. 2003, Nakagane 2013, Kumagai 2015).

Despite this, the flying geese model has been critiqued on several grounds. These include the ambiguity of technology as a transfer mechanism for domestic firms, the non-linear approach of the catch-up process that countries may choose to follow (in that, not every country may start from import substitution before reaching export promotion),the use of the model to promote imperialism of advanced countries, the failure to promote innovation in less-developed countries and the lack of emphasis on complete development of import substitution before reaching the stage of export promotion (Cumings 1984, Yoshihara 1988, Bernard & Ravenhill 1995, Kasahara 2004).

Having discussed some of the theoretical literature, relevant empirical literature for this essay are briefly considered in the next section.

Empirical Literature

The empirical literature on exports and economic growth is made up of studies that have followed different methodologies to analyze the influence of exports and its composition on economic growth. Recent studies in the literature have focused more on the

[4]Johnson (1982, chap. 1) further explains the workings of the MITI and the industrial policies they instituted in Japan.

technological content of exports and do not consider the estimation of growth models (Shimbov et al. 2019, Franke et al. 2019, Vogiatzoglou 2019). However, this essay follows the econometric approach used by earlier studies such as Tyler (1981), Fosu (1990*a*,*b*) and Sheridan (2014). Out of these studies, it is only Sheridan (2014) who uses a Cobb-Douglas production function to estimate the effect of exports on economic growth for developing and developed countries whereas the other studies use a standard neoclassical production function, which controls for labour and capital.

The empirical literature which has used the standard neoclassical production function involves earlier studies such as Emery (1967), Balassa (1978, 1985), Feder (1983) and Ram (1987), who have generally found a positive influence of exports on economic growth in developing countries. For instance, Tyler (1981) uses the production function and includes the natural log of exports as an additional factor of production in his estimations. His data covers 55 middle income countries, including six oil-producing countries over the period 1960 - 1977. Further, the study uses the Ordinary Least Squares (OLS) approach and estimates the specified production function using both total exports and manufacturing exports. Fosu (1990*a*) follows the same approach and augments the production function with a variable that is expressed as a function of total exports. However, he disaggregates the export variable into primary and manufacturing exports and finally examines the influence of both types of export outcomes on economic growth. His data covers 64 developing countries over the period 1960 - 1980. He also estimates the model using the OLS technique. Furthermore, Fosu (1990*b*) uses a restricted sample of 28 Less Developed Countries (LDCs) and splits the sample into African and non-African LDCs. The objective of this study is to determine whether the influence of exports on economic growth is different for African LDCs or for non-African LDCs. Here also, the OLS technique is employed to estimate the export-augmented production function and the data is pooled for countries over the periods between 1960-70 and 1970-80.

However, studies such as Sheridan (2014) use a Cobb-Douglas production function instead of the neoclassical production function. For such studies, the Cobb-Douglas production is not only augmented with labour and capital, but the function is augmented with human capital, in line with the work of Mankiw et al. (1992). Sheridan also focuses on the influence of both primary exports and manufacturing exports on economic growth. Hence, the paper makes its contribution by showing that the effect of export composition on economic growth differs based on the level of human capital. In this paper also, the technical progress variable is defined as a function of exports, noting that exports are disaggregated into primary exports and manufacturing exports in the analysis. Sheridan uses a sample of 117 countries over the period 1960 - 2009 and estimates the production function using OLS and fixed effects.

Other than Sheridan, recent studies that have investigated the influence of exports composition on economic growth of developing countries have not used production functions. For instance, Xu (2000) estimates the effects of primary exports on industrial exports and Gross Domestic Product (GDP) for 74 countries between 1965 and 1962. The study uses a Vector Autoregressive (VAR) model to estimate the influence of primary exports on industrial exports and GDP and later estimates impulse response functions. The study finds evidence of a positive effect of primary exports on industrial exports and GDP in the short-term and long-term, for 49 countries in the sample. The findings suggest that governments in developing countries should not discriminate against the export of primary commodities. Another example is Cuaresma & Wörz (2005), who investigate the hypothesis that exports of high-technology industries have positive externalities and

higher productivity. The study uses an industry dataset for 45 industrialized and developing countries for the period 1981 - 1997. The study also uses a panel econometric model, controlling for random effects and endogeneity in the model using an error-corrected two-stage least squares estimation technique. The results showed that the level of technology in an industry contributed to the influence of each industry on output growth, supporting the hypothesis that exports from technology-intensive industries contributed to higher productivity. However, the study did not find any evidence of a significant externality effect of high-technology industry exports.

Furthermore, Hausmann et al. (2007) demonstrate that the exports of a country are important, when local costs, knowledge spillovers and the extent of specialization are considered. The study develops indices of productivity associated with product exports and the per capita income associated with each product for a sample of 113 countries for the period 1991 - 2001 using data from the World bank and the United Nations. The study concludes that there are differences in the quality of exports of countries sampled and that countries who have higher quality, in terms of technology, perform better. Again, Berg et al. (2012) determine what makes growth sustained for 140 countries by generating growth spells based on their analysis of structural breaks. The paper defines a growth spell as a period of high growth, beginning with an expansion in growth and ending with a contraction or the end of the sample. The study finds that growth spells are shorter mostly in African and Latin America and that growth is sustained by manufacturing exports, greater openness to direct investment, and the avoidance of exchange rate overvaluation, among others. Finally, Jarreau & Poncet (2012) investigate export sophistication and economic growth for 30 provinces in China for the period 1997 - 2009. This study follows the approach of Hausmann et al. (2007). This study models the growth of real GDP per capita as a function of initial export sophistication, initial income, investment and human capital. the study finds evidence that sophistication of exports influences growth positively through activities of domestic firms.

After reviewing the literature, none of the studies focus on the growth-effect of government policy and exports. This essay attempts to fill this gap. This essay also follows the same direction as Sheridan (2014) and uses a Cobb-Douglas production function, augmented with human capital. Sheridan's approach also involves examining the influence of exports by type (primary and manufacturing), which has been done by earlier studies like Fosu (1990*b*, 1996). However, Sheridan's approach does not involve examining the composition of exports by the level of technology, product or industry as has been the case in earlier studies (Hausmann et al. 2007, Jarreau & Poncet 2012). In the next section, the econometric model to be estimated is derived. This is then followed by a discussion of the data and sample.

3 Methodology

Consider a Cobb-Douglas production function augmented with human capital (Mankiw et al. 1992, Knight et al. 1993, Temple 1999):

$$Y_t = K_t^{\alpha} H_t^{\beta} (A_t L_t)^{1-\alpha-\beta} \tag{1}$$

where Y_t represents total output at time t, K_t represents physical capital at time t, H_t is human capital at time t, L_t is labour at time t and A_t is a measure of technological progress at time t. Also, the assumption of decreasing returns to capital applies, so that $\alpha + \beta < 1$.

Furthermore, the labour force growth is equal to population growth, n. In line with the growth literature, the labour force and technological progress function are assumed to grow at the constants rates of n and g respectively. However, what makes this study different is how the technological progress function is defined. Unlike other studies, the technological progress equation is defined as a function of both exports (X) and government policies (P) and the interaction between both export and government policies. The labour force and technological progress function are shown as:

$$L_t = L_0 e^{nt} \tag{2}$$

$$A_t = A_0 e^{gt} e^{\beta_2 X} e^{\beta_3 P} e^{\beta_4 (X \times P)} \tag{3}$$

The variable, X, in Equation 3 captures the share of exports in total output, as well as the shares of primary and manufacturing exports in total output, and has been argued to be a determinant of technology or total factor productivity (TFP). For instance, earlier studies like Sheridan (2014) argue that technological progress is a function of social inputs that are achieved aggregately and that the level of exports influences the kind of technology that an economy would need as it develops, due to knowledge and technology spillovers that occur during production for exports. Also, scholars such as Tyler (1981) acknowledged the significance of the technological progress term on economic growth in his study, indicating that manufacturing export activity would be associated with greater technological progress. In this light, this essay expresses the technological progress (A_t) as a function of the share of the level of exports in total output, as shown in Equation 3.

To transform Equation 1 into its intensive form, both sides of the equation are divided by $A_t L_t$:

$$y_t = k_t^{\alpha} h_t^{\beta} \tag{4}$$

where:

$$y_t = \frac{Y_t}{A_t L_t} \qquad k_t = \frac{K_t}{A_t L_t} \qquad h_t = \frac{H_t}{A_t L_t}$$

From Equation 4, y, k and h are expressed as units of output, capital and human capital per unit of effective worker.

Physical and human capital evolve according to the following equations :

$$\frac{dk}{dt} = s_k y_t - (n + g + \delta) k_t \tag{5}$$

$$\frac{dh}{dt} = s_h y_t - (n + g + \delta) h_t \tag{6}$$

From the equations above, physical and human capital are assumed to depreciate at a rate of δ. Also s_k is defined as the fraction of income invested in physical capital whereas s_h is defined as the corresponding fraction in human capital.

From equations (4) - (7), the steady state levels of k and h are given by:

$$k^* = \left(\frac{s_k^{1-\beta} s_h^{\beta}}{n + g + \delta} \right)^{\frac{1}{1 - \alpha - \beta}} \tag{7}$$

$$h^* = \left(\frac{s_k^{\alpha} s_h^{1-\alpha}}{n + g + \delta} \right)^{\frac{1}{1 - \alpha - \beta}} \tag{8}$$

Substituting equations 7 - 8 into equation 4 and taking logs:

$$ln\hat{y}^* = -\left(\frac{\alpha+\beta}{1-\alpha-\beta}\right) ln(n+g+\delta) + \left(\frac{\alpha}{1-\alpha-\beta}\right) ln(s_k) + \left(\frac{\beta}{1-\alpha-\beta}\right) ln(s_h) \quad (9)$$

Rewriting equation 9 in terms of output per effective worker and noting that technology evolves according to equation 3 gives:

$$\begin{aligned} ln\frac{Y_t}{L_t} = lnA_0 + gt + \beta_2 X + \beta_3 P + \beta_4 (X \times P) + \phi_1 \left(\frac{\alpha}{1-\alpha-\beta}\right) ln(s_k) \\ + \phi_2 \left(\frac{\beta}{1-\alpha-\beta}\right) ln(s_h) - \left(\frac{\alpha+\beta}{1-\alpha-\beta}\right) ln(n+g+\delta) \end{aligned} \quad (10)$$

Mankiw et al. (1992) show that by approximating around the steady state, the growth of equation 10 is given by:

$$\begin{aligned} ln\frac{Y_t}{L_t} - ln\frac{Y_0}{L_0} = \phi lnA_0 + gt + \beta_2 X + \beta_3 P + \beta_4 (X \times P) + \phi_1 \left(\frac{\alpha}{1-\alpha-\beta}\right) ln(s_k) \\ + \phi_2 \left(\frac{\beta}{1-\alpha-\beta}\right) ln(s_h) - \phi \left(\frac{\alpha+\beta}{1-\alpha-\beta}\right) ln(n+g+\delta) - \phi ln\frac{Y_0}{L_0} + \epsilon \end{aligned} \quad (11)$$

where $\phi = 1 - e^{-\lambda t}$ and λ is the convergence rate which measures how fast coutries adjust toward their steady-state level of output per worker along a balanced growth path.

Econometric Model

Equation 11 can be written more compactly, across country i and time t as:

$$\begin{aligned} \hat{y}_{it} - \hat{y}_{i0} = \eta - \psi \hat{y}_{i0} + \beta_2 X_{it} + \beta_3 P_{it} + \beta_4 (X \times P)_{it} + \sigma ln(s_k)_{it} \\ + \rho ln(s_h)_{it} - \gamma ln(n+g+\delta) + \mu_i \end{aligned} \quad (12)$$

where $\hat{y}_{it}$ represents the natural log of real income per capita for country i at time t, and $\hat{y}_{i0}$ represents the initial level of real income per capita for each period average. The data in this paper is averaged over a 5-year period and the initial level of real income per capita captures conditional convergence. In addition, μ_i is included to capture country fixed effects. Equation 12 is the baseline model which is empirically tested to determine the influence of the types of exports and government policies on economic growth in Africa.

Consider now the government policies selected in this essay. The policy measures were selected because they are fundamental government policies for promoting exports, which contributed to the growth of the East Asian economies. Beyond this, where the effect of such fundamental policies on exports and economic growth are examined in an African context, different results may emerge and some lessons can be learned. These policies were implemented by countries like Japan, South Korea, to develop their domestic industries for export (Johnson 1982, Amsden 1992, Chow et al. 2004). The hypothesis here is that where policies and export type interact, the effect on economic growth of African countries is statistically significant. The set of policy measures for country i at time t, (P_{it}), is expressed as follows:

$$P_{it} = f(cc_{it}, ge_{it}, rq_{it}, rl_{it}, ca_{it}, psc_{it}) \quad (13)$$

where cc_{it} refers to the control of corruption in each country i at time t, ge_{it} refers to government effectiveness in each country i at time t, rq_{it} refers to regulatory quality in each country i at time t and rl_{it} refers to the rule of law in each country i at time t. Furthermore, ca_{it} refers to the Chinn - Ito index of capital account openness in each country i at time t, developed by Chinn & Ito (2006). Also, psc_{it} refers to domestic credit given to the private sector by banks, expressed as a share of GDP, in each country i at time t. From equations 12 and 13, each of these policies is interacted with the share of exports in total output.

From equation 12, the coefficient of the interactive term, β_4, is hypothesized to be positive, given that the literature shows evidence of the positive influence that such policies and exports have had on the growth of countries who have used them.

To estimate equations 12 in this essay, the following strategy is used: First, equation 12 is estimated using the share of total exports to GDP, which is denoted as X_{it}. After this, estimations using both shares of manufacturing exports to GDP and primary exports to GDP are introduced in the regression model and estimated. This essay follows this approach, which was used by Sheridan (2014). Sheridan argues that the effect of the share of total exports may be masked by aggregation. He therefore addressed the potential aggregation problem by introducing the types of exports as a share of total output so as to capture the source of the growth effect.

Furthermore, where the share of total exports to GDP (X_{it}) is used, it is expected that its coefficient is positive and significant. Also, in the estimations with the shares of manufacturing exports ($ManX_{it}$) and primary exports to GDP ($PrimX_{it}$), it is expected that their coefficients will be positive and significant. After these estimations, the next step is to interact government policy variables with the shares of manufacturing exports and primary exports in total output. This step will be the analysis that is used to answer the research question in this essay.

Since this paper uses data across countries over time, panel data techniques are employed to estimate equation 12. Earlier studies such as Sheridan (2014) controlled for fixed effects in his estimations. Similarly, older studies such as Fosu (1990*a*,*b*) also controlled for fixed effects in estimating the influence of exports on economic growth. This essay follows a similar approach and uses the fixed effects Ordinary Least Squares (OLS) technique to estimate the results for the panel.

The results from the empirical test are examined in light of some arguments in the literature on the role of manufacturing as an engine of growth in Africa and the influence of government policy and export promotion. Earlier literature by Söderbom & Teal (2003) has argued that manufacturing exports in Africa have decreased over time and have become underdeveloped. As a result, manufacturing may not act as an engine of growth, leaving room for other sectors to lead the growth path in Africa. Similarly, Rodrik (2018) mentions that although the recent economic growth of Africa has been remarkable, there is very little evidence of sustainability. These studies suggest that although Africa has grown, a number of factors including deindustrialization threaten the sustainability of their growth. Despite these, empirical tests in this paper may find a different dimension to such arguments that have been made by earlier scholars.

Data and Sample

The data sources and sample size used in this paper are discussed in this section. First, data on the share of primary and manufacturing exports in total output as well as the

share of total exports in total output, are sourced from the World Integrated Trade Solutions (WITS) database. Also, data on capital account openness is sourced from Chinn & Ito (2006). Furthermore, data on policy measures such as control of corruption, government effectiveness, regulatory quality and rule of law are from the World Governance Indicators (WGI) database. In addition, data on human capital is sourced from Penn World Tables (PWT) version 9.1. The remaining data on real per capita income, population growth and the fixed investment rate are sourced from World Development Indicators(WDI). Tables B - D of the Appendix contains full descriptions of the variables in this essay and their data sources.

This essay focuses on the African continent and samples data for African countries. The data used in this paper is a balanced panel for 37 African countries, covering the period from 1994 to 2017. The full list of countries is shown in Table A of the Appendix. The data is averaged over 5-year periods, in line with approach used in earlier studies such as Fosu (1990*a*,*b*), Knight et al. (1993), Temple (1999), Sheridan (2014). The sampled data used in this essay is classified in the following periods: 1994-1999, 2000-2005, 2006-2011 and 2012-2017.

Now, the measures for each of the variables used in the estimations are explained. First is the dependent variable, which is the measure for economic growth. In this essay, economic growth is measured as the natural log of real GDP per capita over each 5-year period, divided by five. That is, the log differences are first calculated as: $ln(\hat{y}_{i,1999}) - ln(\hat{y}_{i,1994}), \ldots, ln(\hat{y}_{i,2017}) - ln(\hat{y}_{i,2012})$. After that, each of these values is divided by five. Related to this is the measure for the convergence term. In this paper, the convergence term is measured as the natural log of GDP per capita, adjusted for Purchasing Power Parity (PPP). This data is used as the initial value of each 5-year period, so that for each country i, there are the observations: $ln(\hat{y}_{i0,1999}), \ldots, ln(\hat{y}_{i0,2017})$.

Secondly, the fixed investment rate is measured as the share of gross fixed capital formation in GDP. This is calculated by dividing the total value of gross capital formation by GDP. The fixed investment rate for each 5-year period is calculated as the log of the average investment rate. This involves first summing up as follows: $ln(s_{k_i,1994})+, \ldots, +ln(s_{k_i,1999}), \ldots, ln(s_{k_i,2012})+, \ldots, +ln(s_{k_i,2017})$. After this, each of these values is divided by five. This means that for each country i, there will be the following data points: $ln(s_{k_i,1999}), \ldots, ln(s_{k_i,2017})$.

Next, consider the variable $(n + g + \delta)$, averaged over the periods in this paper. The variable n represents population growth rate whiles the variable g measures world growth. The growth rate of the United States is mostly used as a proxy for world growth and is often estimated to be 0.02. The variable δ also measures capital depreciation and this is mostly estimated to be 0.03, which is usually the rate for the United States economy (Nadiri & Prucha 1996). From the literature, Mankiw et al. (1992) and Knight et al. (1993) use these estimates as proxies for their measure of the variable $(g + \delta)$. However, some studies have argued that capital depreciates a lot more in Africa because of the problem of capital inefficiency (Easterly & Levine 1997). This means that due to lower capital-labour ratios in developing countries, fixed capital gets overworked and depreciates faster. As a result, there are increased maintenance costs and higher costs of replacement for fixed capital in Africa (Bu 2006). Where capital is not replaced, further gaps in aggregate infrastructure can result, leaving implications for the growth-effect of fixed capital investment in developing countries. Hence, this essay assumes a higher depreciation rate of capital for the sampled African countries. That is, δ is assumed to be 0.05 instead of 0.03. Hence, the estimate of capital depreciation $(g + \delta)$ used is

amended to 0.07. This means that for each country i, there will be the following data points: $ln(n_{i,1999} + 0.7), \ldots, ln(n_{i,2017} + 0.07)$.

Another explanatory variable used in the estimations is the human capital index, which is a proxy for the ratio of human capital investment to GDP. Data from the PWT version 9.1 captures this index, which proves to have some advantages over data that Cohen & Soto (2007) and Barro & Lee (2013) have developed. Whereas studies such as Mankiw et al. (1992) and Knight et al. (1993) used the school enrolment rate as a proxy for human capital in their growth regressions, this study uses updated data from the PWT in its estimations. The PWT data used in this paper has annual observations for developing and developed countries from 1994 to 2017. The human capital index data is also based on the average number of years of schooling. In this paper, for each 5-year period and country i in the data, there will be observations as follows: $ln(s_{h,1999}), \ldots, ln(s_{h,2017})$.

Again, consider the variable X_{it} in this essay. This variable first represents the share of total merchandise exports to GDP. In subsequent estimations, the notation is adjusted to represent the share of manufacturing merchandise exports to GDP ($ManX_{it}$) and the share of primary merchandise exports to GDP ($PrimX_{it}$). Exports shares are used in order to avoid collinearity, since exports are originally part of GDP. Hence, these export variables are averaged over the same periods earlier indicated so that for each country i, there is one observation per period in the following example: $ln(X_{i,1999}), \ldots, ln(X_{i,2017})$.

In addition, the governance policy measures used in this paper are estimates of the perceptions regarding the ability of governments to control corruption, be effective, ensure regulatory quality and promote the rule of law. These estimates are aggregate scores assigned to each country over time, in units of standard normal distribution, ranging from -2.5 to 2.5. An increase in the score means that the government of that country is doing better at controlling corruption, being effective, ensuring better regulatory quality and enforcing the rule of law. These estimates are averaged for each 5-year period used in the analysis.

Furthermore, the measure of capital account openness is an index which ranges from 0 to 1, where 0 means that the capital account of that country is fully closed whereas 1 means that the capital account of that country is fully open. These values are also averaged for each period so that for each country i, there is $ln(ca_{it,1999}), \ldots, ln(ca_{it,2017})$. Also, credit given to the private sector by banks, expressed as a share of GDP, is used. Similarly, these values are averaged for each period so that for each country i, there is $ln(psc_{it,1999}), \ldots, ln(psc_{it,2017})$. The full definitions of all the variables used in the analysis and their respective sources are shown in Tables B - D of the Appendix.

4 Results and Discussion

The estimations of Equation 12 are shown in Table 4.1 below. As indicated earlier in the empirical strategy, the regression models in this essay control for country fixed effects.

The results from Table 4.1 show that the coefficient of the share of total merchandise exports in total output (X_{it}) is not statistically significant. This suggests that X_{it} does not statistically influence economic growth of African countries in this sample. This finding contradicts results obtained by Sheridan (2014) who finds a positive and significant influence of the share of total exports in total output on economic growth. Also, the results contradict findings of earlier studies such as Emery (1967), Michaely (1977), Tyler (1981), Balassa (1985) and Fosu (1990a) because these studies find a positive and sig-

Table 4.1: Type of Exports and Economic Growth

VARIABLES	(1) $\hat{y}_{it} - \hat{y}_{i0}$	(2) $\hat{y}_{it} - \hat{y}_{i0}$	(3) $\hat{y}_{it} - \hat{y}_{i0}$
$\hat{y}_{i0}$	-1.494***	-1.600***	-1.619***
	(0.526)	(0.532)	(0.533)
$ln(s_h)_{it}$	0.256	0.676	0.697
	(1.277)	(1.294)	(1.268)
$ln(s_k)_{it}$	1.013***	1.030***	1.021***
	(0.290)	(0.295)	(0.303)
$ln(n+g+\delta)_{it}$	-0.979***	-1.028***	-1.024***
	(0.359)	(0.365)	(0.363)
X_{it}	0.0140		
	(0.00849)		
$ManX_{it}$		0.00150	
		(0.0114)	
$PrimX_{it}$			-0.000947
			(0.00649)
Constant	9.478**	10.35***	10.58***
	(3.819)	(3.860)	(3.979)
Observations	148	148	148
R-squared	0.194	0.174	0.174
Number of i	37	37	37
Fixed Effects	Yes	Yes	Yes

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

nificant influence of total exports on economic growth of both developing and developed countries.

Based on this paper's estimation strategy, the shares of primary merchandise exports ($PrimX_{it}$) and manufacturing merchandise exports in total output ($ManX_{it}$) replace X_{it} in a second and third estimation. The results are shown in the second and third column of Table 4.1. From the second column of the table, the results show that the coefficient of $ManX_{it}$ is not statistically significant. A similar outcome is shown for the coefficient of $PrimX_{it}$ in the third column of the table. The results show that the coefficient of $ManX_{it}$ is also not statistically significant. This finding contradicts findings of earlier studies that suggest that manufacturing exports have a stronger effect on economic growth. These studies include Michaely (1977), Balassa (1978), Tyler (1981), Balassa (1985), Fosu (1990*a*,*b*), Xu (2000) and Hausmann et al. (2007). Also, this result contradicts Sheridan (2014) who finds a positive and statistically significant effect of $ManX_{it}$ on economic growth of developing countries. Sheridan's result may have differed because of the inclusion of both developed and developing countries across different continents in his sample whereas this paper only samples African developing countries.

Furthermore, across both columns of Table 4.1, the results show that the coefficient of the sum of population growth, world growth and capital depreciation ($ln(n+g+\delta)_{it}$) is statistically significant. This means that $ln(n+g+\delta)_{it}$ negatively and significantly influences economic growth for African countries in the sample. This finding is consistent and can be seen in both columns of the table. This result suggests that a one percent increase in population growth will negatively influence economic growth of the sampled African countries by 0.979%, 1.028% and 1.024% respectively, holding all other influences

constant.

Also, the results from the Table 4.1 show that the coefficient of the initial real per capita income ($\hat{y}_{i0}$) is statistically significant and negatively signed as expected. This finding is in line with growth estimations of earlier studies such as Mankiw et al. (1992), Knight et al. (1993) and Temple (1999), who account for the initial per capita income in their regression models. This finding is also consistent with Sheridan (2014) who also finds a negative and statistically significant coefficient of $\hat{y}_{i0}$ across countries. The variable, $\hat{y}_{i0}$, is included to capture conditional convergence, which implies that poorer countries with lower capital-labour ratios will grow faster than richer countries with higher capital-labour ratios, holding everything else constant. The coefficient of the convergence term is negative and statistically significant across all estimations in this paper.

Finally, the results from Table 4.1 above show that the investment rate ($ln(s_k)_{it}$) had statistically significant coefficients. This suggests that fied investment rate, measured by the share of gross fixed capital formation in total output,had a significant influence on economic growth of African countries in the sample. This result suggests that a one percent increase in fixed investment will positively influence economic growth of sampled African countries by 1.013%, 1.030% and 1.021% respectively, holding all other influences constant.These findings are in line with the work of Rodrik (2018) who explains that the recent growth of African countries over the last decade has been due to factors such as increasing Chinese fixed investments and natural resources, which are time invariant.The results are also in line with findings of Sheridan (2014) who found a positive influence of fixed investments on economic growth of countries in his sample. The study argues that investments necessary to support exports, especially exports of manufactures.

4.1 Policy, Export Type and Economic Growth

Consider now the influence of government policies and exports on the economic growth of African countries sampled in this essay. As indicated earlier, the policies considered relate to governance and institutional quality as well as capital controls and the allocation of credit to the private sector. For most of the East Asian economies, it was seen that the role of the state was dominant in their economic development, in terms of the efficiency of policy implementation. Hence, this essay makes a similar argument that both government policies and exports may have a significant influence on the growth path of developing countries.

First, the results from the interaction between selected policies and $ManX_{it}$ are presented in Table 4.2. The results show that $ln(n+g+\delta)_{it}$, $\hat{y}_{i0}$ and $ln(s_k)_{it}$ have coefficients that are statistically significant across all the regressions in the table. The coefficients of these variables are statistically significant at the 1% and 5% levels of significance across all the columns of the table. Furthermore, out of the set of policies considered, policies such as government effectiveness, regulatory quality and the rule of law, had statistically significant coefficients. Other policies such as the control of corruption, capital account openness and credit to the private sector did not have statistically significant coefficients.

From the table below, the results showed that government policies such as government effectiveness, regulatory quality and the rule of law have a statistically negative effect on economic growth of sampled African countries. This is seen from the sign of the coefficients of these policy variables and their levels of statistical significance. The results suggest that where government effectiveness, regulatory quality and rule of law increase by one unit, economic growth reduces by 0.94%, 0.965% and 1.225% respectively, holding

all other influences constant. In addition, out of these policies, rule of law appears to have the strongest influence on economic growth, followed by regulatory quality and government effectiveness.

Table 4.2: Policy, $ManX_{it}$ and Economic Growth in African countries

VARIABLES	(1) $\hat{y}_{it} - \hat{y}_{i0}$	(2) $\hat{y}_{it} - \hat{y}_{i0}$	(3) $\hat{y}_{it} - \hat{y}_{i0}$	(4) $\hat{y}_{it} - \hat{y}_{i0}$	(5) $\hat{y}_{it} - \hat{y}_{i0}$	(6) $\hat{y}_{it} - \hat{y}_{i0}$
$\hat{y}_{i0}$	-1.555***	-1.724***	-1.768***	-1.520***	-1.593***	-1.687***
	(0.531)	(0.530)	(0.542)	(0.521)	(0.538)	(0.561)
$ln(s_h)_{it}$	0.630	0.326	0.606	-0.0458	0.538	0.531
	(1.375)	(1.455)	(1.408)	(1.354)	(1.326)	(1.329)
$ln(s_k)_{it}$	0.996***	0.966***	1.001***	0.952***	1.011***	0.996***
	(0.294)	(0.291)	(0.291)	(0.288)	(0.307)	(0.303)
$ln(n+g+\delta)_{it}$	-1.084***	-1.205***	-1.171***	-1.162***	-1.039***	-0.972**
	(0.366)	(0.368)	(0.368)	(0.361)	(0.370)	(0.387)
$ManX_{it}$	0.0130	0.0207	0.0155	0.0218	0.0135	0.00181
	(0.0133)	(0.0143)	(0.0134)	(0.0141)	(0.0195)	(0.0131)
cc_{it}	-0.581					
	(0.418)					
$ManX_{it} \times cc_{it}$	0.0190					
	(0.0116)					
ge_{it}		-0.944**				
		(0.423)				
$ManX_{it} \times ge_{it}$		0.0272**				
		(0.0123)				
rq_{it}			-0.965**			
			(0.455)			
$ManX_{it} \times rq_{it}$			0.0267**			
			(0.0133)			
rl_{it}				-1.225***		
				(0.447)		
$ManX_{it} \times rl_{it}$				0.0314**		
				(0.0134)		
ca_{it}					-0.117	
					(0.318)	
$ManX_{it} \times ca_{it}$					0.00870	
					(0.0113)	
psc_{it}						0.00871
						(0.0221)
$ManX_{it} \times psc_{it}$						-0.0000214
						(0.000440)
Constant	9.815**	11.11***	11.31***	9.594**	10.25**	10.99***
	(3.859)	(3.814)	(3.882)	(3.777)	(4.060)	(4.074)
Observations	148	148	148	148	148	148
R-squared	0.196	0.218	0.211	0.232	0.179	0.176
Number of i	37	37	37	37	37	37
Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

However, where these policy measures were interacted with $ManX_{it}$, their coefficients were positive and statistically significant at the 5% level of significance. For instance, the coefficient of the interaction between government effectiveness (ge_{it}) and $ManX_{it}$ is 0.0272. This coefficient is statistically significant at the 5% level of significance, suggesting that where both manufacturing exports share and government effectiveness increase by one unit, economic growth of African countries will increased by 0.0272%, holding all

influences constant. Similarly, the coefficient of the interaction between regulatory quality (rq_{it}) and $ManX_{it}$ is 0.0267 and this coefficient is also significant at the 5% level of significance, suggesting that where both manufacturing exports share and regulatory quality increased by one unit, economic growth will increase by 0.0267%, holding all other influences constant. Finally, the coefficient of the interaction between rule of law (rl_{it}) and $ManX_{it}$ is 0.0314 and this coefficient is also statistically significant at the 5% level of signficance. This results suggests that where both manufacturing exports share and rule of law increase by one unit, economic growth will increase by 0.0314%, holding all other influences constant.

The findings from Table 4.2 contradict results of studies which have examined the influence of manufacturing on economic growth (Szirmai 2012, Szirmai & Verspagen 2015, Su & Yao 2017). Such studies have argued that economic growth is positively influenced by manufacturing alone, because of the dynamic properties that manufacturing possesses and the forward and backward linkages that the manufacturing sector creates within the economy. However, the results shown in the table above suggest that it is rather both manufacturing exports share and government policies which influence economic growth in African countries.

Consider now the interactions between primary exports share in total output and selected government policies. The results from these interactions are presented in the Table 4.3 below. The results from Table 4.3 show that $ln(n+g+\delta)_{it}$, $\hat{y}_{i0}$ and $ln(s_h)_{it}$ have coefficients which are statistically significant across all the columns of the table. The coefficients of these variables are statistically significant at the 1%, 5% and 10% levels of significance. Whereas the coefficients of $\hat{y}_{i0}$ and $ln(n+g+\delta)$ were negative and statistically significant, the coefficients of $ln(s_h)_{it}$ were positive and statistically significant.

Furthermore, from Table 4.3, out of the set of policy variables selected in this paper, only capital account flexibility had a statistically significant coefficient. Other policy variables such as control of corruption, government effectiveness,regulatory quality, rule of law and credit to the private sector did not have statistically significant coefficients.

From the fifth column in the table below, the coefficient of capital account openness (ca_{it}) is 0.682, which is negatively signed and statistically significant at the 5% level of significance. This result suggests that an increase in capital account openness by one unit will reduce economic growth by 0.682%. holding all other influences constant. These findings are consistent with results from studies such as Saidi et al. (2016), Lopes & de Jesus (2015) who find a negative relationship between capital account openness and economic growth for emerging economies and less democratic countries.

However, where capital account openness and $PrimX_{it}$ interact, a positive coefficient is found. This coefficient is statistically significant at the 1% level of significance.This result suggests that unit increase both capital account openness and the share of primary exports in total output will increase economic growth of the sampled African countries by 0.0168%, holding all other influences constant. This result can also be seen in the fifth column of that Table 4.3 below.

Interestingly, the results from the fifth column of Table 4.3 also show that the coefficient of $PrimX_{it}$ is positive and statistically significant at the 10% level of significance. This result means that a one unit increase in the share of primary exports in total output will increase economic growth of the sampled African countries by 0.0206%, holding all other influences constant.

The results from the Table 4.3 contradict the results of Sheridan (2014) who finds that primary exports do not have a significant influence on economic growth in developing

Table 4.3: Policy, $PrimX_{it}$ and Economic Growth

VARIABLES	(1) $\hat{y}_{it} - \hat{y}_{i0}$	(2) $\hat{y}_{it} - \hat{y}_{i0}$	(3) $\hat{y}_{it} - \hat{y}_{i0}$	(4) $\hat{y}_{it} - \hat{y}_{i0}$	(5) $\hat{y}_{it} - \hat{y}_{i0}$	(6) $\hat{y}_{it} - \hat{y}_{i0}$
$\hat{y}_{i0}$	-1.611***	-1.602***	-1.532***	-1.588***	-1.653***	-1.723***
	(0.539)	(0.538)	(0.537)	(0.543)	(0.447)	(0.555)
$ln(s_h)_{it}$	0.559	0.0505	-0.0722	0.161	0.890	0.570
	(1.366)	(1.458)	(1.362)	(1.388)	(1.456)	(1.298)
$ln(s_k)_{it}$	1.025***	0.939***	0.978***	1.008***	1.045***	0.949***
	(0.310)	(0.311)	(0.307)	(0.304)	(0.297)	(0.313)
$ln(n+g+\delta)_{it}$	-1.020***	-1.050***	-1.042***	-1.057***	-1.066***	-0.857**
	(0.367)	(0.365)	(0.365)	(0.366)	(0.296)	(0.398)
$PrimX_{it}$	0.000294	-0.00836	-0.00554	-0.00705	0.0206*	-0.00613
	(0.00973)	(0.0102)	(0.0106)	(0.00994)	(0.0109)	(0.00891)
cc_{it}	-0.162					
	(0.466)					
$PrimX_{it} \times cc_{it}$	0.00210					
	(0.0127)					
ge_{it}		0.0742				
		(0.511)				
$PrimX_{it} \times ge_{it}$		-0.0124				
		(0.0128)				
rl_{it}			-0.247			
			(0.517)			
$PrimX_{it} \times rl_{it}$			-0.00755			
			(0.0126)			
rq_{it}				0.0397		
				(0.481)		
$PrimX_{it} \times rq_{it}$				-0.0117		
				(0.0127)		
ca_{it}					-0.682**	
					(0.312)	
$PrimX_{it} \times ca_{it}$					0.0168***	
					(0.00559)	
psc_{it}						-0.00296
						(0.0184)
$PrimX_{it} \times psc_{it}$						0.000478
						(0.000538)
Constant	10.50**	11.13***	10.35**	10.73***	9.823***	11.49***
	(4.026)	(4.055)	(4.047)	(4.084)	(3.046)	(4.141)
Observations	148	148	148	148	148	148
R-squared	0.175	0.189	0.194	0.187	0.212	0.183
Number of i	37	37	37	37	37	37
Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

countries. However, the results from the table are similar to results from earlier studies such as Fosu (1990*b*, 1996) and Xu (2000) who also show that primary exports have a positive influence on economic growth of developing countries. In addition, the results also contradict recent studies such as Shimbov et al. (2019), Vogiatzoglou (2019) and Franke et al. (2019) who argue that countries can growth faster if they are move away from primary exports.

Discussion of Results

The results obtained in this paper are mostly in line with theoretical expectations. Firstly, from Table 4.2 the results show that the initial level of per capita income ($\hat{y}_{i0}$) is statistically significant and negatively signed as expected in growth theory. This result is indicative of convergence and suggests that African developing countries will need to grow faster than developed countries in order to catch up. Earlier studies such as Sheridan (2014) and older studies such as Knight et al. (1993), Mankiw et al. (1992) obtained such a result. In addition, the results from Table 4.2 show that gross fixed capital investment has a positive and statistically significant influence on economic growth of African countries in the sample, whereas population growth has a negative and statistically significant influence on economic growth of African countries in this sample. These results are in line with arguments made by Rodrik (2018) concerning the main drivers of growth in African countries. Fixed investment earns higher returns in African countries because of the low capital-labour ratios and rapid population growth puts pressure on limited national income and fixed infrastructure.

However, the results have shown that some government policies on their own do not have a positive influence on economic growth, except when interacted with exports. The results showed that government effectiveness, regulatory quality, rule of law and capital account openness had a negative influence on economic growth of countries in the sample. This finding is not in line with the prior expectation, which ideally should be positive. This paper argues that negative sign of policies such as government effectiveness, regulatory quality and rule of law would be due to the weak ability of institutions to reflect the efforts of governments who implement such policies. This means that although governments may implement such policies, the workings of public institutions do not always support the intended outcomes, leaving a negative influence on economic growth due to lost revenue or missed economic opportunities. In some cases, corruption in institutions by public officials prevent schemes that are designed to enhance the efficacy of such policy from working and leave the country with less revenue and more debt. Others like capital account openness give the chance for investors to easily repatriate huge profits to their home countries, leaving very little revenue for the development of the country in which they operate. These aspects of these policies do not contribute much to the economic growth of African countries, as seen from the results.

This notwithstanding, there is a more optimistic situation that the results in the table show. The results from Table 4.2 and 4.3 show that government policies have a significant role in the export-growth relationship. The results have shown that the interaction of selected government policies, primary merchandise exports and manufacturing merchandise exports have significant growth-pulling effects for African countries in this paper.

This means that, from the results obtained, it is both government policy and exports that contribute to growth significantly. This is a point that earlier studies like Sheridan (2014), Berg et al. (2012), Cuaresma & Wörz (2005) and Xu (2000) failed to point out. In addition, older studies like Fosu (1990*a*,*b*) also did not consider the role of government policies in the export-growth relationship. The discussion in the literature has mainly focused on the influence of technology-based exports. Some evidence have showed that countries that have increased their exports of technology-intensive exports have grown significantly. This is the discussion from recent studies such as Shimbov et al. (2019), Franke et al. (2019). Other studies also suggest that policies that encourage diversification away from traditional or primary export sectors into manufacturing sectors would grow

significantly in the long-run (Vogiatzoglou 2019).

However, this paper makes a case for the role of government policy in the export-growth relationship for developing countries. It is government policies that are usually designed and implemented in order to support the export outcomes that grow the economy. Hence it is important that governments policies are implemented effectively to ensure that exports are growth-promoting, whether there is some form of technology or not. From the historical evidence of the East Asian countries, the governments decided on policies before taking action to set up industries and export processing zones. The policies were designed and clearly formulated to ensure that there would be success, even with primary exports.

In this paper, policies such as government effectiveness, regulatory quality, rule of law and capital account openness have been shown to have a statistically significant influence on economic growth of African countries when interacted with primary or manufacturing merchandise exports. This would mean that these policies are examples of good government policies that must be encouraged to support the growth of African countries.

Looking back at the flying geese theory and historical evidence of some East Asian economies, countries in the beginning stages of development actually relied on imports of capital and finished goods in the first stage and only exported primary products in the second stage. Later on when such countries were became efficient in the use of key technologies and had built linkages with other sectors and developed internal capacity through learning-by-doing, they began to produce consumer goods that could be exported, while becoming more efficient in producing capital goods for domestic use. However, all these developments began with government policy decisions regarding the promotion of exports and the adoption of certain key technologies through foreign direct investments.

The results in this paper point to a similar path regarding the influence of policies and exports on economic growth for African countries. The interaction of capital account openness and primary exports results in a positive and statistically significant influence on economic growth in African countries. Capital account openness provides the opportunity for a developing country to import the required technology and capital that it may need to develop its traditional exports sector and adopt the technology for manufacturing. The history of some of the East Asian countries shows this.

In later stages of development where a country has gained competence in manufacturing exports, policies such as government effectiveness, regulatory quality and the rule of law will also contribute to the economic growth of such countries.

5 Conclusion

In this paper, the influence of two types of exports on economic growth of selected African countries was first tested. Later, the influence of both government policies and exports was analysed, after interacting these such policies with both types of exports in African countries and determining the resulting effect on economic growth. The results showed that neither the share of manufacturing or primary merchandise exports in total output had a significant influence on economic growth of sampled African countries. In addition, the paper found evidence that government policies such as government effectiveness, regulatory quality, rule of law and capital account openness, solely had a negative and statistically significant influence on economic growth of African countries.

However, where government policies were considered, both government policies and

exports had a a statistically significant influence on economic growth of African countries sampled.

These findings have implications for effectiveness of public policy and administration in African countries. Despite pessimistic views in the literature about the insignificant influence of primary exports and the need to increase the technology content of manufactured exports, the paper shows that government policy is also a significant factor to consider in the export-led growth path for developing countries in Africa.

Furthermore, it can be concluded that fixed capital investment has a positive and statistically significant influence on economic growth of African countries. There is still a large gap in fixed capital provision that needs to be filled in African countries and this requires more investment to be done. Further investments can support the desire to improve technology and improve production outcomes in African countries. Where possible, increased fixed investment could also contribute significant infrastructure to support manufacturing in African countries.

On the contrary however is population growth, which has a negative influence on economic growth of African countries. The increase in population reduces income per capita and contributes to higher depreciation of existing fixed capital. There may be measures to control population growth in African countries but the greater implication is expanding the growth of African economies in order to contain the growth of the populace.

Finally, the role of the state must be emphasized if government policies are going to be successful. The literature on development states defines these types of states as those that combine actions with ideas (Evans 2008). This is what African states must become. It must not seem as though becoming a developmental state is far-fetched. Developmental states have been seen in Africa in times past (Mkandawire 2001). Hence, it is possible to adapt the skills that a government will need to become efficient, because the East Asian governments also learnt this. It is possible that African governments can learn and become better at effectively implementing policies. Combining policy with development ideas and following similar paths that the East Asian tigers and China have taken, may bring immense contribution to the growth story of countries in Africa, because their path worked. It is hoped that someday African states can be regarded as developmental states.

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Appendix

Table A: List of Countries Shown by Region

Western Africa	**Eastern Africa**	**Southern Africa**	**Central Africa**	**Northern Africa**
Benin	Ethiopia	Botswana	Burundi	Algeria
Burkina Faso	Kenya	Lesotho	Cameroon	Egypt, Arab Republic.
Cote d'Ivoire	Madagascar	Malawi	Central African Republic	Morocco
Ghana	Rwanda	Mozambique	Congo Republic	Tunisia
Mali	Mauritania	South Africa	Rwanda	
Niger	Sudan	Zambia	Gabon	
Nigeria	Tanzania	Zimbabwe		
Senegal	Uganda	Namibia		
Sierra Leone	Mauritius			
Togo	Sudan			
Gambia, The				

Table B: Definition of Variables

Variable	Definition	Source
$\hat{y}_{it} - \hat{y}_{i0}$	Five-year average growth rate calculated as the log difference between the natural log of average real GDP per capita and its the initial period real GDP over time.	WDI
$\hat{y}_{i0}$	The initial period real GDP per capita averaged over time.	WDI
$ln(s_h)_{it}$	Human Capital Index, based on years of schooling and returns to education.	PWT 9.1
$ln(s_k)_{it}$	Natural log of share of gross fixed capital formation in GDP, in dollar ($) value, averaged over 5-year periods.	WDI
$ln(n+g+\delta)_{it}$	Natural log of annual population growth rate averaged over time	WDI
$PrimX_{it}$	The share of primary exports to GDP, averaged over time. Primary exports is consists of food products and agricultural raw materials. These are classified under SITC Revision 2. Agricultural raw materials are classified under product codes 20, 21,23, 24,25,26 and 29. Food products are classified under product codes 0, 1, 22, 4, 3 and 5.	WITS
$ManX_{it}$	The share of manufacturing exports to GDP, averaged over time. Manufactures are also classified as under SITC revision 2 using the following codes: 5 (chemicals and related products), 60 (UN special code), 61 (Leather, leather manufactures), 63 (cork and wood manufactures) (basic manufactures), 64 (Paper, paperboard, etc.), 65 (Textiles yarn, fabrics,etc),66 (non-metallic mineral manufactures), 7(machinery and transport equipment) and 8 (miscellaneous manufactured goods).	WITS

Table C: Definition of Variables Cont'd

Variable	Definition	Source
X_{it}	Natural log of the share of total exports to GDP, averaged over time. Total exports refers to all consumer goods exports. These are classified in the following range of product codes : 30520 - 970400.	WITS
cc_{it}	Control of Corruption Estimate, averaged over time. Control of Corruption captures perceptions of the extent to which public power is exercised for private gain, including both petty and grand forms of corruption, as well as "capture"" of the state by elites and private interests.	WGI
ge_{it}	Government Effectiveness estimate, averaged over time. Government Effectiveness captures perceptions of the quality of public services, the quality of the civil service and the degree of its independence from political pressures, the quality of policy formulation and implementation, and the credibility of the government's commitment to such policies.	WGI
rq_{it}	Regulatory Quality estimate, averaged over time. Regulatory Quality captures perceptions of the ability of the government to formulate and implement sound policies and regulations that permit and promote private sector development.	WGI

Table D: Definition of Variables Cont'd

Variable	Definition	Source
rl_{it}	Rule of Law estimate, averaged over time. Rule of Law captures perceptions of the extent to which agents have confidence in and abide by the rules of society, and in particular the quality of contract enforcement, property rights, the police, and the courts, as well as the likelihood of crime and violence.	WGI
ca_{it}	Capital Controls Index, averaged over time. The index is measured on a scale of 0 to 1. It measures the extent of flexibility of a country's capital account.	Chinn, M. D. and Ito, H. (2006).
psc_{it}	Credit to the private sector from banks as share of GDP.	WDI

Table E: Panel Summary Statistics

Variable	Definition	Expected Sign	N	Mean	Std. Dev.	Min	Max
$\hat{y}_{it} - \hat{y}_{i0}$	Economic Growth	N/A	148	1.924	2.35	-8.25	10.106
$\hat{y}_{i0}$	GDP per capita income for each initial period	-	148	7.82	0.929	5.936	9.875
$ln(s_h)_{it}$	Human Capital	+	148	1.758	0.428	1.057	2.835
$ln(s_k)_{it}$	Gross Capital formation as a share of GDP	+	148	21.38	7.667	3.958	54.157
$ln(n+g+\delta)_{it}$	Sum of population growth and average estimate for depreciation	-	148	2.488	0.797	0.209	4.763
X_{it}	Share of total exports in total output	+/-	148	22.444	21.144	0.242	89.143
$PrimX_{it}$	Share of primary exports in total output	+/-	148	33.686	23.488	0.195	86.77
$ManX_{it}$	Share of manufacturing exports in total output	+	148	25.943	24.614	0.00093	90.822
cc_{it}	Control of Corruption	+	148	-0.460	0.499	-1.576	0.887
ge_{it}	Government Effectiveness	+	148	-0.558	0.504	-1.758	0.968
rq_{it}	Regulatory Quality	+	148	-0.494	0.486	-2.140	1.037
rl_{it}	Rule of Law	+	148	-0.523	0.509	-1.807	0.922
ca_{it}	Index of Capital Account Openness	+	148	0.291	0.266	0	1
psc_{it}	Private sector credit given by banks (share of GDP)	+	148	20.702	18.213	2.034	101.239

Table F: Correlation Estimates between Economic Growth and Exports

	$\hat{y}_{it} - \hat{y}_{i0}$	$\hat{y}_{i0}$	$ln(s_h)_{it}$	$ln(s_k)_{it}$	$ln(n+g+\delta)_{it}$	X_{it}	$PrimX_{it}$	$ManX_{it}$
$\hat{y}_{it} - \hat{y}_{i0}$	1							
$\hat{y}_{i0}$	-0.1124	1						
	0.1739							
$ln(s_h)_{it}$	-0.0716	0.7558*	1					
	0.3873	0.0000						
$ln(s_k)_{it}$	0.2114*	0.3085*	0.1738*	1				
	0.0099	0.0001	0.0347					
$ln(n+g+\delta)_{it}$	0.1115	-0.5328*	-0.4665*	.0273	1			
	0.1773	0.0000	0.000	0.7416				
X_{it}	0.0666	0.2067*	0.2401*	-0.0126*	-0.4304*	1		
	0.4214	0.0117	0.0033	0.8788	0.0000			
$PrimX_{it}$	0.0443	-0.6305*	-0.4629*	0.3475*	-0.3303*	-0.1111	1	
	0.5928	0.0000	0.0000	0.0000	0.0000	0.1789		
$ManX_{it}$	-0.0017	0.3881*	0.4709*	0.0474	-0.5871*	0.5457*	-0.2881*	1
	0.9841	0.0000	0.0000	0.5670	0.0000	0.0000	0.0030	

Table G: Correlation Estimates between Economic Growth and Policy Variables

	$\hat{y}_{it} - \hat{y}_{i0}$	cc_{it}	ge_{it}	rq_{it}	rl_{it}	ca_{it}	psc_{it}
$\hat{y}_{it} - \hat{y}_{i0}$	1						
cc_{it}	0.0429	1					
	0.6049						
ge_{it}	-0.0402	0.8017*	1				
	0.6274	0.000					
rq_{it}	0.1190	0.7240*	0.8924*	1			
	0.1498	0.000	0.000				
rl_{it}	0.0288	0.7967*	0.9078*	0.9028*	1		
	0.7284	0.0000	0.000	0.0000			
ca_{it}	0.0955	-0.2152*	-0.1007	-0.1123	-0.1183	1	
	0.2482	0.0086	0.2231	0.1741	0.1522		
psc_{it}	0.0561	0.1557*	0.2992*	0.2627*	0.2199*	0.1300	1
	0.4982	0.0588	0.0002	0.0013	0.0072	0.1154	