

The Impact of China's Trade and Foreign Direct Investment on the Economic Growth of Sub-Saharan Africa

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ABSTRACT

Sub-Saharan Africa has recognized trade and foreign direct investment as a major way to change its economic development. China looks on to offer Sub-Saharan Africa a new model for growth alternative to the advanced countries style that depends on commercial relatives and fair market. It prioritizes immovability over democracy by way of providing alternative growth model through promoting product variation and contending in various market mechanism. The main question of this study is "What is the impact of China trade and Foreign Direct Investment (FDI) flows on the Africans economic growth?" This study would get rid of the bad impression people have diabolically registered on their minds about Chinese trade and investments. It is vital that the study would assist scholars, economists, investors, business owners and other government officials to understand the importance of FDI and its realization of a sustainable social and economic growth. It will be able to strengthen existing factual and evaluative statements about the impact of Chinese trade and FDI. This study will be limited to the economic activities Chinese trade and investments have impacted in the economy of Sub-Saharan Africa. This study is set to determine the quality of goods and services rendered to the various economic sectors of Sub-Saharan Africa; the role of Chinese trade and FDI in African economy and other financial flows such as loans, development assistance between China and Sub-Saharan Africa. We use panel data from 4 SSA countries covering 1981 to 2015. The empirical evidence indicates that China trade and FDI has had positive impact on sub-Saharan Africa economic growth. Our findings are promising and support the view that the relation between trade openness, FDI and economic growth is linear for SSA. Accordingly, SSA countries must have more effective trade openness, mainly by industriously regulatory import levels, in order to boost their economic growth through international trade.

Keywords: Trade, Foreign Direct Investments (FDI), Economic growth, China, Sub-Saharan Africa

INTRODUCTION

Trade liberalization has become extensive over the past decades among several countries, as an outcome of the apparent comprehensive import substitution based growth strategies and the effect of international financial institutions, such as the International Monetary Fund and the World Bank, which have often made their support conditional on trade liberalization. The fundamental rationale for this

degree of commitment to a program of trade reform is the obvious belief that liberalization is the requirement to change from relatively closed to relatively open markets. Moreover, due to integration of world economy, FDI flows among countries have also increased. In 2016, global FDI inflows were about US\$1.75 trillion, accounting about 10% of global gross fixed capital formation (UNCTAD 2017). Formerly, centrally planned developing economies have become the part of world economy.

Hence, trade and FDI has grown to be an essential component in the economic development of many emerging economies (Benacek et. al., 2000) and gradually has become the major economic transaction in the world (Graham and Krugman 1993). According to World Investment Report 2017, a total of US\$1 trillion FDI went into developed and US\$ 646 billion to emerging countries and the rest going into transition economies (UNCTAD 2017). FDI has helped many emerging economies to generate additional resources such as capital and technology, to improve the level of domestic outputs and deliver better, more affordable goods and services (Morgan (2003) and Johnson (2005). The substantial upsurge of trade flows among developed and emerging economies have led to a more integrated and globalised international market (De Benedictis and Tajoli, 2011). Globalizations may exert a positive effect on economic growth by facilitating specialisation among countries according to their comparative advantage and facilitating the transfer of resources across countries (Antweiler et al., 2001). However, the comprehensive trade and rapid FDI in some emerging economies have raised concerns relating to growth impact. From this perspective, some estimates are that trade and Foreign Direct Investment (FDI) can be important in promoting growth but at the same time can be a threat to development in the host country. Researchers mostly assert that open countries develop more rapidly than their counterparts do (Grossman and Helpman, 1991; Edwards, 1993). Trade openness is indeed certainly related to development, it then follows that liberalization is essential for development. Despite their initial assurance, current experience proposes that not all trade have been as positive as estimated (Singh, 2010).

China has experienced a remarkable growth due to the economy reform adopted and opening up to the international markets (WEF 2015). The annual growth rate of China's GDP per capita is as high as 10% while worldwide economy witnessed an average growth rate of 2.4 (IMF 2017). Much of China's success, however, has been driven by an incredible growth in exports coupled with equally impressive growths in FDI. The rapid economic growth has further made China's economy powerful in the international market and has drawn along many emerging economies, whether directly through trade and FDI, or indirectly, through the effect of Chinese growth on worldwide commodity costs, and to a certain level lesser interest rates. Thus China's rapid growth has offers an opportunity to trade and invest in some economies. In contrast, the rapid growth has

also impelled urbanization and industrialization which leads to a surge in demand for coal, oil, and natural gas. Hence, the subsequent demand for oil and other commodities has impelled trade with resource-abundant countries in sub-Saharan Africa. In the process, China has become a key destination for a range of African exports as well as an increasingly significant source of a wide range of manufactured goods imported by many African countries.

Although Africa and China have been trading with each other for centuries, the level and intensity of their trade relationship have increased dramatically over the years. For instance, export from Sub-Sahara Africa (SSA) to China increased dramatically after 2001 when China joined the WTO. Foreign direct investment from China to Africa increased from US\$491m to US\$14.7 billion during 2003-2011. In 2012, China surpassed the US and became the second largest exporting partner in SSA. Currently, China is one of Africa's most important trade and economic partners, however, the trends and patterns of trade between China and Africa suggest many possible impacts. China-Africa trade and economic cooperation has not only played a significant role in promoting their respective progress, but has also affected their economy.

Researchers over the years have modelled the relationship between trade and economic growth (Almeida and Fernandes, 2008; Barro and Sala-i-Martin, 1997; Baldwin et al., 2005; Chang et al., 2009; Edwards, 1998; Le Goff and Singh, 2014; Kim, 2011; Jouini, 2015; Musila and Yiheyis, 2015; Ulaşan, 2015; Kim and Lin 2009; Trejos and Barboza 2015; Newfarmer and Sztajerowska, 2012; Herzer 2013; Zeren and Ari 2013). The vast economic growth have been hypothesised by many scholars to have a link with trade (Almeida and Fernandes, 2008; Barro and Sala-i-Martin, 1997; Baldwin et al., 2005; Chang et al., 2009; Edwards, 1998; Le Goff and Singh, 2014; Kim, 2011; Jouini, 2015; Musila and Yiheyis, 2015; Ulaşan, 2015; Kim and Lin 2009; Trejos and Barboza 2015; Newfarmer and Sztajerowska, 2012; Herzer 2013; Zeren and Ari 2013)

China's relationships with sub-Saharan Africa (SSA) have grown stronger over the years. China has become sub-Saharan Africa's major trading partner and a significant source of FDI. Chinese companies have also become directly engaged in the buildup of infrastructure in the continent, sometimes via other cross border sources of funding. All this happened during a period in which China has become a major global player as the most interrelated economy in world trade. Remarkably, growths in China have a

progressively significant influence on sub-Saharan African countries through different channels. These channels include China's direct effect as a trading partner and source of financing and investment. However, FDI and trade flows between China and SSA have expanded intensely during the past decade and show no signs of reducing in the anticipatable future. The following questions therefore arise as these two economies embrace massive trade and FDI. Is China's economic growth important for SSA growth? What is the impact of China's trade on SSA economy? Does country variety play a role? Which element of China's GDP is more crucial: consumption or investment? What role does Chinese economy play in SSA's exports?

Taken massive variation in economic physiognomies among SSA economies, it is important to explore the implications of economy heterogeneity on the degree of economic dependence on China. For example, iron-ore-exporting countries may heavily rely on China's construction industry while SSA countries exporting cotton are likely to be sensitive to China's domestic consumption. Therefore, this study splits SSA economies into collections ensuing well-accepted criteria and examines mutual features for each collection.

Additional remarkable angle to measure China's influences is to disaggregate China's growth into consumption and investment to compute the exact effects of China's GDP components. This growth disaggregation also account for the study of the role SSA economies heterogeneity play for China's effects. China's impacts on SSA are well quantified, a following question would be what the potential transmission channels are? How China influences SSA? In this context, the paper seeks to assess the traditional channels of trade and FDI by examining whether China-related variables are among the determinate of SSA's total exports and exports to China.

There is an existing literature (Chang et al., 2009; Kim, 2011; Jouini, 2015; Grossman and Helpman 1991; Sachs and Warner, 1995; Rajan and Zingales, 2003) that established growth-improving impact of trade while others (Redding 1999; Young 1991; Lucas 1988) propose that trade openness is not always favorable to economic growth. Some of these literature have confirmed a positive relationship between trade openness and economic growth (Chang et al., 2009; Kim, 2011; Jouini, 2015), whereas others have found no link (Musila and Yiheyis, 2015; Ulaşan, 2015). The literature is inconclusive partly because different analysts use different proxies for liberalization or trade openness and rely on different methodologies. The evidence

for growth enhancements through trade liberalization displays mixed effects because of problems with misspecification and the diversity among the liberalization indices used.

Increased international trade can generate economic growth by facilitating the diffusion of knowledge and technology from the direct import of high-tech goods (Barro and Sala-i-Martin, 1997; Baldwin et al., 2005; Almeida and Fernandes, 2008). Trade facilitates integration with the sources of innovation and enhances gains from foreign direct investment. By increasing the size of the market, trade openness allows economies to better capture the potential benefits of increasing returns to scale and economies of specialization (Alesina et al., 2000; Bond et al., 2005). In their theoretical models, Grossman and Helpman (1991) show that trade openness improves the transfer of new technologies, facilitating technological progress and productivity improvement, and that these benefits depend on the degree of economic openness. This consensus rests on the assumption that trade creates economic incentives that boost productivity through two dynamics: in the short-run, trade reduces resource use misallocation; in the long run, it facilitates the transfer of technological development. Trade liberalization can also force governments to commit to reform programs under the pressure of international competition, thus enhancing economic growth (Sachs and Warner, 1995; Rajan and Zingales, 2003). Trade liberalization in developing countries has therefore often been implemented with the expectation of growth stimulation.

Chinese trade with SSA has sustained to grow at a rapid clasp, reaching a total value of US\$170 billion in 2013. China has recently overtaken Europe as SSA's largest export partner, and regional economies are gradually becoming vulnerable to changes in international commodity prices and Chinese demand conditions. The composition of China-SSA trade is not symmetric, with SSA importing a wide variety of consumer and capital goods and tremendously exporting primary commodities, especially oil, minerals, and other natural resources. This pattern has become even more extreme during the past years; agricultural goods now represent a mere 5 percent of SSA's total exports to China. Moreover, China and Africa mutual trade has been steadily growing for the past 16 years, interrupted by a slight decline and rapid recovery from the 2009 financial crisis. However, low prices of goods and services since 2014 have greatly influenced the rate of African exports to China, even while Chinese exports to Africa remained steady (CARI 2017).

Considering these observations, this study does not take for granted that China's impacts on SSA economy since 1981. Instead, we run regressions with varied sample periods to check the effect China's engagement on SSA. The regression outcomes and economic intuition jointly direct the literature to emphasis on the time of 1981-2015 to understand the impact of trade and FDI on SSA economy after China joined the WTO.

The remainder of the study is organized as follows. The Literature review section reviews related literature, whilst the Data and method section presents the econometric approach used in this study. The Empirical results section presents the empirical results and discussion of this study. The Conclusion and possible policy recommendations section present the conclusion and policy recommendations.

LITERATURE REVIEW

Traditionally, international trade theory proposes that trade is administered by relative benefit, which assumes that the efficient exchange of goods and service leads to optimal results. The role of trade policy in economic growth has been a major topic of discussion in the economic growth literature. Ricardo's theory proposes that openness abroad permits a country to reorient its scarce resources to more efficient sectors. The neoclassical development models related to Solow's (1957) model consider technological revolution as exogenous and propose that, therefore, trade policies do not affect development. However, recent economic development theories estimate that technological revolution is an endogenous variable and that trade regulations can be joined with those on global trade. The presence and kind of the relationship between trade openness and economic growth have been the topic of significant argument. However, neither the extant theoretical models nor empirical analyses have produced a definite conclusion.

The possible impact of trade liberalization on development are also noteworthy. Although the intermediate influence is possible to be harmful, as resources become useless in areas of relative disadvantage, their subsequent restructuring into areas of relative advantage will surge up the growth rate (Greenaway et al., 2002; Falvey et al., 2012). Extended growth achievements must be attained through increases in factor productivity (Kim and Lin, 2009), which can happen through various channels such as technology transmission and revolution. While trade openness stimulate the distribution of technology and innovations (Krueger and Berg, 2003; Lucas, 1988), technology adoption depends on a country's absorptive capacity, which is determined by

human capital and R&D (Verspagen, 1991; Fagerberg, 1994), financial improvement (Aghion et al., 2005), governance, and national institutional settings (Haltiwanger, 2011; McMillan and Verduzco, 2011). Therefore, emerging economies categorized by an absence of human capital, R&D, cumulative financial and good government system may not gain from relocation of technology.

IMF (2016) stated three recognized spillover channels through which China may affect the global economy: trade, external financing and commodity prices. Hong et al (2016) investigates the reason of China's imports slowing down and estimates its impacts on Asia countries. Blagrove and Vesperoni (2016) sets up a panel VAR and quantifies the spillover effects of China's economic transition on exports of advanced economies and emerging markets. Dizioli et al (2016) concentrated on China's spillovers on ASEAN-5 economies via trade, commodity prices and financial markets.

The empirical outcomes, like the theoretical studies, are debatable. The evidence has indicated that excessive regulations restrict growth because resources are prevented from moving into the most productive sectors and to the most efficient firms within sectors (Bolaky and Freund, 2008) and that institutions can help explain the heterogeneity in the trade-growth relationship (Sindzingre, 2005).

Falvey et al. (2012) employed threshold regression techniques on crisis indicators to identify the relevant crisis values and the differential post-liberalization growth effects in crisis and non-crisis regimes. Their findings indicate that an economic crisis at the time of liberalization does affect post-liberalization growth, in a direction that depends on the nature of the crisis. An internal crisis implies lower growth and an external crisis higher growth relative to a non-crisis regime. Based on an augmented production function, Fosu (1990) argued that export increases improve economic growth in African countries, whereas Ulaşan (2015) used a dynamic panel data framework to conclude that trade openness measures are not robustly significantly associated with economic growth, implying that trade openness alone does not boost economic growth. Trejos and Barboza (2015) provide robust empirical evidence that trade openness is not the main engine of the Asian economic growth "miracle." The benefits of trade openness are not automatic. Policies, such as measures aimed at fostering macroeconomic stability and a favorable investment climate, must accompany trade openness (Newfarmer and Sztajerowska, 2012).

Kim and Lin (2009) found that trade openness contributes to long-run economic growth, with effects varying according to the level of economic development. Herzer (2013) found that the impact of trade openness is positive for developed countries and negative for developing ones. The effect of trade liberalization on growth depends on the liberalization level. An income threshold exists above which greater trade openness has beneficial effects on economic growth and below which increased trade has detrimental consequences (Agénor, 2004; Liang, 2006).

There are some empirical studies concentrating on China's impact on financial markets (Cashin et al (2016), Arslanalp et al (2016) and Mwase et al (2016). Kolerus et al (2016) assesses empirically Chinese impacts on worldwide commodities markets). Some other the literature have discovered a potential mutual connection in the trade-growth nexus, whereby economies with more trade may generate high income, whereas economies with higher income is capable to purchase the infrastructure beneficial to trade and have additional resources with which to overcome the information search costs linked with trade, or may request more traded goods (Kim and Lin, 2009). Zeren and Ari (2013) discovered positive bidirectional causal relationship between openness and economic growth for G7 economies.

Foreign Direct investment (FDI) on the other hand has been recognized an important tool in the economic literature. Thus, the quest to achieving a sustainable economic growth and FDI flow is a growing concern of a country regardless of its political system. Most countries utmost desire is to improve their real GDP; thus, increase the value of national output and as well as the standard of living (Abdouli and Hammami 2015). Therefore, foreign Direct investment (FDI) plays an important role in the development of a country's economy by increasing employment opportunities, technology transfer, production, market access and supply of funds for domestic investment (Kapoor et al 2010). Kiviyiro and Armnien (2014) disclosed that FDI is one of the determinants of economic development. However, many scholars assert that the percent rate of increase in real gross domestic product thus real GDP determines the rate of economic growth in emerging economies (Ekanayake et al., 2003; Tsang and Yip, 2007; Omri and Kahouli, 2013). For instance, in De Long et al. (1992) study, the authors discovered a strong linkage between equipment

investment and economic growth. Lee and Chang (2009) stated that FDI has a huge direct impact on economic growth and increases growth related to FDI. Aitken et al. (1997) have shown evidence of beneficial spillovers from international industries to the emerging country, while Hsiao and Blomstrom et al. (1996) also stated that the percent rate of growth is more closely linked to the capital formation rates in growing stages than to the present or prior rates. Alfaro et al. (2010) have revealed that FDI stimulate economic growth in developed countries. Shen (2003) study revealed that economic growth is one of the key drivers of FDI inflow especially in developing countries. According to (Zhang, 2001) the interrelationship between economic growth and FDI is related to factors of a host country.

The above-mentioned inconclusive outcomes in the literature on the trade-growth link is the fact that different studies use different proxies for trade openness and rely on varied approaches. Most empirical studies focused on cross-country growth regressions propose an essential development-stimulating result of trade openness, these shortcomings maybe due to poor quality of sample data used and inadequate control of endogeneity (Edwards, 1998; Le Goff and Singh, 2014). The inconclusive outcomes may happen because trade liberalization must almost certainly be joined with other proper policies, and linear regression models cannot capture such complementary dynamics (Winters, 2004). Greenaway et al. (2002) provided evidence that misspecification and the diversity of liberalization indices are partly responsible for the inconclusiveness of the research. Using a dynamic panel framework and three different indicators of liberalization, their results indicate that liberalization does appear to impact growth, albeit with a lag. These results suggest that working in a panel context is more effective than working in a cross-country context. Such a technique extracts more information and produces more reliable estimates than the time series and cross-section regressions do.

Though the impact FDI and trade is a well-study area, there are still some remaining issues that is essential to be addressed. Most of the previous literature focus on establishing a link between trade policies and long-term economic growth, measured in terms of productivity or per capita GDP growth. The theories stimulating inward a FDI, the unsustainable and often destructive effects of import-substitution and export have, by and large, been discredited with the

realization that potential benefits of an open trade regime may outweigh its costs.

Overview of China, Africa trade and FDI

Economic development in Sub-Saharan Africa (SSA) has averaged about 5% yearly over the past decade, improving living standards and boosting human growth across the region. Stronger public institutions, a supportive, private sector-focused policy environment, responsible macroeconomic management, and a sustained commitment to structural reforms have greatly expanded opportunities for countries in SSA to participate in global markets. In recent years, many emerging countries have benefited from an increasingly favorable external environment, high commodity prices, and particularly great demand for natural resources by developing countries, especially China. China-SSA trade has rapidly intensified since the late 1990s and in 2013 China became SSA's largest export and development partner. China now represents about a quarter of SSA's trade, up from just 2.3 percent in 1985. About one-third of China's energy imports come from SSA—a vital trade link, particularly as energy use rates in China have grown by more than twice the global average over the past years. China have also supported large-scale investments in African infrastructure. More than 2,200 Chinese enterprises are currently operating in SSA, most of them private firms (UNCTAD 2014; Shen 2014).

Despite augmented efficiency and increasing local production, rapid urbanization and industrialization continue to spur robust Chinese demand for coal, oil, and natural gas. Hence, the subsequent demand for oil and other commodities has impelled trade with resource-abundant countries in sub-Saharan Africa. China has become both the top destination of exports and top source of imports for many sub-Saharan African countries. However, China's relationships with sub-Saharan Africa (SSA) have grown stronger and faster over last 16 years. China has become sub-Saharan Africa's main trading partner and an important source of foreign direct investment (Arellano & Bover, 1995). For example, in 2012, total of goods trade between China and Africa upsurge from \$9 billion in 2000 to \$166 billion, making China Africa's leading trade partner (UNComtrade, 2014). Chinese FDI flows to Africa augmented from just \$200 million in 2000 to \$2.9 billion in 2011, revolving China into the largest emerging country investor in Africa (UNCTAD, 2013; MOFCOM). Additionally, Chinese aid initiatives in Africa in the form of economic or

technical cooperation have also increased remarkably in the last decade. According to China's National Bureau of Statistics (NBS), the turnover on economic cooperation projects 2 in Africa reached \$29 billion in 2011 compared to \$1.2 billion in 2000 (Asche & Schüller 2008).

Remarkably, Africa's economic performance has improved. During 2000-2009, Africa's Gross Domestic Product (GDP) per capita raised by an annual average of 2.4 percent, whereas the growth rate contributed 1.8% during 2010-2012 (World Bank, 2014). With this trade and FDI, the following question arises as to whether China's involvement has impacted economic development in Africa. Observably, numerous components have contributed to Africa's improved economic performance, including a marked growth in institutions and infrastructure and a reduction of conflicts and macroeconomic misrepresentations (OECD et al., 2013; UNECA, 2013), all of which have to be controlled for in an empirical investigation.

Even though China's engagement in Africa has received considerable attention in policy publications (Goldstein et al., 2006; Broadman, 2007; Kaplinsky et al., 2007, Asche and Schüller, 2008; Morrissey and Zgovu, 2011), there are very few econometric analyses on this topic. Of the existing econometric literature one strand explores the determinants, while the other studies the impact of Chinese trade, FDI and/or aid in Africa. Hence, it can never be exaggerated the need for such a research to focus specifically on the impact of China engagement on African growth in advancing the economy.

2. METHODOLOGY

This study used panel data from selected sub-Saharan countries for the period 1981-2015. In table 1 source and description of data is given. This study is purely based upon availability of data. To test the optimum relationship this study used following empirical model.

$$\begin{aligned}
 lSSAGDP_{it} = & \alpha + \beta_1 lCGDP \\
 & + \beta_2 lIGDP_{it} + \beta_3 lFDI_{it} + \beta_4 lTrade_{it} \\
 & + \varepsilon
 \end{aligned}$$

In this empirical model *lSSAGDP* is log of SSA GDP-per-capita growth, *lIGDP* is log of China's Investment-to GDP, *lCGDP* is log of China's Government-consumption-to GDP, $\beta_3 lFDI$ is log of SSA Foreign direct investment net inflows from China (% of GDP), *lTrade* is the log of Net SSA Current Account Balance with China (% of total) and

i represents country, *t* represents time, and ε is error correction term.

Table 1: Description and sources of data

Variables	Description	Source
IGDP	China's Investment-to GDP	WBD 2017
CGDP	China's Government-consumption-to GDP	WBD 2017
FDI	SSA Foreign direct investment net inflows from China (% of GDP)	WBD 2017
Trade	Net SSA Current Account Balance with China (% of total)	WBD 2017
SSA-GDP	SSA GDP-per-capita growth	WBD 2017

We used SSA GDP-per-capita growth as dependent variable. In this research different estimation techniques were used to check the robustness of relation between SSA GDP-per-capita growth, China's Investment-to GDP, China's Government-consumption-to GDP, SSA Foreign direct investment net inflows from China (% of GDP), China's Government-consumption-to GDP and Net SSA Current Account Balance with China (% of total) or trade. In this model we can see the effects of China's Investment-to GDP, SSA Foreign direct investment net inflows from China (% of GDP), and Net SSA Current Account Balance with China (% of total) on SSA GDP-per-capita growth. This research first estimated OLS then used instrumental variable regression analysis in order to know the significant results.

EMPIRICAL RESULTS

To estimate our prescribed model we used stata 12.0. In table 2 summary of variables which are used in model are presented. In identifying potential outliers descriptive statistics proved nature and insight of data and direct us which may bias in econometric estimation. This research used log of all variables so these are elasticities. We performed Unit root test and data is stationary at first difference.

Table 2: Data Summary

VARIABLES	MEAN	S.D	MIN	MAX	OBS
SSA-GDP	5.75	0.505	4.62	6.45	140
LIGDP	1.59	0.42	0.01	2.32	140
CGDP	3.21	0.24	2.76	3.65	140
LFDI	19.55	2.41	12.42	24.51	140
LTRADE	3.56	0.50	2.48	4.48	140

We performed different tests in this research to check heteroskedasticity and auto correlation of model. Modified wald test was used to check heteroskedasticity in given model and confirmed the heteroskedasticity as Prob>chi2 = 0.0000. To check

autocorrelation we performed Wooldridge test for autocorrelation $F(1,3) = 69.201$, $Prob>F = 0.0036$ which rejected null hypothesis of no serial correlation. We also used multiplies test of Breusch and Pagan Langrangian in this test $prob > \chi^2 = 1.0000$. For group wise heteroskedasticity Modified Wald test performed and $\chi^2(4) = 154.38$, $prob > \chi^2 = 0.0000$. This study used Doornik Hansen M=Normality check for its model $\chi^2(10) = 217.158$, $prob>\chi^2 = 0.0000$ this rejected the null hypothesis of univariate normality in variables. That's why this study go beyond the Ordinary Least Squares (OLS).

Correlation matrix is presented in table 3. This matrix shows that although variables has correlation with each other this shows their relationship with each other but some correlations are might be due to multicollinearity in our model.

Table 3: Correlation Matrix

	SSA-GDP	iGDP	cGDP	FDI	Trade
SSA-GDP	1.0000				
iGDP	0.1132	1.0000			
CGDP	0.1845		1.0000		
CGDP	0.3791*	0.0280	0.0000	1.0000	
LFDI	0.6752*	0.2784*	0.6100*	0.0000	1.0000
LTrade	0.4132*	0.1357	-0.1988*	0.2726*	0.0000
	0.0000	0.1111	0.0185	0.0012	

Note: * denotes significant at 5%

This correlation matrix is showing the relationship between SSA GDP-per-capita growth, China's Investment-to GDP, China's Government-consumption-to GDP, SSA Foreign direct investment net inflows from China (% of GDP) and Net SSA Current Account Balance with China (% of total) or trade. All these variables are showing positive correlation with each other. Given that as China's Investment-to GDP increases SSA GDP-per-capita growth also increases but this result is not significant in this matrix. It is also important to note that increase in China's Investment-to GDP and China's Government-consumption-to GDP also increases SSA GDP-per-capita growth in given economies. We further found positive correlation between Net SSA Current Account Balance with China (% of total) and SSA GDP-per-capita growth as trade within the economy increases SSA GDP-per-capita growth also increases. So due to this ambiguity we further used methodology to come up with robust results. Due to the fact this correlation cannot provide mere results so this study further proceeded to empirical evaluation and provide support in favor of relationship between SSA GDP-per-capita growth, China's Investment-to GDP, China's Government-

consumption-to GDP, SSA Foreign direct investment net inflows from China (% of GDP) and Net SSA Current Account Balance with China (% of total) or trade. We also used alternative techniques to assure that possible measures are robust. We used fixed and random results and selected between fixed and random effects. The results of fixed and random estimations are presented in table 4.

Table 4: Fixed and random effect estimation (SSA GDP-per-capita growth is dependent variable)

VARIABLES	FE	T	P> T	RE	Z	P> Z
IGDP	0.001783 (0.0194405)	0.09	0.92 7	- 0.1182258 (0.0752673)	- 1.5 7	0.11 6
CGDP	0.3523226 (0.1094985)	3.22	0.00 2	0.0640452 (0.1832223)	0.3 5	0.72 7
FDI	0.072137 (0.0072024)	10.0 2	0.00 0	0.1262762 (0.0195596)	6.4 6	0.00 0
TRADE	- 0.0257906 (0.0352399)	- 0.73	0.46 6	0.2293171 (0.0731658)	3.1 3	0.00 2
F(4,129)	147.63		Wald		chi2(4)	
NO. OF OBSERVATIONS	140		138.20		Observations	
R-SQUARE	0.37		No. of		140	
			R-Square		0.51	
HAUSMAN CHI2(5)			2.62			
PROB>CHI2			0.7578			

Note: Standards errors are presented in parenthesis.
The choice of these variables is in recent times SSA GDP-per-capita growth is getting higher as industries increases and urbanization increases. As life style of people getting higher SSA GDP-per-capita growth also increases. Due to increase in industries income of economy also increases so we selected these variables to check possible relation between variables. We used fixed and random estimation techniques and we choose fixed method due to our hausman result. Then proceeding to this study we used robust OLS because our estimation is robust to heteroskedasticity and serial correlation in table 5. We used SSA GDP-per-capita growth as dependent variable in all our estimations. We then used the three stages least square due to existence of endogeneity. Results of SSA GDP-per-capita growth, China's Investment-to GDP, China's Government-consumption-to GDP, SSA Foreign direct investment net inflows from China (% of GDP) and Net SSA Current Account Balance with China (% of total) or trade is consistent in all the estimations except fixed effect estimation.

Table A.5: Robust OLS (SSA GDP-per-capita growth is dependent variable):

Variables	Coef.	z	p> z
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<i>IGDP</i>	-0.1182258 (0.0953255)	-1.24	0.215
<i>CGDP</i>	0.0640452 (0.6477734)	0.10	0.921
<i>FDI</i>	0.1262762 (0.048427)	2.61	0.009
<i>Trade</i>	0.2293171 (0.2262555)	1.01	0.311
Prob > chi2	0.0000		
	0.51		
Obs.	140		

Note: Standards errors are presented in parenthesis.

OLS robust results show that IGDP has negative correlation with SSA GDP-per-capita growth but this is not significant in this case. Increase in China's Investment-to GDP shows positive correlation with SSA GDP-per-capita growth this is same result as fixed effects estimation model. Increase in SSA Foreign direct investment net inflows from China (% of GDP) also have positive correlation with SSA-GDP-per-capita growth this result is also consistent in both cases. Net SSA Current Account Balance with China (% of total) or trade shows positive correlation with SSA-GDP-per-capita growth in robust OLS and negative correlation in fixed effect estimation model to confirm the best results we carried out IV (instrumental variable) regression analysis in table 6 which shows optimum results.

Table 6: IV regression analysis (SSA GDP-per-capita growth is dependent variable):

Variables	Coef.	z	p> z
<i>IGDP</i>	0.001783 (0.0194405)	0.09	0.927
<i>CGDP</i>	0.3523226 (0.1094985)	3.22	0.001
<i>FDI</i>	0.072137 (0.0072024)	10.02	0.000
<i>Trade</i>	-0.0257906 (0.0352399)	-0.73	0.464
Prob	0.0000		
R-square	0.82		
Waldchi2 (4)	598298.14		
Obs.	140		

Note: Standards errors are presented in parenthesis.

Interesting results have found in IV (instrumental variable) regression. In this table it is shown that IGDP has positive correlation with SSA GDP-per-capita growth because as economic growth increases, SSA GDP-per-capita growth also increases. In this result we can say that China's economic growth strengthens economic growth of Sub-Saharan African states with help of new and efficient technology. Increase in foreign direct investment has positive correlation with SSA GDP-per-capita growth. This result describe that as foreign investment increases in the host country SSA GDP-per-capita growth will automatically be higher. Because foreign firms invest in the industries of firms due to which production will also be higher due

to higher investment. Increase in trade also has positive correlation with SSA GDP-per-capita growth. Because increase in trade increases host country's so SSA GDP-per-capita growth will be higher. Increased international trade can generate economic growth by facilitating the diffusion of knowledge and technology from the direct import of high-tech goods (Barro and Sala-i-Martin, 1997; Baldwin et al., 2005; Almeida and Fernandes, 2008). Trade facilitates integration with the sources of innovation and enhances gains from foreign direct investment. By increasing the size of the market, trade openness allows economies to better capture the potential benefits of increasing returns to scale and economies of specialization (Alesina et al., 2000; Bond et al., 2005).

CONCLUSION & POLICY IMPLICATIONS

China has become a major worldwide player and the main trading partner for many countries in sub-Saharan Africa and around the world. Its remarkable development has pulled along many emerging countries, whether directly through trade, FDI and financial relationships, or indirectly, through the effect of Chinese growth worldwide commodity cost, and to some degree lower interest rates. China has had a clearly beneficial impact on sub-Saharan Africa over the last decade and a half, not only through trade, but also as an increasingly important source of foreign direct investment. This research investigated the dependency of SSA's economic growth on economic growth in China which is Africa's biggest trading partners. Results of this study have presented some important policy implications. This study is in the favor of the analysis that economic growth in China has positive correlation with SSA GDP-per-capita growth. China's remarkable economic growth is characterized by trade, high rate of FDI and worldwide surplus effects. The annual growth rate of China's GDP per capita is as high as 10% while worldwide economy witnessed an average growth rate of 2.4 (IMF 2017). The rapid economic and social growth has further made China's economy powerful in the international market and thus attracted world spread attention. This study provides four outcomes (1) IGDP growth has positive correlation with SSA GDP-per-capita growth, (2) FDI has positive correlation with SSA GDP-per-capita growth, (3) CGDP is positively correlated with SSA GDP-per-capita growth (4) trade with China also has a positive correlation with SSA GDP-per-capita growth. The study confirms the evidence in the extant literature that China's rapid growth has

offers an opportunity to trade and invest in some emerging economies including African economies. In the process, China has become a key destination for a range of African exports as well as an increasingly significant source of a wide range of manufactured goods imported by many African countries.

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