COLLEGE OF BUSINESS AND ECONOMICS
DEPARTMENT OF ECONOMICS

THE IMPACT OF EXTERNAL DEBT ON FOREIGN DIRECT INVESTMENT- GROWTH NEXUS: THE CASE OF SUB SAHARAN AFRICA

BY

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DECLARATION

I, Dessalegn Tsega Abebe hereby declare that the thesis entitled "THE IMPACT OF EXTERNAL DEBT ON FOREIGN DIRECT INVESTMENT- GROWTH NEXUS: THE CASE OF SUB SAHARAN AFRICA", submitted by me to the award of the degree of Master of Science in Development Economics at Addis Ababa University is original work and it hasn't been presented for the award of any other Degree, Diploma or educational study of any other university or institution.

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This is to certify that the thesis prepared by Dessalegn Tsega Abebe entitled: The impact of external debt on foreign direct investment- Growth nexus; the case of Sub Saharan Africa: a System GMM approach and submitted in partial fulfilment of the requirements of the Degree of Masters of Science in Economics (Developmental Economics) complies with the regulations of the university and meets the accepted standards with respected originality and quality.

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Acronyms and Abbreviations

AfDB	African Development Bank
AEO	African Economic Outlook
GDP	Gross Domestic Product
GDPPC	Gross Domestic Product Per Capita
FDI	Foreign Direct Investment
GMM	Generalized Method of Moment
GNI	Gross National Income
IMF	International Monetary Fund
OLS	Ordinary Least Square
SSA	Sub Saharan Africa
System-GMM	System-Generalized Method of Moments
UNCTAD	United Nations Conference on Trade and Development
WBR	World Bank Report
WDI	World Development Indicator

ABSTRACT

Many developing countries now in the world gain an advantage and has been benefited from the world FDI so as to promote their economic growth. While, other developing countries like Sub Sahara African countries are set to be struggled with external debt crisis still now. Empirical studies on external debt and FDI has been done so far. However, the issue is still controversial and inconclusive, studied only at country as well as sub region level and previous studies did not take in to account that, which (debt or FDI) greatly affected economic growth in the region and also differ in the methodology they applied. Therefore, this study examines the impact of external debt on the inflow of foreign direct investment to SSA region and to identify the more impactful variable (external debt and FDI) on economic growth nexus using annual secondary panel data approach extracted from the WDI database from 2001-2020. The data were analyzed using descriptive statistics, as well as dynamic panel models of one step system-GMM approach. The validity of results was confirmed by the Arellano-Bond test for autocorrelation in the disturbance term and the Hansen and Sargan tests for the validity of instrumental variables. The results of the one step system GMM suggest that external debt exerts a negative impact on both FDI inflow and economic growth of SSA countries. The lagged FDI, external debt, trade openness, gross fixed capital formation, and exchange rate are factors significantly affecting the inflow of FDI. Economic growth in the region also significantly influenced by; previous year growth, external debt, infrastructure, and population growth. The study concludes and recommends that SSA countries should reduce their external borrowing utmost not beyond their maximum threshold level and thus should adopt and implement policies that favors in improving trade openness, rising domestic saving, attracting FDI inflow in order to finance their capital budget deficit and focusing on expanding infrastructure that will enhance productivity so as to improve economic growth.

Keywords: FDI, External Debt, Economic Growth, System-GMM, Sub Saharan Africa.

CHAPTER ONE

1. INTRODUCTION

1.1 **Backgrounds of the study**

Grants in the form of conventional and non-conventional loans by developed countries and international monetary institutions to developing countries especially to Sub Saharan African (SSA) countries have been increasing at an increasing rate in the recent years. The recent two decades witnessed a significant increase in external debt of many developing countries in overlaying persistent current account and fiscal imbalances. According to the African Development Bank, since the beginning of the last recent decade, the debt sustainability index of SSA countries indicates that a large number of countries have fallen into debt distress which is unable to meet their obligations and more downgrades are expected as a result of COVID–19 (AfDB, 2020).

According to the World Bank report (WBR, 2021), globally it was increasing rapidly for countries borrowed from multilateral and bilateral funding organizations as such the external debt of developing countries has more than doubled in one decade from 2010. The debt flow of low- and middle-income countries in Sub Saharan Africa has increased to a record $702 billion in 2020 which was increased by 230.16% from 2010, at a time sub-Saharan Africa's debt stood at around $305 billion. As the report showed, the region has more debt than it can pay as compared to economies potential as the debt-GNI ratio rose nearly double percentage points in a decade to 43.7 per cent in 2020 from 23.4 percent in 2011. The ratio of debt-GNI of the region is rapidly increasing and it was above 100 percent in some sub-Saharan countries in 2020 like; Mozambique, Zambia, Cabo Verde and Angola (WBR, 2021).

The average Government debt as a share of GDP in Sub-Saharan Africa's (SSA) region was 42.24 % in 2016 and it was 50.4% in 2019 as compared to 48.5% in 2018. This increase is resulted due to the rise of interest in infrastructural development in consistent with increased investments across the entire region. However, the region's debt burden has also surprisingly raised to 57.25% and 57.8% of GDP in 2020 and 2021 respectively due mainly to Covid-19 pandemic and in some countries, the debt increase is more than twice their annual budget (IMF, 2021). The massive growth in external debt in sub-Saharan Africa over the past two decades has given rise to concerns about the detrimental effects of external debt on investment and growth in developing countries especially

Sub Saharan African countries. Furthermore, there is now considerable evidence that the buildup in debt was accompanied by increasing capital flight or losing its natural resources as a guarantee for the debt services in the region and it results for a great flight of capital from the region. In other words, sub-Saharan Africa was simultaneously an importer and an exporter of capital, which means the region has first get inflow of capital as a form of borrowing or development assistances from bilateral and multilateral international organizations and foreign private financial institutions, but after two or three years the continent is forced to pay its debt and debt services within a short period of time and due to this the region is suffered by capital flights (AfDB, 2021).

Countries around the world are taking different multi directional development policies and strategies to support and improves the socio-economic wellbeing of their citizens and to protect the sovereignty of their nation (Alfaro, et al, 2004). Among this development policies and strategies, increasing the flow of foreign direct investment and external loans are the main concern issues when they try to formulate and implement growth plans and future directions as the issue of capital flows and external debt is considered to be the most accessible route for economic growth based on the findings of different researches and studies. The continued structural transformation in the global economy in terms of changes in market orientation and development cooperativeness between different nations has recognized the importance of foreign direct investment (FDI) and external debt as one of the possible channels to augment capital deficit and stimulate growth.

1.2Statement of the problem

The total external debt for low-income countries has increased by 10% which is about 7.68 trillion US dollars in 2018, indicating a growth rate of 4% over than what it was in 2016 and significantly rises from 60% to 70 percent in 2019 (IMF, 2020). As such, African countries debt burden has been rising from time to time and experience a significant increases in national economy's share which pushes the region to stay struggle with large repayment of debt principal and its debt services in its economic growth process. However, its share from world FDI inflows is very low. Africa's global FDI inflow in 1970 was 9.5% and declined to 4.4% in 2009 and further declined to 3.9 % in 2013 and its average FDI to GDP ratio was 2.41 in the last twenty years (from 2001-2020) (WB, 2021). Most SSA countries has striven to attract FDI with the view of accelerating the growth process as a substitute for foreign financing of external borrowing which pushes them for modifying and

improving their socio-economic bottlenecks in order to attract the inflow of FDI for their country. However, despite the increased flow of foreign direct investment to developing countries especially to Sub Saharan African countries are still characterized by the least preferable region in attracting FDI as compared to other developing countries like, Latin America and Asia (Kafayat A., et al, 2016).

The sources of financing a deficit budget by a country may include but not limited to external borrowing, foreign direct investment and official development assistance through multilateral and bilateral relations which has been continuously rising and it was more prevailed in developing countries especially it is common in SSA countries (Sailesh T. et al, 2018). This pushes countries to borrowed abroad but the earned debt is not allocated to productive sectors in the economy rather it goes to government's expenditures in nonproductive sectors which in turn hurts the sovereign nation will have a huge debt burden for repaying the principal plus the debt service or interest. It is also important to assess the ability of a country to repay the debt back within the specified time period for their lenders as the borrowing fund couldn't touch its target or its seated economic project (Zaghdoudi and Hakimi, 2017). Currently there is another big challenge which adds fuel on the existing problems in developing countries all over the world.

The COVID–19 pandemic has caused a surge in public financing needs as governments spend more to mitigate the socioeconomic consequences of the pandemic. The International Monetary Fund estimates that, African countries will need an additional $285 billion in financing through 2025 to deal with the fallout from the pandemic within a short period of time and this will worsen the region's external debt burden (IMF, 2020).

The rising burden of external debt and high debt service payments becoming a huge concern for these developing economies especially SSA countries whose sources of financing the debt burden is very limited and couldn't grow as it was expected compared to other developing countries like; Latin America and Asian countries. Countries around the world have seen trying to attract diverse sources of capital in order to boost their economic power through rising its nation's foreign reserve. Foreign direct investment is among one of the great sources of capital for economic activities and many countries use as a means of financing a budget and used as an instrument to repay external debt. Rising the inflow of FDI has been considered as an important source of financing investments and generating income for a countries especially in emerging and developing economies (Zaghdoudi and Hakimi 2017,). But, in Sub Saharan Africa, FDI is not increasing as expected as

compared to other developing countries around the world and do not see its significance in filling the gap associated with capital deficit in a substitute for external borrowing. This raises a question that; why FDI growth in the SSA region is not attractive enough, on the other hand its external debt burden has been increasing rapidly in the region as compared to other developing countries. Thus, this high indebtness contrasts limits to reapply growth benefits from FDI.

The COVID-19 pandemic adds fuel to the existing external debt burdens for developing countries and due to this, countries around the world have seen seeking different alternative channel solutions like FDI for their capital deficit financing mechanisms other than external debt. The COVID-19 pandemic put its adverse impact on both sides, it decreases the international inflow of FDI to developing countries and simultaneously it pushes governments to borrow abroad to fill their capital budget deficit this will in turn increase the external debt burden of developing countries, especially SSA countries where sources of financing development projects is very limited. Studies which has been done recently with a main focus on the issue of external debt, foreign direct investment and economic growth are available in a variety of works done so far. However, their, analysis, findings and conclusions of study area regarding about the relationship between external debt, FDI and economic growth are different and inconclusive from one another.

Some researchers study and finding suggest that any capital inflow associated with a country's external debt retards or hampered the inflow of foreign direct investment and economic growth (Borensztein Hameed et al. 2008, Presbitero 2012, Zakaria et. al. (2014), Ostadi, H. and Ashja, S. (2014), and Guei 2019). Their studies suggest that developing countries should decrease their dependency on external borrowing as a means of promoting investment and filling budget deficit to financing government projects. On the other hand, other studies support the opposite view, showing that external debt has a positive effect on promoting investment and thereby also boosting economic growth for developing countries especially countries who is a victim of capital deficit in financing developing projects (Jayaraman and Lau 2009, Ahlborn and Schweickert 2015, Egbetunde 2012, Sánchez-Juárez and García-Almada 2016, Owusu-Nantwi and Erickson 2016). However, firstly those available previous studies which focused mainly in Sub Saharan African region are limited and still showing no clear message that, whether external debt promotes the inflow of FDI in the region or not. Thus previous studies didn't fully addressed its ambiguity on the issue of external debt and its impact on foreign direct investment inflow in the region as a whole

and Secondly, there is no previous studies conducted on, which (FDI or Debt) is highly influential on economic growth process in SSA region didn't take in to account by previous empirical studies. By considering this limitations on the recently available empirical studies, this paper try to address these inconclusive issues of the effect of external debt on FDI inflow in the region and which has a great impact on the efforts in promoting economic growth process in SSA region will be addressed by this study in accordance with the recently available data relative to the findings of recently available empirical literature studies which will be discuss in the literature review section.

1.3 **Objectives of the study**

The general objectives of this study is to investigate the relationship between external debt and foreign direct investment inflows in Sub Saharan Africa.

The specific objectives are:

i. To examine whether external debt or FDI have more economic impact for growth in SSA.
ii. To identify factors affecting the inflow of FDI in SSA region.
iii. To assess trends in the inflow of foreign direct investment & external debt in SSA countries.

1.5 Research questions

i. Is external debt the main determinants of FDI inflows in Sub-Saharan Africa?
ii. Which; external debt or FDI has a higher impact on SSA economic growth?
iii. What are the main reasons for the increasing external debt burden of SSA region?

1.4 Significance of the Study

This study is significant to the extent that the relationship between external debt and FDI has been examined in a variety of works but provides ambiguous results, the examination of this nexus will support as an additional input for further findings. Additionally, most of the existing literature focuses on individual country specific studies rather at regional level study since FDI and external debt is macro-economic variable which is highly affected by the nature of a nation's economic policy (fiscal and monetary policies) and it is obvious that FDI and external debt has a positive effort for a country a who has a good economic policy, so it needs to be overview at a regional level because almost all SSA countries experienced a rising debt to GDP ratio for the last two decades. Thus, this study re-visits this nexus and it will provide a detail analysis of FDI inflows and

external debt nexus for SSA countries. The other consideration of the outcome of this study, it will be used as input for policy makers to set appropriate decisions and take relevant measures to tackle these problems in Sub- Saharan Africa countries especially for Ethiopia as she is one of the victim for rising debt burden and slow growth in FDI inflows in the recent five years, it will be give some insight and take some lessons from this study for its future socio economic development process. Lastly it could be an additional reference for students and academicians who may wish to study a related research topic in the future.

1.6 Scope and delimitations of the study

The study of this thesis covers the last twenty years from 2001 up to 2020 which the researcher is believed that it is enough for analyzing the impact of external debt on FDI inflow in the region and it will not be consider all 54 SSA countries rather the region's 44 countries due as per the availability of data since the study is utilizing fully online secondary data sources.

1.7 Organization of the thesis

This thesis study is divided into five sections; Section one discuss the introduction, Statement of the problem, objective of the study, research question and delimitations. Section two discusses recent empirical literature reviews on external debt and FDI inflows and its trends in SSA following that section three is about research Data and Methodology. Section four deals with results and discussions, and the last section provide conclusion and recommendation based on the research findings relative to other empirical studies.

CHAPTER TWO

2. LITRATURE REVIEW

2.1 Theoretical Literature Reviews

It has been difficult and impossible for any developed as well as developing country to support itself or to produce all commodities as well as to provide all services and can maintain a balance in demand and supply of an economy by producing only within a country itself through utilizing domestic financial and natural resources. Because these resources are scarce and limited by nature and there is also science, knowledge and technological gaps and this is why countries promoting their international relations and diplomacies through international trade, foreign direct investment and grants for their trade and political partners.

The dual gap framework identified the need for financial resources from foreign sources to augment available limited domestic financial resources in order to achieve sustainable economic growth in a country especially for a developing country. According to this dual gap framework external (foreign) debt and foreign direct investment (FDI) are required to fill this gap and countries around the world have seen competitiveness in attracting such financial inflows and it is also prevail in developing nations like SSA countries in order to attain the economic status that allows them to be relevant for their residents and to compete globally.

According to Todaro and Smith (2011), Conventional wisdom suggests that foreign borrowing is an important source of finance for investment particularly in developing economies. As observed, a large accumulation of foreign debt is particularly common in the early stages of economic development, when there are low levels of domestic savings, high current account deficits, and if there is lack of capital imports. However, following the Third World Debt crisis of the early 1980s, many developing countries suffered from a serious problem of debt overhang.

According to P. Krugman (1988) argues that debt overhang occurs when the expected repayment on external debt falls short of the contractual value of debt. If a country's debt level is expected to exceed the country's capability of future repayment, then expected debt service is likely to be an increasing function of the country's output level. Foreign investors do not want some of the returns from investing in the domestic economy are effectively taxed away by foreign creditors, thus

discouraging further investment. This pushes capital inflows to the region, a high burden of debt increases expectations that debt will tend to be financed by distortionary measures (e.g. higher interest rate, financial repression or other punitive taxes or expenditure cuts), leading to lower or riskier investment, greater uncertainty about future returns, and potentially lower growth prospects for developing countries (P. Krugman, 1998).

2.1.1 Definitions and concepts of key terms

Foreign direct investment (FDI) is a company or an investor located outside its borders for a business decision to acquire a substantial stake in a foreign business or to buy it outright in order to expand its operations to a new region. FDI refers to investment made by investors in one country by acquiring 10 percent and above ownership stock in another country and have direct and significant control over the management of the companies (UNCTAD, 2015).

According to Paul Krugman (2000), in order attract foreign investors to invest in another country through foreign direct investment businesses, there are three main motives for companies to invest across national boarder. The first one is Market-Seeking FDI, it is where investors access new market and produced goods and service domestically to serve the local market. Market-Seeking FDI is driven by market growth, per capital income, market size, access to regional and global market, market structure(World Bank, 2016). The second is Asset - Seeking FDI (resource seeking), which states that investors set their companies where a resource is available. The purpose of asset -seeking FDI is to access, extract natural resource, raw material, low cost of unskilled labor and physical infrastructure in the host country which is not available in home country and motivated by investor's interest in acquiring strategic assets (brands, human capital, distribution networks, etc.) (World Bank, 2016). The third is Efficiency-Seeking FDI**,** it is motivated by creating new source of competitiveness for firms and it goes where the productivity of labor resource, costs of inputs are lower. For instance, countries like Bangladesh and Vietnam has cheaper input of production for light manufacturing such as textile hence. Efficiency-seeking FDI is particularly important for countries looking to integrate into the global economy and move up the value chain (World Bank, 2016). In recent years, there is an increase inflow of FDI to African countries like Ethiopia, Ghana, Kenya, Uganda and Mauritania have also experienced an increase in FDI due not only interested in natural resources but also due to an expanding middle class and changes in consumer behavior propelled by higher purchasing power (AEO, 2014).

The other most important variable need to be define is external debt which refers to money borrowed from a source outside the country. External debt has to be paid back in the currency in which it is borrowed. External debt can be obtained from foreign commercial banks, international financial institutions like IMF, World Bank, ADB and from companies of foreign nations. Normally these types of debts are in the form of tied loans, meaning that these have to be used for a predefined purpose as determined by a consensus of the borrower and the lender (The Economic Times, 2020). External debt is the portion of a country's debt that is borrowed from foreign lenders, including commercial banks, governments, or international financial institutions. These loans, including interest, must usually be paid in the currency in which the loan was made. External debt can take the form of a tied loan, whereby the borrower must apply any spending of the funds to the country that is providing the loan. If a country fails to repay refuse to repay its external debt, it faces a debt crisis and it is said to be in sovereign default (AEO, 2021). A debt crisis can occur if a country with a weak economy is not able to repay the external debt due to an inability to produce and sell goods and make a profitable return (IMF, 2020).

2.2 Empirical Literature Review

2.2.1 Relationship between external debt and foreign direct investment

Studies about foreign trade, external debt, foreign direct investment and economic growth has been done by different researchers and scholars in different time period and countries in the last decades so far. The relationship between those listed variables also identified and put their different recommendations and suggestions is given for policy makers and other researchers based on the findings of their study although the findings of their study has been different from one another. However, most of the studies were focused on the relationship between external debt and economic growth or FDI and economic growth. Due to this there was a little studies about external debt and Foreign Direct Investment which is less common than those focused on the relationship between external debt and growth. Thus, very few empirical studies focus on the direct linkage between debt and investment, and their empirical findings as well as conclusions are mixed and inconclusive since some studies report that, the two variables have a negative association and other studies told they have a positive association between debt and investment.

According to Adamu (2016), who studied on Nigerian economy over the period 1970 up to 2013 and using the autoregressive distributed lag bounds tests, he found that external debt and debt service exert a negative impact on public capital investment. The same result is prevailed not only in SSA countries but also in other developing countries around the world. For example, Ramírez and Erquizio (2012) identified that it has a negative impact in the case of Mexico, Using information of 31 federal entities in Mexico over the period from 1993 to 2006, they found a negative relationship between new external debt obtained by governments and spending on public investment. Similarly, another study based on data related to 32 federal entities in Mexico for the period 2005 to 2009, Rodríguez and Azamar (2013) found that any increase in debt decreased both investment. In contrast to numerous studies showing the negative effect of external debt on investment, few studies support a positive association between external debt and investment.

Studies by Khrwash and Siam (2010) studied the determinants of FDI in Jordan using OLS model. The results revealed the coefficients of debt service share in GDP are positive and significant. This implies external debt are an important sources of increasing the inflow of FDI in Jordan. Sánchez-Juárez and García-Almada (2016) studied 32 states in Mexico for the period 1993~2012. They applied dynamic models of panel data and the GMM as an econometric approach. Results revealed that public debt exerts a positive effect on investment which in turn positively affects economic growth. However, in the case of Colombia, Salamanca and Monroy (2009) confirmed the negative effect of external debt, reporting that a higher level of external debt decreases investment.

According to Ostadi and Ashja (2014) they investigated that, the effect of external debt service on FDI in Development cooperation among 8 Developing Countries using panel regression model, the coefficients of external debt service and government size were revealed to be negative and significant an indication that external debt service and government size are decreasing the inflow of FDI. The effect of debt service on FDI in Sub-Saharan Africa using panel regression model. The results showed the coefficient of debt service to be negative and significant. This implies that debt service is a curse for increasing FDI and become an important determinant of investment in the region. There have been also a few recently available studies which is tried to analyze the relationship of external debt and FDI growth in developing countries (Elbadawi et al., 2014).

There is one very important study conducted by Chung, (2010); Nicholson & Lane, (2013), they attempts to explicitly characterize the debt–FDI–GDP growth nexus at either theoretical or

empirical level have not been previously reported in the literature, they used debt and FDI as an ingredient of growth. In an attempt to identify possible mechanisms through which a country's indebtedness level could act as a threshold in the FDI and growth link, they set different arguments as a starting point based on their literature reviews. First of all they agree on the idea that, "debt servicing costs eat up a major proportion of a country's foreign exchange earnings, and whereas capital inflows contribute to the build-up of foreign exchange reserves, depletion of such resources can undermine macroeconomic stability and growth.

According to Benedict et.al, (2013) a large external debt can also affect growth through the crowding out effect of FDI or by affecting the composition of private investment. An increasing debt service may increase the government's interest bill and the budget deficit and consequently, cause the long-term interest to rise or simply crowd out credit available for private investment (Gale and Orzag, 2003; Baldacci and Kumar, 2010). Similarly, heavy debt burdens acts to reduce investment through both debt overhang and the crowding out effect (Iyoha, 1997). In summary the previous literature on the impact of external debt on economic FDI are inconclusive. While some studies show a positive relationship other studies indicate a negative influence on FDI in the region. However, the overall effect of external debt on the whole economy provides ambiguous results. This ambiguity necessitates a further investigation particularly for SSA countries where the trend of external debt and FDI flows is on increase. On the other hand, external debt as another source of finance has been increasing on yearly basis due to deficit budget and currently due to the challenge in COVID-19 in the region especially for implementing its development programs like Agenda 2063 and to complete already started development projects like African Free Trade area and one passport for Africans and it needs a great cooperative force among countries in the region to get out of this debt trap.

2.2.2 Relationship between FDI and growth

As studies which focused on the relationship between external debt and Foreign Direct Investment provides an ambiguous results, Studies on FDI and growth also show that different findings and results based on the type of data they used, the methodology they apply and the time and economic entity they apply. Osinubi and Amaghionyeodiwe (2010) examined the trend and importance of the effect of foreign private investment on Nigerian economic growth from 1970 to 2005. It surfaced that foreign private investment is statistically significant and directly related to economic growth.

Kotrajaras et.al (2011) employing both panel data analysis and co-integration methods examined the impacts of FDI on the growth of 15 East Asian economies. The results suggested that the positive influences of FDI on these economies are dependent on factors like proper macroeconomic policies. Behname (2012) checked for the influence FDI has on the growth of the Southern Asian economy between 1977 and 2009, reported FDI is statistically significant and positively correlated with economic growth.

According to studies like, Melnyk, Kubatko and Pysarenko (2014) investigated the impact of foreign direct investment on the growth of 26 post communism transition economies from 1998 to 2010 and suggested that FDI has remarkable influence on the growth of these economies. Iqbal et.al (2014) examined whether FDI has the tendency to stimulate growth of Pakistan from 1983 to 2012. The results indicated FDI directly relates to gross domestic product (GDP); hence, FDI has a growth-stimulating effect on Pakistan. Al Khathlan (2014) applied co-integration technique to assess the long-term relationship between FDI inflows and economic growth from 1980 to 2010 in Saudi Arabia. The study concludes that FDI to have a positive but insignificant relationship with economic growth in the long run.

According to Abala (2014), who studied the relationship between economic growth and FDI in Kenya using OLS model analysis and, concluded that it have a positive impact on growth. The findings showed the coefficients of external debt service and openness of the economy to be negative and insignificant. Udo and Obiora (2006) studied the effect of FDI on economic growth among the West African Monetary zone using panel regression model. The results revealed the coefficient of FDI have a positive and significant impact. Islam (2014) examined the impact of FDI on Bangladesh economy using secondary data for the years from 1996 –2010. He argues that FDI in Bangladesh plays an important role in achieving expected economic growth. The results show that FDI has a positive correlation with GDP, export and private investment. Similarly, Ayanwale (2007) examined FDI and economic growth in Nigeria and the findings for the study show that FDI promotes the country's economic growth through providing new employment opportunities and improving the country's national foreign reserve.

On the contrary, Onyeagu and Okeiyika (2013) examined the relationship between FDI, human capital and economic growth in Nigeria and to ascertain the long-run sustainability of FDI-driven growth. The results showed FDI inversely and significantly impacts on growth in the long term. Another study on the impact of foreign direct investment on economic growth by Saqib et. al (2013)

reveal that Pakistan's economic performance is negatively affected by foreign investment while its domestic investment has benefited its economy. This shows that initially foreign investors may create good economic growth simulative activities and would help to rise the country's production capacity and rise GDP for a while, but in the long run it will be capital flight as a means of accumulating profits for their originating country (Moga J. Mathehu and Gondaje Dacka, 2016). This can also be explained by the limited capacity of the host country to diffuse the transfer of knowledge and technology for further development of the region or a country. According to different researchers result ((Adams, 2009) of recent studies assert that countries may not enjoy the spillover growth benefits of FDI if they lack the required absorptive capacity to transform these benefits in to economic growth.

2.2.3 External debt and economic growth

The studies on external debt and economic growth finding was different one another as studies on FDI and economic growth or FDI and External debt. According to Studies like Behname (2012); Sulaiman and Azeez (2012); Yagoob and Zhengming (2013); Melnyk and Kubatko (2014); Haider and Anwar (2014), find that external debt and FDI has a positive growth-stimulating effect on the economy and external borrowing is important and necessary to increase the pace of economic growth as long as they are channeled to increase the economic productivity. Findings like by; Osinubi and Amaghionyediwe (2010) assert that FDI supplements domestic financial resources in order to empower a country to effectually perform her development programmes as well as elevate living standards of her people. External debt and FDI are macroeconomic variables which tend to bolster the economy. This is because they both represent capital inflows which are likely to increase the rate of capital formation which is necessary to promote economic growth.

According to Wamboye (2012) studied about, the impact of public external debt on long term economic growth of forty least developed countries (LDC's) using unbalanced panel data from 1975 to 2010. The results of their analysis indicate that there exists a positive relationship between external debt, economic growth and investment. Their findings indicate that external debt ratio of GDP stimulates growth in the short - term; the private investment which is a measure of real and tangible development shows a decline. Another study, Farhana and Chowdhury (2014) applied Autoregressive Distributive Lag (ARDL) model to explore the association between foreign debt and economic growth of Bangladesh from 1972 to 2010. The study revealed that debt from foreign

sources has significant and inverse association with economic growth. The same result also found by Zouhaier and Fatma (2014), study the effect of debt on 19 developing economies from 1990 to 2011 by applying a dynamic panel data model. The results derived showed that ratio of total external debt to gross domestic product and external debt as a fraction of gross national income interact negatively with economic growth.

Ejigayehu (2013) utilizing data for 8 Highly Indebted Poor Counties (HIPC) from Africa between 1991 and 2010 ascertained whether external debt impacts on economic growth via debt crowding-out effect or debt overhang. The estimates indicated that economic growth is affected by debt crowding-out effect rather than debt overhang. Aminu et.al (2013) investigated the impact of external and internal (domestic) debts on the Nigerian economy from 1970 to 2010 using Ordinary Least Square (OLS) method and Granger Causality test. The OLS results showed that external debt is unfavorable to the economy while internal debt is favorable and the causality test revealed a two-way causality between external debt and economic growth and no causality between internal debt and economic growth. Yagoob and Zhengming (2013) built an error correction model to determine the effect of external debt sustainability on Sudanese growth and found indices of external debt sustainability to significantly influence economic growth. It has been argued that, most literatures and studies suggest that, capital flows from external debt and foreign direct investment can bridge the gap between the desired investments and savings mobilized internally.

CHAPTER THRE

3. RESEARCH METHODOLOGY

3.1 Research design

The research design which will be employed for this study is longitudinal panel data analysis. This is because, the data for the study is collected across different countries (44 SSA countries) for the same time path (from 2001 – 2020) for all observations. A balanced panel data analysis will be employed and estimated via system Generalized Method of Moments (system GMM) approach. Longitudinal panel data empirical method estimation is commonly used in panel data approach. Panel data techniques are now widely used to estimate dynamic econometric models in order to capture dynamic effects which are its basic advantage over cross-sectional data and it offers options of investigating heterogeneity effects resulting from the cross-sectional components of the sample and the adjustment dynamic resulting from time series component (Bond, 2002).

3.2 Data Sources and type

This study assessed the impact of external debt on foreign direct investment in sub-Saharan Africa. Given the importance of FDI in filling foreign exchange gap and the role of government in addressing the problem of high debt burden in the region, data from a total of 44 SSA countries were utilized in the course of this study. Both the variables, FDI which is the dependent variable and external debt as independent variable is measured in Dollars as a ratio of GNI of the countries in the study in constant 2015 US Dollar price. External debt was originally in current US dollar price in the World Development Indicator (WDI) database but was converted to constant 2015 US Dollar price as appropriate. The same is true for other explanatory variables which is taken as in an appropriate ways and data is collected from the World Development Indicators (WDI) online database for all variables for this study is undertaking for all countries and for all years.

3.3 Methods of analysis

The estimation technique preferred for this study is panel data estimation technique because the data is collected across 44 SSA countries for twenty years for all observation. Panel data techniques are now widely used to estimate dynamic econometric models in order to capture dynamic effects

which are its basic advantage over time series and cross-sectional data. Its advantage over aggregate time series data includes the possibility that underlying micro-economics dynamics may be secured by aggregate basis. Specifically, panel data offers options of investigating heterogeneity effects resulting from the cross-sectional components of the sample and the adjustment dynamic resulting from time series component (Bond, 2002).

There are a number of supporting reasons why the GMM estimation approach is preferred for panel data analysis especially when there will be a possibility of endogeneity problems (variables correlated with past and possibly present errors; lag FDI and first lag of growth for this study). The GMM modeling strategy is, which is dynamic, enables the control of persistence in FDI levels since it has behavioral effects that persist in panel data analysis. Persistence can be checked through correlation of the dependent variables and their corresponding first lag (FDI and Growth, and their corresponding first lag for this study). The GMM approach, in particular, fits well for this study panel data estimations, when the number of time periods T (twenty years for this study from 2001 to 2020) is relatively lower, while the value of cross section units N (44 SSA countries) is relatively higher, there are regressors that are not strictly exogenous (endogenous regressors) (like; lag FDI, external debt and first year lag of growth for this study), and fixed effects exist. It is also useful when heteroscedasticity and autocorrelation exist within (fixed effect) each country's data but not across countries (outside the group). There is also another advantages that, the method leaves room to account for any likely endogeneity problem by controlling for unobserved heterogeneity with time invariant omitted variables and variations across countries are controlled in the regressions (Arellano and Bover, 1995).

The GMM technique is divided into two, namely, Differenced GMM and System GMM .The panel data estimation technique preferred to this study is the system-Generalized Method of Moment (System-GMM) regression technique. This is because the relevant literatures related to this study, it has been established that external debt and FDI, FDI and economic growth, external debt and Economic growth have a bi-causal relationship, which has led to the problem of endogeneity, based on this, a well-suited technique to deal with such an endogeneity issue is the GMM methodology, which actually combines the relevant regressors expressed in both their first differences and levels in a system. The System-GMM has been shown in practice to be capable of correcting for unobserved country heterogeneity, errors due to measurement, omitted variable bias and likely endogeneity problems, corrects for biases associated with the difference estimator, which often

affect growth estimation (Hoeffler and Tample, 2001; Blundell and Bond, 1998 and (Arellano and Bover, 1995).

Arellano and Bover (1995) and Blundell and Bond (1998) also shows that the system GMM is an improvement over the first difference GMM and "No matter how many gaps, it is computable for all observations except the last for each individual, so it minimizes data loss" (Roodman, 2009). Furthermore, it included in all estimations are time dummies that capture time specific effects. Time dummies reflect the assumption of no autocorrelation across countries and help reduce the level of autocorrelation among different countries and the idiosyncratic error term, which will certainly lead to a very robust estimation. However, to avoid proliferation or over-identification of instruments, which causes bias of the GMM estimator, over-fitting of endogenous variables, and weakening of the Sargan/Hansen test, the rule of thumb is that the number of instruments to be included in the model should not be higher than the number of periods in the cross sections (Arellano and Bover, 1995).

3.4 Post estimation tests

Panel data estimation techniques have its own post estimation tests which assures the validity (fitness) of the model, data estimation type, variables measurement and over all validity of the model which used to apply. Post estimation tests which will be tested in this study is; heteroscedasticity test , serial correlation or authocoroletion test and other necessary tests which have to be tested in using system GMM estimation approach. Arellano and Bover (1995) and Blundell & Bond (1998) emphasize the need to conduct serial correlation tests for the random error term in the GMM estimation. The serial correlation tests are called AR (1) and AR (2) tests. AR(1) test has a null hypothesis that there is no autocorrelation, specifically concerning the first order in the error term series, while the null hypothesis of AR(2) is that there is no serial correlation specifically concerning the second order type in the error term series. For better results, it is important that the null hypothesis of AR (2) test should be accepted (Blundell & Bond, 1998).

In testing for overall validity of the instrumental variables used, the Sargan and Hansen test, which is a test of over-identifying restrictions used. It is good to know that the consistency of the GMM estimator depends on the validity of instruments. The null hypothesis under both Sargan and Hansen tests is that all instrumental variables, as a group, are exogenous. Therefore, a higher p-value (insignificant) is desirable so that the stated null hypothesis may be accepted. According to Bond

(2002), the good estimate of the lagged dependent regressor should fall between its OLS and Within-Group (Fixed Effect) estimates. Thus, these estimates provide a useful robustness check on results. To this end, this study carried out those post-estimation tests in order to establish the validity and correctness of estimates and the validity of these instruments can be tested using the Sargan test for over-identifying restrictions and the Arellano-Bond test for autocorrelation in first differenced errors as well as higher order autocorrelations are also computed (Bond, 2002).

3.5 Empirical model specification

As stated before, the problem associated with budget deficit in developing countries is due to the low level of saving which is not enough for governments to cover their shortage through domestic financing methods like, domestic borrowing, increasing revenues through taxation, minimizing unnecessary government expenditures, issuing domestic bonds for financial institutions and other remedial solutions which is important to address the problems of government budget deficit and financing development projects in most of underdeveloped economies, this led to the need for reliance on foreign aid as well as external borrowing.

The dual gap theory demonstrates that an economy's development is a function of the total investment. Consequently, this investment is so inadequate to achieve such economic development and in order to inspire growth and development, economies resort to external sources of financing its budget deficit and to bridge the savings-investment gap normally, external borrowing, foreign direct investment, grant and aids from developed economies. Based on this theoretical backgrounds and assertions on external debt, FDI and economic growth, this study uses it's anchored on the basic traditional investment model in order to identify the impact of external debt on FDI inflows in Sub Saharan Africa countries.

$$k = f(y, r) \quad \text{(1)}$$

Where k is the preferred capital stock, y is the output and r is the real cost of capital in a host country.

$$\text{Therefore, } k = f(DEBT, r) \quad \text{(2)}$$

Because debt is taken as the income gain from external borrowing which support to fill the budget gap and used as sources of financing for development projects in a host country where, k is the capital stock of foreign direct investment. As foreign investors make decision on where to invest,

other factors apart from the ones (real cost of capital) in the basic investment model become important to consider other variables to be included in the model which are essential to determine FDI. These variables include inflation rate, exchange rate, gross fixed capital formation, gross domestic product, market size, trade openness and infrastructure.

The analysis for model specification used in this study is based on two steps. First, I need to test how external debt affects the flow of foreign direct investment in SSA countries and the next step is which variable (external debt or FDI) has more impact on economic growth in SSA through using GDP per capital as a controllable (dependent) variable, external debt and FDI as independent variables since both variables may have an impact on economic growth. From the traditional investment model, we can drive the following investment equations by adding additional determinant variables based on the previous empirical studies and the researcher uses additional variables which may have its own impact on the inflow of FDI in the region.

The econometrics model is derived from the FDI equation which becomes;

FDI = f (Debt. Xi) …….. (3)

Where, Xi is those other determinant variables which affect FDI, thus

LFDI = f (LFDIit_1, LDEBT, TROP, GFCF, INFR, INF, INFR, URP, EXCH, RGDP)…… (4)

$$LFDIit = \beta0 + \beta1LFDI\ (t\text{-}1)it + \beta2LDEBTit + \beta3TROPit + \beta4GFCFit + \beta5INFit + \beta6INFRit + \beta7URPit + \beta8EXCHit + \beta9RGDPit + \eta i + \mu t + \varepsilon it \ldots\ldots (5)$$

LFDI it: denotes the natural logarithm of Foreign Direct Investment inflow as percentage of Gross Domestic Product in time "t" and it is the key dependent variable for the main purpose of this study.

β1 LFDI(t-1)it: refers to first year lag of FDI transformed by natural logarithm as percentage of gross domestic product in time"t" for country "i".

β2 LDEBTit: refers to the natural logarithm of external debt which is measured by the sum of external debt as percentage of GNI in time "t" for country "i" and it is the main determinant independent variable for this study.

β3 TROPit: Stands for trade openness calculated by the sum of exports and imports of goods and services measured as a percentage of gross domestic products in time "t" for country "i".

β4 GFCFit: stands for Gross Fixed Capital Formation measured by Gross fixed capital formation (% of GDP) in time"t" for country "i".

β5 INFit: denotes that Inflation measured by the growth rate in general price level in time "t" for country "i".

β6 INFRAit: represents Infrastructure measured by total fixed telephone subscriptions per 100 people in time "t" for country "i".

β7 URPit: shows Urban Population as a proxy for domestic market size measured as the ratio of the total population living in urban areas in time "t" for country "i".

β8 EXCHit: stands for Exchange rate measured as the price of domestic currency in terms of international currency (constant 2015 US dollar) in time "t" for country "i".

β9 RGDPit: stands for Real Gross Domestic Product measured by the ratio of nominal GDP to GDP deflator in time "t" for country "i".

Whereas; β0 stand for an intercept, η represents the country specific effects, μ represents the time effects and ε represents the error term.

The second estimation equation for analyzing the impact of external debt and FDI on economic growth in SSA country's estimation equation is as shown below and it is based on the recently available research studies used by Guei (2019), who uses the investment and growth model equations of foreign direct investment model specification and their applied investment -growth model is presented by the following equation:

LDPPC = f(LGDPPt-1, LFDI, LDEBT, INFR, POPG, INF)

LGDPPC= β0+ β1LGDPPC (t-1) it + β2LFDIit + β3LDEBTit + β4INFRit + β5POPGit + β6INFit + ηi + μt + εit……. (6)

Where, LGDPPC shows "Gross Domestic Product Per capital income" transformed by natural logarithm measured as the sum of GDP to total population in time "t" for country "i" and it is the main dependent variable for this study, LGDPPC (t-1) it: stands for first lag of GDPPC transformed by natural logarithm in time "t" for country "i", POPG it shows population growth

the rate at which population increases yearly in time "t" for country "i" and all the rest variables as well as parameters are same as described in the first equation above.

3.6 Definitions of variables, measurement and Hypothesis

Foreign Direct Investment: Foreign direct investment (FDI) is the investment undertaken by an entity resident of one economy in an enterprise resident in a different economy, with the intention of obtaining and sustaining a lasting interest in the enterprise and also to exercise a major level of influence in its management. Management and voting rights are granted to the investors if the investor's ownership level is greater than or equal to 10% of the common shares (UNCTAD, 2008). FDI is used as a dependent variable in this study and it is used by other researchers like; like; Kariuki (2015) and Zakaria et. al. (2014) for their study. Lag FDI refers to first year lag of FDI for each countries also used by different studies like; Gichamo (2012) Anyanwu (2011), Mijiyawa (2015),Kariuki (2015), Ezeoha & Cattaneo (2011), they found that lag FDI have positive and statistically significant impact on FDI, this study also expects a positive significant result.

External Debt: External debt is that part of the total debt in a country which is owed to the creditors outside the country. The debtors can be the government, corporations or citizens of that country. The literature on external debt offers different proxies. However, this study used external debt stock as a percentage of GNI in both the above equations for many reasons. First, according to studies by Clements et al. (2003), the present value of debt should reflect the degree of concessionality of loans, which means loans based on concessional agreements between the lenders and the borrowers of developing countries in different time periods and secondly, it was applied in different literature studies which is considered to be the most recently and most widely used by researchers like, Al Kharusi and Stella Ada (2018), Guei (2019), Zaghdoudi and Hakimi (2017) and Zaghdoudi (2018). According to studies by Zakaria et. al. (2014) studies on, the impact of trade liberalization on foreign direct investment (FDI) in Pakistan from 1972-2005 was assessed through applying GMM estimation techniques. The study used FDI as a dependent variables and external debt independent variable and their result shows that external debt, inflation has found a negative and statistically significant relationship to FDI inflows, and this study expects a negative results.

***Exchange rate*:** is the price of one currency in terms of another currency and exchange rates can be either fixed or floating. It is the floor price that must be paid irrespective of the market price and its expected sign is negative in case of depreciation. According to studies by Wafure and Nurudeen (2010) provides an empirical assessment of the factors that determine the inflow of FDI in Nigeria through multiple regression model and their finding suggest that exchange rate (depreciation) positively, market size and deregulation statistically significant affect FDI to Nigeria, on the other hand trade liberalization, infrastructural development and inflation are not statistically significant in attracting FDI inflows.

***Inflation*:** In economics, inflation refers to a general progressive increase in prices of goods and services in an economy. When the general price level rises, each unit of currency buys fewer goods and services; consequently, inflation corresponds to a reduction in the purchasing power of money, based on this its expected sign will be negative for this study. Recently available literature's work used inflation as a determinant for FDI in their studies and gets different conclusions. For example; Ezeoha & Cattaneo (2011), they found that positive and statistically significant. Whereas, Asiedu (2005), Ajide (2014), Gichamo (2012), Zakaria .et.al (2014) found that inflation have a negative and statistically significant impact on FDI inflow. On the other hand, Kudaisi, B.V (2014), Wafure & Nurudeen (2010) found no significant impact.

Gross fixed capital formation: GFCF is a flow value measured by the total value of a producer's acquisitions, less disposals of fixed assets during the accounting period plus certain additions to the value of non-produced assets realized by the productive activity of institutional units. In this way GFCF is a measure of gross net investment (acquisitions less disposals) in fixed capital assets by enterprises, government and households within the domestic economy, during an accounting period such as a quarter or a year (UNDP, 2008). The expected sign for this study is positive and significant.

Trade openness: refers to the orientation of a country's economy in the context of international trade. The degree of openness is measured by the actual size of registered imports and exports of an economy. *Trade openness* is measured as the sum of a country's exports and imports as a share of that country's GDP (in %). Recent studies like, Asiedu (2005):Zakaria .et.al (2014), Gichamo (2012), ,Mijiyawa (2015), Kariuki (2015), Anyanawu & Yameogo (2015), found that trade

openness have positive and statistically significant impact on FDI inflow, on the other hand Ajide (2014) found it is negative and statistically significant whereas, Kudaisi, B.V (2014), Wafure & Nurudeen (2010) found that it is not statistically significant. However, this study expects it will have a positive sign and significantly affect the flow of FDI.

***Infrastructure*:** the basic physical and organizational structures and facilities (e.g. buildings, roads, transport, and power supplies) needed for the operation of a society or enterprise. It is the social and economic infrastructure of a country and this study uses total fixed telephone subscriptions per 100 people in time as a proxy for infrastructural development. Studies by Hailu (2010), Demirhan and Masca (2008), Asiedu (2005), Kariuki (2015) and Zakaria .et.al(2014) found that infrastructure have a positive and statistically significant impact on FDI inflows which is supported and expected to have a positive sign for this study. On the other hand Ajide (2014) found it is negative and statistically significant. Whereas, Asiedu (2002), Kudaisi, B.V (2014),Wafure & Nurudeen (2010) found that not statistically significant.

Real GDP: GDP stands for "Real Gross Domestic Product" and represents the total monetary value of all final goods and services produced (and sold on the market) calculating quantities but using constant prices that are adjust for inflation within a country during a period of time and it is the most commonly used measure of economic activity and it is expected to have a positive sign. Studies by Mijiyawa (2015),Anyanwu (2011), Demirhan and Masca (2008), Asiedu (2005), Ajide (2014), Kudaisi, B.V (2014), Wadhwa & S, Wafure S. (2011), found that it is statistically significant and have positive impact on FDI inflow.

Urban population: urban population is one of an indicators for domestic market size and used as a proxy for market size. As we know countries who have large population, there is a great demand for commodities and an increase in domestic market size. Due to this, international investors are willing to invest in countries who has such comparative advantage (Ambaye Adugna, 2016). For this reason, the study uses the ratio of the total population living in urban areas as an indicator for domestic market size; thus, this study expects a significant positive impact. Studies by researchers like; Mijiyawa (2015),Anyanwu (2011), Asiedu (2005), Ajide (2014), Kudaisi, B.V (2014, they found that, domestic market size have statistically significant and positive impact on FDI inflows.

GDP per capital income: Per capita gross domestic product (GDP) measures a country's economic output per person and is calculated by dividing the GDP of a country by its population. It is a global measure for gauging the prosperity of nations and is used by economists, along with GDP, to analyze the prosperity of a country based on its economic growth. Small, rich countries and more developed industrial countries tend to have the highest per capita GDP, due to this a higher GDP per capital means a higher economic growth for a nation. In this study its first year lag of GDP per capital was also used since previous year growth affects this year growth and the expected sign for this variable lag is positive like; Ajide (2014), Kudaisi, B.V (2014), and Ambaye A., (2016).

Population growth: Population growth refers to change in the size of a population of a country and it can be either positive or negative over time, depending on the balance of births, deaths and migration. Studies by Amade Peter and Ibrahim Bakari, (2019), their findings suggest that hat population growth impacts positively on economic growth and thus African countries should adopt and implement pragmatic policy measures that will enhance the productivity of its population. Other studies in the region also support this positive impact (i.e, Essien (2016), Tartiyus, Mohammed and Peter (2015). While other found that population growth have a negative impact on economic growth in SSA countries. Studies by; Hamza (2015), Akintunde, Olomola and Oladeji (2013); Cist, Mora and Engelman (2017) found that population growth rate retards the process of economic growth in food security in Sub-Sahara Africa and concludes that countries in the region should limit their population growth which is above its economic growth rate and the expected result of the variable in this study will be negative and significant.

CHAPTER FOUR

4. RESULTS AND DISCUSSIONS

4.1 Descriptive analysis

Descriptive analysis is the first step helped to describe relevant aspects of Phenomena of foreign direct investment and provide detailed information about each relevant variables. To empirically analyze the determinants of FDI inflow in Sub-Saharan African countries, Forty four Sub-Saharan Africa countries were included in this study based on the availlability of data from 2001 up to 2020. Moreover, in order to analyze the collected panel data, first I show the relevant trend of FDI and economic growth for the region and next to that I used summary of statistics which is maximum and minimum values, mean value and standard deviation were employed to examine the general trends of data. Pair wise correlation matrix was also used to make sure about the relationship between independent variables and dependent variable.

4.1.1 External debt trend in Sub Saharan Africa

According to the IMF (2021), African governments required additional gross financing budget of about $125 to $154 billion in 2020 to respond to the great crisis due to COVID-19. Unfortunately they couldn't get the required amount from international donors due to global pandemic within a specified period of time. African countries has been experience significant increases in their debt-to-GDP ratios, for example the average debt-to-GDP ratio had reached about 60 percent in 2019 and around 68% in 2020, especially countries who experience resource-intensive economies in the region since 2010. This rise in debt to GDP ratio has been caused by different factors beyond the great pandemic COVID-19 which will challenge the countries national budget for so many years.

From the figure below, SSA's external debt growth relative to other developing regions in the world is looking it has been decreasing since 2000 to 2008, but increasing at an increasing rate since 2010 relative to other regions.

The increasing growth of public debt level for the region in 2018 crossed the 50% threshold level which was an alarming signal that the fast growth in the public debt levels in Africa and can again surpass the highest public debt levels-to-GDP in the world, which can cause another debt crisis for

the region. This debt accumulation for the region indicates that the debt dynamics have been driven mainly by cumulative depreciation in exchange rates, growing interest expenses, and high primary budget deficits in SSA countries.

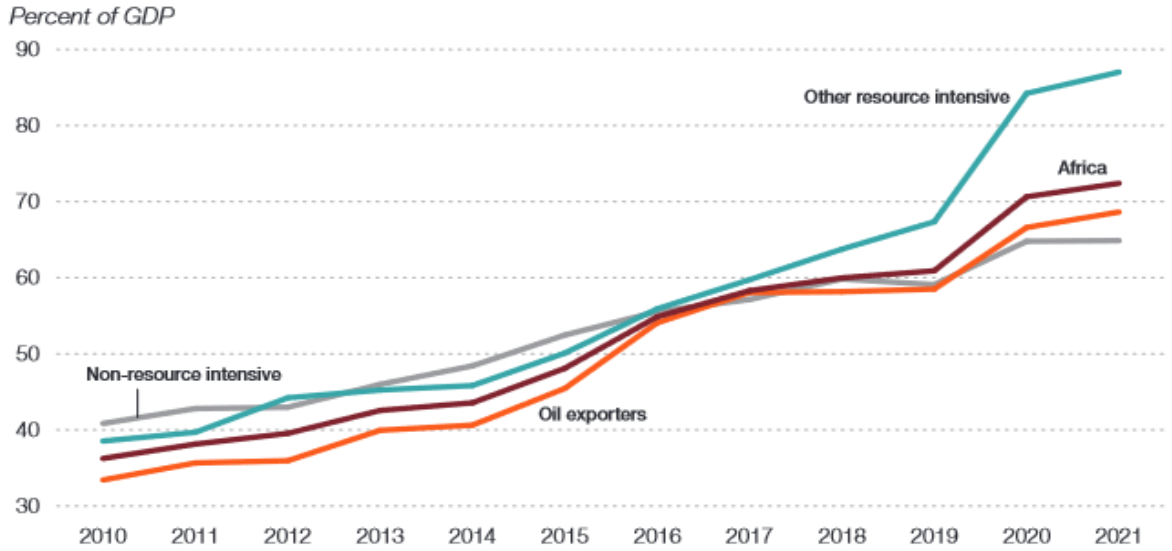
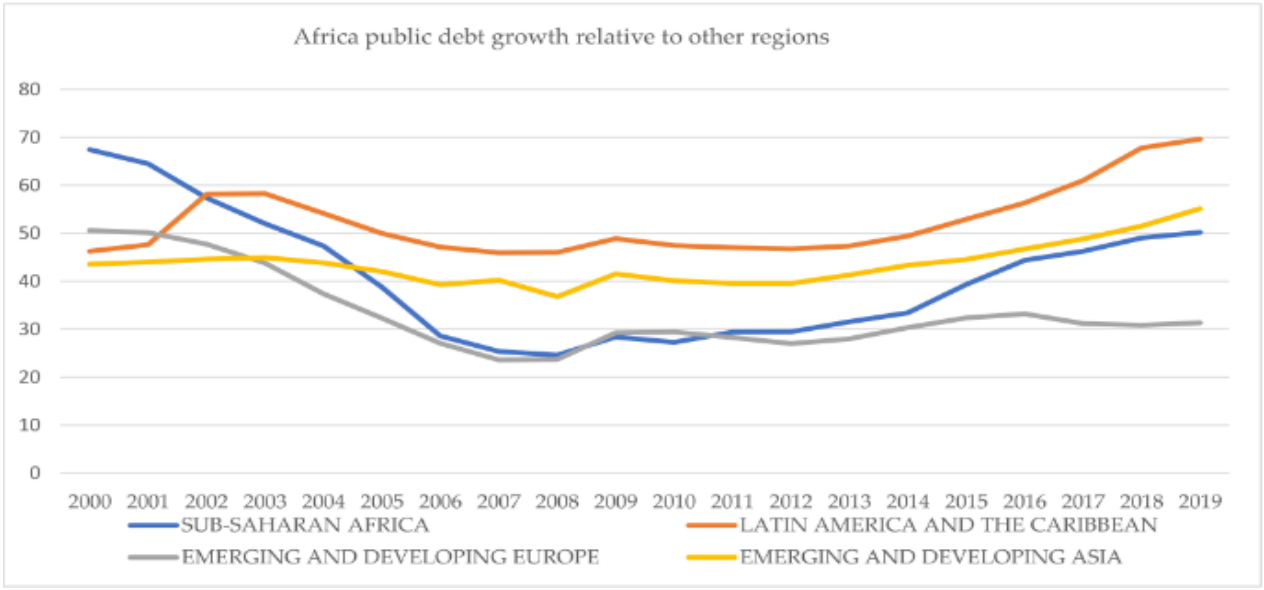


Figure 1: Gross government debt in SSA has been increasing since 2010

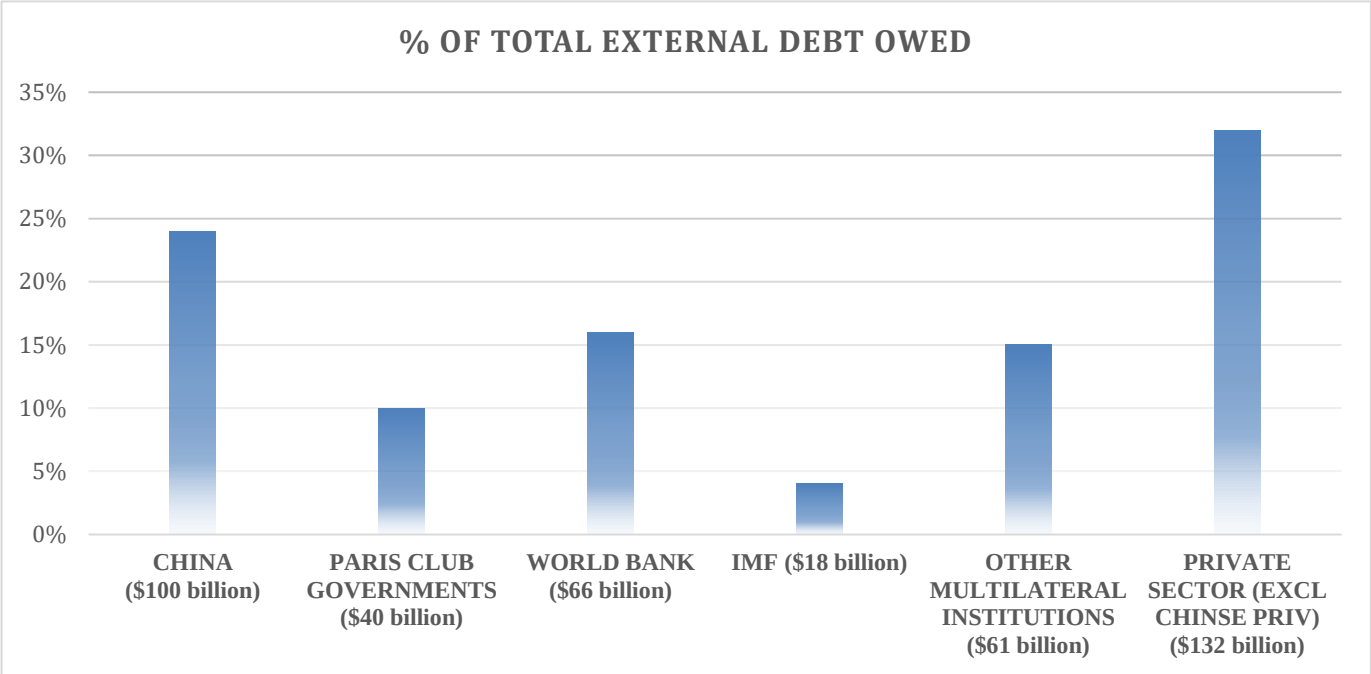


Source: Author's own computation

Figure 2: Trends in Public debt levels across the world regions sourced from the WDI

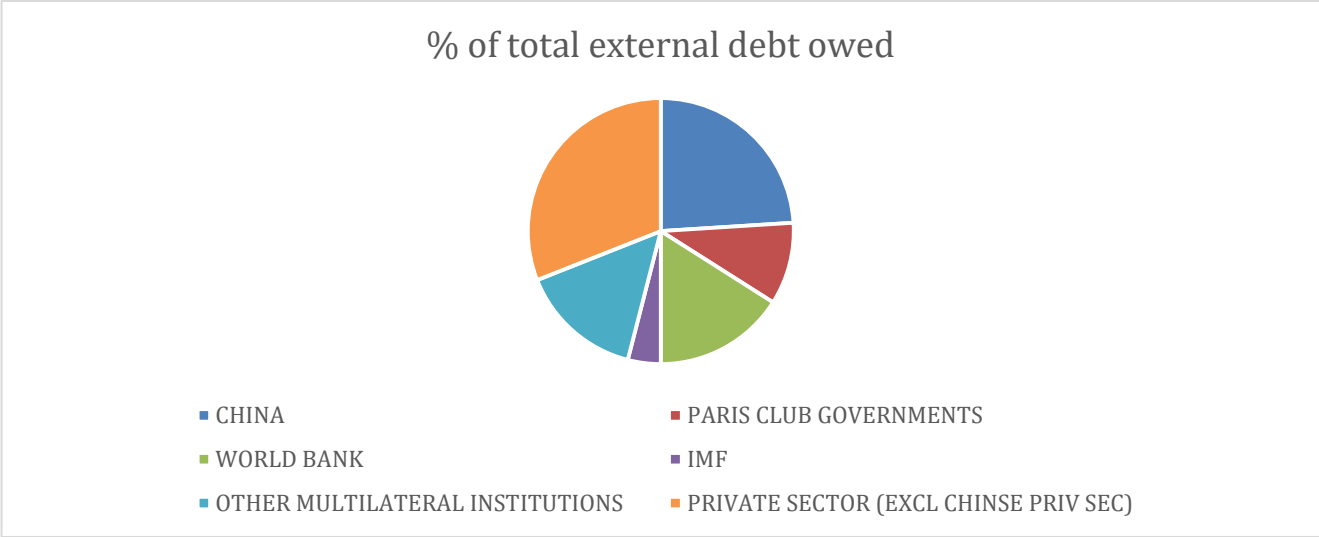
Although, strong growth recorded over the years has helped to dampen the rate of growth of the debt-to-GDP ratio for countries like, Ethiopia, Kenya, Botswana and South Africa, in addition to

that, there was also other major drivers of debt dynamics like high inflation, weak governance, security spending, and weaknesses in revenue mobilization



Source: own computation, 2022

Figure 3: SSA government's external debt owed to different creditors



Source: own computation, 2022

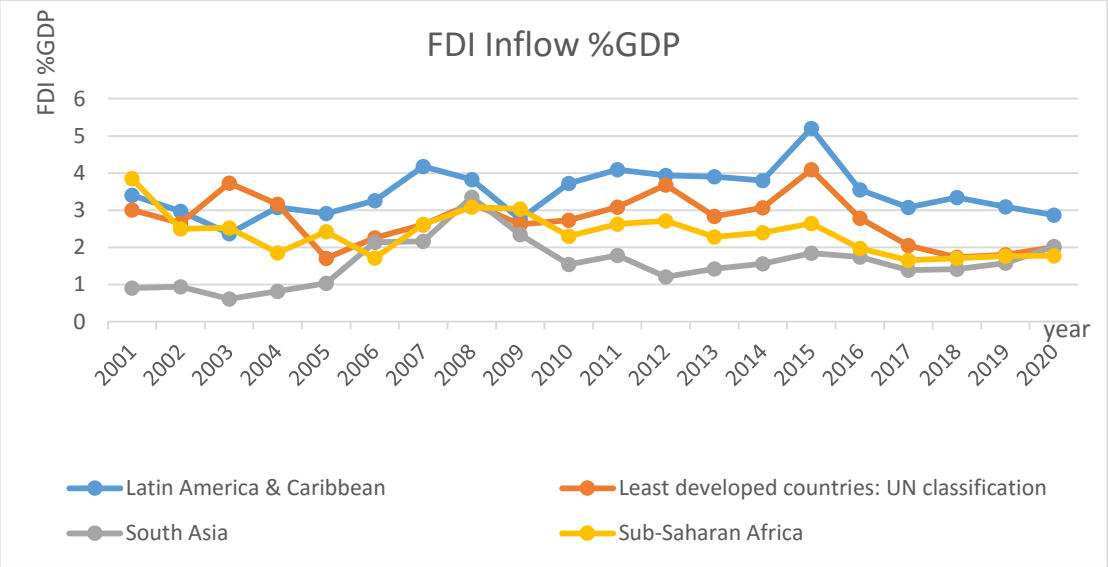
Figure 4: Sources of external borrowing accrued from

From the above diagram shown, the great creditor for SSA region is private sector excluding Chinse private sectors which is around 31% followed by China 24%, World Bank 16%, other multilateral

institution 15%, Paris club governments 10% and IMF 4%. This shows that China and Private sector creditors take lions share for the regions accumulated debt burden. The most creditors for SSA countries are: bondholders (which account for 27 percent of the continent's external debt at the end of 2019), China (13 percent), the World Bank-International Development Association (12 percent), the African Development Bank (7 percent), and other multilateral lenders (7 percent) IMF, 2021).

4.1.2 FDI inflows and Trends in Sub Saharan Africa

Studies on FDI inflows in sub-Saharan Africa seems particularly relevant as there is very limited knowledge of implications on the role played by an inward FDI in the region's economic growth process through providing employment opportunities, increasing productivity, creating wealth, maintaining social stability and increasing knowledge and technology transfer in the region. However, recurrent civil conflict as well as governance challenges have been contributed to the region's limited ability to attract higher FDI inflows and this bottleneck need to be resolved and improved for creating better investment opportunities in the region (Anyanwu, 2012). FDI inflow to the region is low and below the average level of least developing countries of the world for almost twenty years since 2002 up to 2020. SSA region is still the least the destination for world FDI inflow even though, it is the most resource abundant and availability of cheap labor force in the region as compared to other developing regions in the world.



Source: own computation, 2022

Figure 5: FDI inflows to different regions in the world from 2001 -2020

Africa's percentage of global FDI inflow was sharply declined from 4% of GDP in 2001 to 1.8% of GDP in 2005, but 2011 there was a gradual recovery as FDI inflows to SSA countries increased from US$55 billion in 2012 to US$57 billion which is 2.8% of SSA's GDP in 2013 which was grew by 3.6%. On the other hand Asia's percentage of global inflow has shown very significant and dramatic change from 6.4% in 1970 to 10.56% in 1999 and further increased to 29.36% recently in 2013. In 2001, the total FDI inflow as a percentage of GDP in SSA region is 4% GDP which was higher than other developing regions (i.e. Asia, 1% GDP and Latin America 3.5% GDP) but, after one year in 2002 it was below those regions and never come back above other regions since 2002.

4.2 Descriptive Statistics of Variables

The descriptive statistics for this study presented in Table A and Table B gives the general summary of the basic statistics of study variables apply for this study. This descriptive summery includes; mean which is the average value of the series, measures of central tendencies (mean, median & mode), measure of dispersion ((range, variance, standard deviation etc.), dispersion or spread in the series, minimum and maximum values, degree of peakedness or the tallness flatness of the distribution (measured by the kurtosis values), asymmetry of the distribution of the series (measured by the skewness statistics), and the normality test which used to identify whether the series is normally distributed or not (measured by the Jarque-Bera statistics) of all the series considered in this study.

From Table A below, FDI, DEBT, EXCH, INFR, INF, GFCF, TROP, RGDP and URP have mean values of 4.7129, 54.1375, 964.1447, 0.7836, 8.0184, 22.6637, 64.61, 637.126, and 3.6279 respectively. This indicates that the average of the ratio external debt as % GNI is higher and above the threshold (50%) level on the other hand the average of the ratio of FDI inflow as % of GDP is less than 5% (4.7129%, in this study), its infrastructural development is below 1% average which means the average fixed telephone subscription per 100 people is less than one person and contrary to this the regions local currency is depreciated on average 964.1447 per US dollar in SSA countries. This means that the value of FDI inflow can deviate from mean to both sides by 8.2246% of GDP. The maximum and minimum values of FDI inflow as % GDP are 97.33 and 0.032% respectively.

All the variables under this study is positively skewed (long right tail) except for URP and also all variables are leptokurtic (peaked-curve, Kurtosis; which is all greater than 3). The Jarque-Bera statistics is significant

for all variables which is not normally distributed except for TROP and URP suggesting that they are normally distributed for a period of twenty years

Table A: provides descriptive statistics of the study variables, main variable FDI.

	FDI	DEBT	EXCH	INFR	GFCF	INF	TROP	RGDP	URP
Mean	4.7129	54.1375	964.1447	0.7836	22.6637	8.0184	64.61	637.126	3.6279
Median	2746559	37.1764	401.2398	0.0639	20.8681	5.3187	57.8207	176.762	3.8263
Maximum	97.3373	610.452	21258.26	35.554	127.702	359.937	225.1	142291	9.5647
Minimum	0.032698	3.89500	0.0550	0.0001	2.0004	-9.6161	-0.438	-38264	-1.9124
Std Dev.	8.2246	57.6901	2619.991	2.9637	10.0930	16.3033	38.07	6000.53	1.3524
Skewness	5.9419	4.4739	5.2376	6.7351	2.2459	13.665	0.956	15.7346	-0.5699
Kurtosis	53.6992	31.5379	33.1069	55.996	18.3258	264.431	4.636	368.056	4.1958
Jaque Bera	99426.6	32797.5	37216.94	101037	9352.15	2530530	231.302	4922720	100.084
Prob.	0.00	0.00	0.00	0.00	0.00	0.00	6.01	0.00	1.8487
Sum	4147.3542	47641.01	847483.26	635.513	19944.1	7048.177	565921619	560670.8	319263642
Sum sqDv	59460.1	2925450	6026898416	7115.08	89543.4	233370.8	1268407.98	316496246	1607.88
Observation	880	880	880	871	880	880	876	880	880

Source: Authors' computation 2022

From Table B below, GDPPC, FDI, DEBT, INFL, POP and INFR have mean values of 1957.496, 4.712902, 54.13751, 8.018405, 2.418184, 45.42805and 0.7836 respectively. The mean deviation from there mean value for GDPPC, FDI and DEBT are 2505.629, 8.224669 and 57.69018 respectively. The maximum and minimum values of GDPPC and FDI inflow as % GDP are 15913.77, 0.03268 and 97.3374 and 0.036% respectively. All the variables under this study is positively skewed (long right tail) except for POPG and also all variables are leptokurtic (peaked-curve, Kurtosis; which is all greater than 3). The Jarque-Bera statistics is significant for all variables which is not normally distributed suggesting that they are normally distributed for a period of twenty years.

Table B: provides descriptive statistics of the study variables, Main variable GDPPC.

	GDPPC	FDI	DEBT	INFL	POG	INFR
Mean	1957.496	4.712902	54.13751	8.018405	2.418184	0.7836
Median	1044.140	2.746559	37.17645	5.318716	2.639704	0.0639
Maximum	15913.77	97.3374	610.4519	359.9366	4.829677	35.554
Minimum	0.0326982	0.0036987	3.895006	-9.616154	-2.828656	0.0001
Std Dev.	2505.629	8.224669	57.69018	16.30332	0.888143	2.9637
Skewness	2.778396	5.941916	4.473974	13.66453	-1.190148	6.7351
Kurtosis	11.77407	53.69921	31.53790	264.4309	4.985728	55.996
Jaque Bera	3954.947	99426.61	32797.51	2530530	352.3285	101037
Probability	0.00	0.00	0.00	0.00	0.00	0.00
Sum	1722596	4147.354	47641.01	7048.178	2128.002	635.5135
Sum sqDv	552092562	59480.12	2925450	233370.8	693.3536	7115.08
Observation	880	880	880	880	880	871

Source: Authors' computation 2022

4.3 Correlation Analysis

Correlation refers to the degree of linear joint movement or relationship between two or more study variables and it need to be tested as it is part of the pre-estimation analysis for the two models in order to avoid multicollinearity in the model to be estimated.

Multicollinearity problem can be solved by dropping or addition to variables. But dropping variables results to committing model specification bias therefore increasing the sample size by increasing additional variable is the best remedy (Guajarati, 2009). Multicollinearity refers to the existence of perfect or exact linear relationship among some or all explanatory variables in the model. When multicollinearity is present standard errors may be inflated. The existence of the problem of multicollinearity is tested using correlation coefficient test for panel data analysis. Correlation above 0.8 between variables indicates the existence of problem of multicollinearity (Guajarati, 2009).

Table C. Correlation Matrix for the first model, dependent variable is FDI

	FDI	DEBT	EXCH	GFCF	INF	INFR	TROP	RGDP	URP
FDI	1.0000		0.235	0.235	0.235	0.235	0.235	0.235	0.3255
DEBT	0.0840	1.0000							
EXCH	0.1092	0.1713	1.0000						
GFCF	0.2151	-0.1096	0.0098	1.0000					
INF	0.1039	0.1189	0.0650	0.1085	1.0000				
INFR	0.1006	0.0937	-0.0582	0.1876	-0.0911	1.0000			
TROP	0.0955	-0.0874	-0.2732	0.3253	-0.0630	0.3762	1.0000		
RGDP	0.0104	-0.0331	-0.0225	0.0210	-0.0406	0.0897	0.0860	1.0000	
URP	0.0177	-0.1018	0.0864	0.0822	0.0972	-0.3780	-0.3515	-0.0450	1.0000

Source: Authors' computation 2022

Table D: Correlation Matrix for the second model, dependent variable is GDPPC

	GDPPC	FDI	DEBT	INF	INFR	POPG
GDPPC	1.0000					
FDI	0.0903	1.0000				
DEBT	-0.0238	0.1290	1.0000			
INFL	-0.0533	0.0638	0.1235	1.0000		
INFR	-0.6734	-0.0851	-0.0601	0.0710	1.0000	
POPG	-0.4502	0.0548	-0.0260	0.0631	0.3928	1.0000

Source: Authors' computation 2022

From the above two tables; Table C and Table D, it can be conclude that the variables in both models did not exhibit any correlations as the highest correlated variable in both model is 0.3762 between INFR and TROP which is very far from the value of high correlation up to 0.95 as it can cause serious multicollinearity among variables if they exist together in an econometric model (Iyoha, 2004). For this model the correlation between FDI and GPPC of their corresponding first lag is 0.98973 and 0.9982 respectively showing that there is a high correlation between the dependent variables and their corresponding first lag and this why this study uses GMM modeling strategy which is dynamic, enables the control of such persistence in FDI and growth levels since

it has behavioral effects that persist in panel data analysis. However, there is persistency in the dependent variables which yield higher correlation. Persistence can be checked through correlation of the FDI and its corresponding first lag (FDI and Growth, and their corresponding first lag is 0.98973 and 0.9982 respectively for this study)

4.4 Model Estimation Results

The estimation result for one step system-GMM estimation technique is applied for both models (the first is the estimation result for FDI used as a dependent variable while the second is GDPPC as a dependent variable) are presented in the following Table 4.1 and 4.2. The estimation method uses the instrument collapsed option and was also set to a lag limit of 1 and limit of (1-2) for level equation. In order to avoid proliferation of instruments in the model, inflation was removed from the instrument list in the first model. The natural logarithmic transformation form of both the dependent and main control variables is used for both models under this study. The estimated results under the first model revealed that a one period lagged FDI (LFDI_l) has a significant and positive impact on current year FDI at 5% level of significance. The estimated result for LFDI_lag is 0.0400814 shows, as the previous year FDI (LFDI_l) inflow rises by 1%, this year's FDI inflow increases approximately by 0.04%. This may reflect that, the inflow of foreign direct investment in the previous year has the potential to improve the current year FDI inflow.

The estimated result for the coefficient of external debt (which is the main study variable for this study) is negative and significant at 5% level of significance. The one step system-GMM robust result for external debt (LDEBT) is -0.5115082 reveals that, a 1% increase in external debt is associated with a 0.5115% decline in the inflow of FDI and it is the main determinant for FDI inflow. This shows that, any attempt to increase external borrowing of a country will retard the inflow of FDI simultaneously. This estimation result reinforces and corroborates with the work of previous empirical studies (like; Adamu,(2016), Zakaria et. al. (2014), Elbadawi, et al (2014), Ostadi & Ashja (2014), Bendict, et al (2013), Rodriguez & Azamar (2013), Ramiret & Erquizio (2012), Beladicci et. al (2010)), who reported that external debt negatively affects the inflow of FDI in SSA's region. The estimated coefficient value of official exchange rate (EXCH) is 0.0000956 which is positive and significant at 5% level of significance. This implies that a one unit increase in the official exchange rate (depreciation of local currency against US dollar) in SSA region

resulted approximately a 0.01% increase in the inflow of FDI and this result is similar with the work of Wafure and Nurudeen (2010). The implication for this is that, as the exchange rate of domestic currency deprecated (the value of domestic currency is decreased) against foreign currency, the inflow of FDI trend rises, since export become cheap in abroad and export will increase and import will decline as foreign investors are willing to invest their capital where there is trade in an economy.

The coefficient for Gross fixed capital formation (GFCF) is 0.0255626 which is positive and significant at 5% significant level. This indicates that, a one unit increase gross fixed capital formation resulted an approximately a 2.56% increase in the inflow of FDI to the region. This is because when the value of fixed asset of a country is large enough, foreign investor's takes in to account the investments in fixed assets or physical capital during a given period in the economy and these result reinforces the work of Alsan et, al (2004) and Zakaria et. Al (2014). It is worthy of note that inflation (INFL), infrastructure (INFR), market size (URP) and economic growth (lRGDP) does not significantly affect the inflow of foreign direct investment, since the coefficient of inflation, infrastructure and economic growth variables are a little bit positive but not significant at 5% level of significant and the result of inflation and infrastructure reinforces with the result reported by Kudaisi B.V. (2014), Wafure & Nurudeen (2010) and also the result of market size is positive but insignificant similar with the work done by Mudiyanselag R. (2015).

The coefficient of infrastructure is positive indicates that, infrastructure in developmental projects (such as road, hospital and school constructions, provision of stable power supply and the provision of environmental amenities for communities attracts foreign investors to invest in the region. The regression output for the coefficient of trade openness (TROP) in this study is 0.0074053, which is also positive and significant at 5% level of significance. The result indicates that a one unit increase in trade openness resulted a 0.74% increase in the inflow of FDI in Sub Saharan Africa. The resulted variable may promote FDI inflow significantly in Sub-Sahara Africa through effective trade participation and proper management of trade relations with other countries is ordinarily expected to positively impact on investor's decision in investing abroad.

The F-statistic (Prob > F = 0.000) shows that the statistical significances, indicating the overall significance of the model. In addition, the number of instruments in the model was 18, which is below the number of groups 44, thereby reducing the chance of having the problem of instrument proliferation that weakens the Sargan and Hansen tests for this study.

Table 4.1 One-step system-GMM estimation results with robust standard error

Dependent Variable: LFDI

	One-step system-GMM with robust Std. error estimates			
Independent variables	Coefficients	Std. Error	t-statistics	Probability value
LFDI_1	0.04	0.0107485	3.73	0.001
LDEBT	-0.5115082	0.2148532	-2.34	0.024
TROP	0.0074053	0.0034766	2.13	0.039
GFCF	0.0255626	0.0120279	2.13	0.039
INF	0.0039606	0.0123542	0.32	0.750
INFR	0.0152271	0.0290324	0.52	0.603
URP	0.0252715	0.1052863	0.24	0.811
EXCH	0.0000956	0.0000353	2.71	0.010
RGDP	0.00000214	0.00000214	0.39	0.702
Constant	1.43917	1.070887	1.34	0.186
Number of Instruments = 18 Number of groups = 44 Number of obs = 822 F(9, 44) = 20.45 Prob > F = 0.000				

Source: own computation, 2022

The next section is discussing about the estimated result of the second model using economic growth (GDPPC) as a dependent variable in order to identify FDI or external debt (DEBT) has a great impact on growth. Firstly, the estimated result for the lagged dependent variable needs to be explained, the result is significant and have a positive impact on present year's growth at 5% level of significance. As such the lagged GDPPC (LGDPPC-1) estimated results under one step system-GMM is 0.0003577 which means on average, a 1% increase in the lagged GDPPC (previous year growth) resulted a 0.00036% increase in the current year's economic growth. The result revealed that it is positive and significantly affect growth. This may indicate that, the growth in previous year has the potential to facilitate and improve growth for current year.

The estimated result for the coefficient of external debt (one of the main study variable for this model) is negative and significant at 5% level of significance under this study. The one step system-GMM result for external debt (LDEBT) is -0.0847736 reveals that, on average a 1% increase in external debt is associated with approximately a 0.085% decline in economic growth. This shows

that, the rise in external borrowing in SSA region is one of the bottlenecks for the region's economic development. This may be due to external debt affects economic growth through debt crowding-out effect or debt overhang, the borrowed loan may not be allocated to productive socio economic activities, challenges government officials to adopt their own economic policy formulation and makes under the controller of the creditors nation, and make vulnerable to debt crisis and results fail in implementing effective development projects to grow. This estimation result reinforces and corroborates with the work of previous empirical studies like; Farhana and Chowdhury (2014), Zouhaier and Fatma (2014), Ejigayehu (2013), Aminu, et.al (2013) who reported that external debt negatively affects SSA's economic growth. Thus, external debt affects the economy at a great impact than the impact associated with FDI inflow.

The estimated coefficient value of official exchange rate (EXCH) is 0.0000956 which is positive and significant at 5% level of significance. This implies that a one unit increase in the official exchange rate (depreciation of local currency against US dollar) in the SSA region resulted in approximately a 0.01% increase in the inflow of FDI and this result is similar with the work by Wafure and Nurudeen (2010). The implication for this is that, as the exchange rate of domestic currency deprecated (the value of domestic currency is decreased) against foreign currency, the inflow of FDI trend rises, since export become cheap in abroad and export will increase and import will decline. Thus, foreign investors are seeking a market where there is such an advantage to invest their capital in an economy.

The estimated result for the coefficient of foreign direct investment (FDI) in this study is positive as expected but, surprisingly it is insignificant at 5% significant level. The reason behind this is, FDI can promote economic growth of an economy in various ways; creating employment opportunities, increasing productivity, transfer of technology and skill, inflow of capital to finance debt and budget deficit but countries may not enjoy the spillover growth benefits of FDI if they lack the required absorptive capacity to transform these benefits in to economic growth. Additionally, the majority of the FDI attracted to SSA were focused on the natural resource sectors of the economy, and therefore, not efficient in growth enhancing tool in the region. This may be the reason that the estimation result of FDI for this study has no a significant impact in promoting growth which reveals that, in terms of influencing economic growth in SSA region, external debt is more effective and sensitive to growth than FDI for this study. The result reinforces with the study reported by Al Khathlan (2014). The estimated result for the coefficient of Inflation is positive but

insignificant at 5% level of significance. Low inflation rate is advisable in facilitating economic activities to promote growth similar with the work of Wafure & Nurudeen (2010).

Table 4.2 One-step system-GMM Estimation Results, Dependent Variable: LGDPPC

	One-step system-GMM with robust Std. error estimates			
Independent variables	Coefficients	Std. Error	t-statistics	Probability value
LGDPPC_1	0.0003577	.0000695	5.23	0.000
LFDI	0.0000768	0.0055071	0.01	0.989
LDEBT	-0.0847736	0.0318827	-2.66	0.011
INFL	0.0001215	0.0013699	0.09	0.930
INFR	0.0533533	0.016329	3.27	0.002
POPG	-0.1041071	0.0502925	-2.07	0.044
Constant	6.987888	0.2344011	29.81	0.00
R2 = 0.82011 Adjusted R2= 0.510645 F(6), 44 = 3312.66 Prob > F = 0.000 Number of instruments = 12, Number of groups = 44, Number of observations = 864				

Source: own computation, 2022

The estimated result of infrastructure (INFR) is 0.053353 which is positive and significant at 5% level of significance showing that, a one unit increase in infrastructure is associated with 5.33% increase in economic growth. The coefficient of infrastructure is positive indicates that infrastructural development projects (such as road, hospital and school constructions, provision of stable power supply and communications across the region through providing environmental amenities for society attracts promotes economic growth.

The estimated result for the relationship between population growth (POPG) and economic growth (GDPPC) under this study is negative and significant at 5% significance level. The coefficient for population growth (POPG) is -0.1041071 indicates that, a one unit increase in population growth results 10.41% decrease in economic growth, which is very sensitive variable for growth for this study and the result supports the early Malthusian view was that population growth is likely to impede economic growth because it will put pressure on the available resources, thus resulting in reduction in per capita income and resources; this, in turn, harmful to the wellbeing of the society.

The estimation result of the growth (GDPPC) model specification of this study shows, F (6, 44) = 3312.66 and Prob > F = 0.000 which indicates the overall significance of the model and also the number of instrument (12) is less than the number of groups (44) to avoid instrument proliferations and the coefficient of determination; R2 = 0.82011, implies that 82% of the variation in the dependent variable (LGDPPC) is explained by the variation in the explanatory variables in the model.

4.5 Post-estimation diagnostic results

4.5.1 Serial Correlation Test

The post estimation tests applied for panel GMM methodology analysis are; tests for serial correlation and Sargan and Hansen Tests for testing the consistency of the model**.** Serial correlation tests are estimated by using the Arellano-Bond test of autocorrelation are AR(1) and AR(2) tests. The null hypothesis is that there is no autocorrelation in the model while the alternative hypothesis is that there is serial correlation among the explanatory variables.

The AR(1) and AR(2) for this study came out in the first model (FDI as dependent variable) with a probability value of 0.00 and 0.746, respectively. The AR(2) test shows that there is no serial correlation, which accepts the null hypothesis at 5% level of significance. According to Arellano and Bond (1991), the AR(2) test should be accepted which should be theoretically so valid. From this the AR(2) tests validate the estimates of the system-GMM result (described as in Table 4.3).

The Arellano-Bond test of autocorrelation for the second model (GDPPC as dependent variable) of AR(1) and AR(2) tests shows a probability value of 0.427 and 0.170 respectively. According to Arellano and Bond (1991), the AR(2) test shouldn't be rejected and accepts the null hypothesis of AR(2) so that the GMM estimation result may be valid. both the AR(1) and AR(2) tests validate the estimates of the system-GMM result for this model (described in Table 4.4).

Table 4.3 Arellano-Bond test of autocorrelation, Dependent variable LFDI

	Z-Statistics	Probability value
AR(1)	-4.17	0.00
AR(2)	0.32	0.746

Source: Own computation

Table 4.4 Arellano-Bond test of autocorrelation, Dependent variable GDPPC

	Z-Statistics	Probability value
AR(1)	-0.79	0.427
AR(2)	-1.37	0.170

Source: Own computation

4.5.2 Sargan and Hansen Tests

For checking the consistency of the model for this study, The Sargan and Hansen tests statistics are the tests that used to identify whether the model applied for this study is appropriate or not since the consistency of the GMM estimates depends on the validity of instruments used to estimate. The Sargan and Hansen tests are both tests of over-identifying restrictions in testing for the overall validity of the instrumental variables used in the estimation process. The Sargan and Hansen tests for the null hypothesis was that all instruments as a group were exogenous or, more specifically, that all instruments are valid. The Sargan and Hansen tests statistics in the present study have probability values of 0.000 and 0.127 respectively for the first model (Table 4.5), and 0.000 and 0.122 respectively in the second model (described in Table 4.6), both the Sargan and Hansen test statistic result indicating to reject the null hypothesis.

Table 4.5 Post estimation test presentation of Sargan and Hansen tests, Dependent variable FDI

	Chi-square Statistics	Prob > chi2
Sargan test	31.05	0.000
Hansen test	12.60	0.127

Source: Own computation

Table 4.6 Post estimation test of Sargan and Hansen tests, Dependent variable GDPPC

	Chi-square Statistics	Prob > chi2
Sargan test	538.67	0.000
Hansen test	8.70	0.122

Source: Own computation

4.5.3 Ordinary Least Square (OLS) and Within-group (Fixed Effect) estimates

Table 4.7 Summary of Within-Group (Fixed Effect) Estimation, Dependent Variable: LFDI

Independent variables	Coefficients	Std. Error	t-statistics	Probability value
LFDI_1	0.032079	0.005023	6.385899	0.0000
LDEBT	-0.144775	0.060428	-2.395828	0.0168
TROP	0.009555	0.002725	0.109022	0.0005
GFCF	0.018179	0.004884	3.722327	0.002
INF	0.002002	0.002244	0..891977	0.3727
INFR	0.053862	0.037433	1.438909	0.1506
URP	-0.015855	0.062630	-0.253153	0.8002
EXCH	0.0000452	0.0000415	0.109022	0.9132
RGDP	-0.00000288	0.0000557	0.051680	0.9588
Constant	0.074672	0.411771	0.181344	0.8561
R2 = 0.5711 Number of instruments = 20 Number of groups = 44 Adj R2= 0.5441, F-Stat = 21.17879 Prob (F-stat) = 0.0000 , Number of observations = 805				

Source: Authors' Computation, 2022

The fixed effect and ordinary least square (OLS) regression result is required in order to identify the system-GMM model whether it is appropriate or not through comparing the coefficient of the lagged dependent variables for the two models under this study. The fixed effect (within group) effect result presented in Table 4.7 reveal that the lagged FDI was significant at 5% level with a coefficient value of 0.032079. All other variables except trade openness, gross fixed capital formation and external debt (which is significant at 5 percent level) were insignificant at 5 percent level of significance. The coefficient for external debt (DEBT) is negative and statistically significant, which reveals that how a debt burden affects the inflow of FDI in Sub Saharan Africa. The fixed effect (within group) effect estimation result shows the coefficient of determination known as the R2 = 0.5711, implies that 57.11% of the variation in the dependent variable is explained by the variation in the explanatory variables in the model and the same interpretation is applied for all other estimation results. The number of instruments for the model is lower than the number of groups (20<44), which very important in analyzing this estimation.

Ordinary Least Squares estimates (OLS

Table 4.8 Summary of Ordinary Least Squares estimates (OLS), Dependent Variable: LFDI

Independent variables	Coefficients	Std. Error	t-statistics	Probability value
LFDI_1	0.061990	0.005144	12.05179	0.0000
LDEBT	0.0100064	0.054256	1.844308	0.0655
TROP	0.005281	0..001343	3.932789	0.0001
GFCF	0.036496	0.004433	8.232939	0.0000
INF	0.003177	0.002492	1.274770	0.2027
INFR	0.005870	00.008773	0.669152	0.5036
URP	-0.028308	0.036745	-0.770393	0.4413
EXCH	0.000054	0.00000545	3.428219	0.0006
RGDP	0.0000048	0.00000670	0.071646	0.9429
Constant	-0.940829	0.271607	-3.463933	0.0006
R2 = 0.516122 Adjusted R2= 0.510645 F-Stat = 94.21974, Prob (F-stat) = 0.0000 Number of instruments = 18, Number of groups = 44, Number of observations = 822				

Source: own computation, 2022

The ordinary least square (OLS) regression result presented in Table 4.7 below, reveals that the lagged FDI was positive and significant at 5% level with a coefficient value of 0.061990. All other variables except trade openness, gross fixed capital formation and exchange rate (which is significant at 5 percent level) were insignificant at 5 percent level of significance.

4.6 Robustness Check of the System GMM Results

Among the criteria for testing the validity of the System GMM results, it depends on the ability of the lagged dependent variable to fall in the range of its pooled OLS estimate and its Within-group (Fixed effect) estimates (Bond, 2002). To verify the validity of the one step system-GMM results used for this model, The lagged FDI of one step system GMM must fall in between its values in both pooled OLS (Table 4.8) and Within-group estimates (Table 4.7), the estimated coefficient for the lagged FDI in pooled OLS, Fixed effect and system GMM estimation result is 0.061990, 0.032079 and 0.04008 respectively. Thus, 0.032079<0.04008 < 0 .061990 in the present study. Hence, the validity of the model is confirmed.

The next section is discussing about the system-GMM output for the second model (Growth model) in testing the validity of the System GMM results comparing the lagged GDPPC results from the following table and the same procedure is applied for confirming the validity of the model.

Table 4.9 OLS, Fixed effect and One-step system-GMM Estimation Results

	The coefficient of Estimated variables result , Dependent Variable: LGDPPC		
Independent variables	**Fixed effect**	**System-GMM**	**Pooled OLS**
LGDPPC_1	0.000303	0.0003577	0.000359
LFDI	0.020178	0.0000768	0.041888
LDEBT	-0.058953	-0.0847736	-0.092852
INFL	-0.000299	0.0001215	0.000257
INFRA	0.035987	0.0533533	0.074191
POPG	-0.010890	-0.1041071	-0.144025
Constant	6.748995	5.037625	7.091465

Source: own computation, 2022

The estimated result for all the three estimation techniques, the coefficient of external debt (DEBT) and population growth (POPG) are negative and hampered economic growth of the region while the lagged GDPPC, foreign direct investment (FDI) and infrastructure (INFRA) have a positive impact on economic growth in sub Saharan Africa. The other variable inflation (INFL) has a negative coefficient in fixed effect estimation but positive in both system-GMM and OLS estimations.

To test the validity of system-GMM output for growth model in this study, the above table summarizes all the resulted estimation output of OLS, Fixed effect and system-GMM coefficient of variables. to test its validity, the lagged FDI of one step system GMM result must fall in between its values in both pooled OLS and Within-group estimates, the estimated coefficient for the lagged FDI in pooled OLS, Fixed effect and system GMM estimation result is 0.000359, 0.000303 and 0.0003577 respectively. Thus, 0.000303<0.0003577 < 0 .000359 in the present study. Hence, the validity of the system-GMM estimation analysis model is confirmed.

CHAPTER FIVE

5. CONCLUSION AND RECOMMENDETION

5.1 Conclusion

There has been a huge inflow of external debt in to Sub Sahara African countries from time to time even beyond their capacity to repay its debt on or before the agreed time period. There is a few empirical literatures on the assessment of the impact of external debt on FDI inflow, and the impact of FDI and external debt on economic growth in a SSA region. But the reported result has been diverse and some have found positive while others found negative and no relationship at all between those variables. Panel data is collected from 2001 to 2020 for 44 SSA countries and the system GMM estimation method is adopted for both models of this study because the number of countries or the number of groups (44 countries) was higher than the number of years (20 years) considered for the model and its validity has been conformed.

The results of panel system-GMM estimation analysis show that external debt is significant and negatively affect FDI inflow to Sub Sahara Africa. This results a dual adverse effect that; first, external debt decreases the inflow of FDI and secondly, it negatively affects economic growth in the region. Other variables included in the model also positive and significantly affects the inflows of FDI like; trade openness, gross fixed capital formation and exchange rate.

The second estimation model of economic growth (GDPPC) is that, among the total six explanatory variables, two of them are insignificant (namely, FDI and inflation). FDI is insignificant may be due to the fact that economic growth is more attributed from the growth in other economic activities than the growth in FDI because economic growth (GDPPC) is also has no significant on FDI inflow even though both their impacts (coefficients) are positive with one another. Other variables like; previous year growth, external debt, population growth and infrastructure are significant at 5% level of significance. The coefficient for external debt is negative, as such external debt has a negative impact on both FDI inflow and economic growth in Sub Saharan Africa. This shows that economic growth is highly affected by external debt than FDI inflow although FDI is insignificant and high debt burden limits SSA region's growth process by reducing the growth benefit accrued from FDI inflow. This implies, the negative impact associated from external debt to economic growth is more sensitive than the positive impact from FDI, since debt crowd outs FDI and simultaneously it retards economic growth in Sub Saharan Africa region.

5.2 Recommendation

Finding the main constraints of economic growth and foreign direct investment in order to sustain economic growth for countries around the world has been widely exercised and researched by scholars, academic scientists, and policy makers which resulted a variety of findings, recommendations or a tools to solve challenges for growth. The implication for this study is that governments in the region should take appropriate measures to utilize the borrowed income in a wise and responsible manner for productive economic activities and This means that the external debt effect on economic growth is not dependent on the level of debt but may be related to the management of debt distribution and utilization. However, FDI may be affected by the level of external debt in the region. Policymakers in these countries should ensure that external debt will be channeled into income-generating and productive activities. Low-income countries are advised to stabilize macroeconomic conditions to manage debt service requirements and avoid payment defaults and also reducing (not beyond their maximum threshold limit) external borrowing through encouraging domestic financing methods. For example trade openness is positive and significant, this indicates that to promote FDI inflows, governments should improving international trade relationship and open its trade door rather closed small which is used to attract new FDI through informing other investors to invest by easing restrictions and bureaucracies. As infrastructure is positive and significant for economic growth, governments should expand new infrastructural developments (like, road, telecom, electricity and other amenities) to promote growth and increase productivity.

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Appendix A

List of countries used in the study

Angola	AGO	Liberia	LBR
Benin	BEN	Madagascar	MDG
Botswana	BWA	Malawi	MWI
Burkina Faso	BFA	Mali	MLI
Burundi	BDI	Mauritania	MRT
Cabo Verde	CPV	Mauritius	MUS
Cameroon	CMR	Mozambique	MOZ
Central African Republic	CAF	Namibia	NAM
Chad	TCD	Niger	NER
Comoros	COM	Nigeria	NGA
Congo, Dem. Rep.	COD	Rwanda	RWA
Congo, Rep.	COG	Sao Tome and Principe	STP
Cote d'Ivoire	CIV	Senegal	SEN
Eswatini	SWZ	Seychelles	SYC
Ethiopia	ETH	Sierra Leone	SLE
Gabon	GAB	South Africa	ZAF
Gambia, The	GMB	Sudan	SDN
Ghana	GHA	Tanzania	TZA
Guinea	GIN	Togo	TGO
Guinea-Bissau	GNB	Uganda	UGA
Kenya	KEN	Zambia	ZMB
Lesotho	LSO	Zimbabwe	ZWE

Appendix B

Estimated STATA results

```
Dynamic panel-data estimation, one-step system GMM
------------------------------------------------------------------------------
Group variable: id                              Number of obs      =       822
Time variable : year                            Number of groups   =        44
Number of instruments = 18                      Obs per group: min =        12
F(9, 43)        =     20.45                                    avg =     18.68
Prob > F        =     0.000                                    max =        19
------------------------------------------------------------------------------
             |               Robust
        Lfdi |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
    LFDI_lag |   .0400814   .0107485     3.73   0.001      .018405    .0617578
       lDEBT |  -.5115082   .2185324    -2.34   0.024    -.9522207   -.0707956
        EXCH |   .0000956   .0000353     2.71   0.010      .0000244    .0001668
        INFL |   .0039606   .0123542     0.32   0.750    -.0209541    .0288753
        GFCF |   .0255626   .0120279     2.13   0.039      .0013061    .0498191
         TRA |   .0074053   .0034766     2.13   0.039       .000394    .0144166
        INFR |   .0152271   .0290324     0.52   0.603    -.0433222    .0737765
         URP |   .0252715   .1052863     0.24   0.811    -.1870587    .2376016
         GDP |   2.14e-06   5.56e-06     0.39   0.702    -9.07e-06    .0000134
       _cons |   .8673616   1.498167     0.58   0.566    -2.153979    3.888703
------------------------------------------------------------------------------
Instruments for first differences equation
  Standard
    D.(EXCH URPG INFR RGDP TRA)
  GMM-type (missing=0, separate instruments for each period unless collapsed)
    L(1/2).(LFDI_lag lDEBT RGDP GFCF) collapsed
  GMM-type (missing=0, separate instruments for each period unless collapsed)
    D.(LFDI_lag lDEBT RGDP GFCF) collapsed
------------------------------------------------------------------------------
Arellano-Bond test for AR(1) in first differences: z =  -4.17  Pr > z =  0.000
Arellano-Bond test for AR(2) in first differences: z =   0.32  Pr > z =  0.746
------------------------------------------------------------------------------
Sargan test of overid. restrictions: chi2(8)     =  31.05  Prob > chi2 =  0.000
  (Not robust, but not weakened by many instruments.)
Hansen test of overid. restrictions: chi2(8)     =  12.60  Prob > chi2 =  0.127
  (Robust, but weakened by many instruments.)

Difference-in-Hansen tests of exogeneity of instrument subsets:
  GMM instruments for levels
    Hansen test excluding group:     chi2(4)     =   7.41  Prob > chi2 =  0.116
    Difference (null H = exogenous): chi2(4)     =   5.18  Prob > chi2 =  0.269
  iv(EXCH URPG INFR RGDP TRA)
    Hansen test excluding group:     chi2(3)     =   5.89  Prob > chi2 =  0.117
    Difference (null H = exogenous): chi2(5)     =   6.71  Prob > chi2 =  0.244
```

```
Dynamic panel-data estimation, one-step system GMM
------------------------------------------------------------------------------
Group variable: id                              Number of obs      =       864
Time variable : year                            Number of groups   =        44
Number of instruments = 12                      Obs per group: min =        12
F(6, 43)      =   3312.66                                      avg =     19.64
Prob > F      =     0.000                                      max =        20
------------------------------------------------------------------------------
             |               Robust
      lGDPPC |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
    lagGDPPC |   .0003577   .0000695     5.15   0.000     .0002176    .0004979
        Lfdi |   .0000768   .0055071     0.01   0.989    -.0110292    .0111828
       lDEBT |  -.0847736   .0318827    -2.66   0.011    -.1490713    -.020476
        INFL |   .0001215   .0013699     0.09   0.930    -.0026411    .0028841
        IFRA |   .0533533    .016329     3.27   0.002     .0204227     .086284
        POPG |  -.1041071   .0502925    -2.07   0.044    -.2055316   -.0026827
       _cons |   5.037625   .7309977     6.89   0.000     3.563428    6.511823
------------------------------------------------------------------------------
Instruments for first differences equation
  Standard
    D.(POPG INFL)
  GMM-type (missing=0, separate instruments for each period unless collapsed)
    L(1/2).(lagGDPPC Lfdi lDEBT) collapsed
Instruments for levels equation
  GMM-type (missing=0, separate instruments for each period unless collapsed)
    L(1/2).(lagGDPPC Lfdi lDEBT) collapsed
  Standard
    POPG INFL
    _cons
  GMM-type (missing=0, separate instruments for each period unless collapsed)
    D.(lagGDPPC Lfdi lDEBT) collapsed
------------------------------------------------------------------------------
Arellano-Bond test for AR(1) in first differences: z =  -0.79  Pr > z =  0.427
Arellano-Bond test for AR(2) in first differences: z =  -1.37  Pr > z =  0.170
------------------------------------------------------------------------------
Sargan test of overid. restrictions: chi2(5)    = 538.67  Prob > chi2 =  0.000
  (Not robust, but not weakened by many instruments.)
Hansen test of overid. restrictions: chi2(5)    =   8.70  Prob > chi2 =  0.122
  (Robust, but weakened by many instruments.)

Difference-in-Hansen tests of exogeneity of instrument subsets:
  GMM instruments for levels
    Hansen test excluding group:     chi2(2)    =   3.74  Prob > chi2 =  0.154
    Difference (null H = exogenous): chi2(3)    =   4.96  Prob > chi2 =  0.175
  iv(POPG INFL)
    Hansen test excluding group:     chi2(3)    =   5.15  Prob > chi2 =  0.161
    Difference (null H = exogenous): chi2(2)    =   3.55  Prob > chi2 =  0.169
```

Dependent Variable: LFDI
Method: Panel Least Squares
Date: 05/29/22 Time: 12:06
Sample: 2001 2020
Periods included: 20
Cross-sections included: 44
Total panel (balanced) observations: 880

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LAGFDI	0.032079	0.005023	6.385899	0.0000
LDEBT	-0.144775	0.060428	-2.395828	0.0168
EXCH	4.52E-06	4.15E-05	0.109022	0.9132
INFL	0.002002	0.002244	0.891977	0.3727
GFCF	0.018179	0.004884	3.722327	0.0002
TRA	0.009555	0.002725	3.505962	0.0005
INFRA	0.053862	0.037433	1.438909	0.1506
URPG	-0.015855	0.062630	-0.253153	0.8002
RGDP	2.88E-07	5.57E-06	0.051680	0.9588
C	0.074672	0.411771	0.181344	0.8561

Effects Specification

Cross-section fixed (dummy variables)

R-squared	0.571124	Mean dependent var	0.846717
Adjusted R-squared	0.544157	S.D. dependent var	1.415464
S.E. of regression	0.955666	Akaike info criterion	2.805521
Sum squared resid	755.2973	Schwarz criterion	3.093403
Log likelihood	-1181.429	Hannan-Quinn criter.	2.915612
F-statistic	21.17879	Durbin-Watson stat	1.523655
Prob(F-statistic)	0.000000		

Dependent Variable: LGDPPC
Method: Panel Generalized Method of Moments
Transformation: First Differences
Date: 05/29/22 Time: 12:37
Sample (adjusted): 2003 2020
Periods included: 18
Cross-sections included: 44
Total panel (unbalanced) observations: 775
White period (period correlation) instrument weighting matrix
White period (cross-section cluster) standard errors & covariance (d.f. corrected)
Standard error and t-statistic probabilities adjusted for clustering
Instrument specification: @DYN(LGDPPC,-2) LFDI(-1) LDEBT(-1) INFL(-1) INFR(-1) POPG(-1)
Constant added to instrument list

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LAGGDPPC	0.000424	1.83E-05	23.11776	0.0000
LFDI	0.005511	0.000919	5.994194	0.0000
LDEBT	-0.039451	0.001548	-25.48902	0.0000
INFL	-0.001614	0.000185	-8.706845	0.0000
INFR	-0.029774	0.003533	-8.427876	0.0000
POPG	-0.058745	0.002604	-22.56289	0.0000

Effects Specification

Cross-section fixed (first differences)

Mean dependent var	0.015870	S.D. dependent var	0.045088
S.E. of regression	0.061977	Sum squared resid	2.953857
J-statistic	37.82436	Instrument rank	45
Prob(J-statistic)	0.523409		