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Are US Government Foreign Aid Flows and FDI Flows Intertemporally Related? An Investigation of Twenty-Three Countries in Sub-Saharan Africa

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ARE US GOVERNMENT FOREIGN AID FLOWS AND FDI FLOWS INTERTEMPORALLY RELATED? AN INVESTIGATION OF TWENTY-THREE COUNTRIES IN SUB-SAHARAN AFRICA

BY

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This thesis is approved as a creditable and independent investigation by a candidate for the master's degree and is acceptable for meeting the thesis requirements for this degree. Acceptance of this does not imply that the conclusions reached by the candidate are necessarily the conclusions of the major department.

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TABLE OF CONTENTS

ABBREVIATIONS

ACFTA: African Continental Free Trade Area
AIC: Aikaike information Criterion
Caid: Current Aid
C_con: Corruption Control
FCI: Financial Capital Inflows
FDI: Foreign Direct Investment
G_eff: Government Effectiveness
GDP: Gross domestic product
ODA: Official Development Assistance
OECD: Organization for Economic Co-operation and Development
P_stb: Political Stability
UNCTAD: United Nations Conference on Trade and Development
USAID – United States Agency for International Development
SDGs: United Nations Systemic Development Goals

LIST OF FIGURES

LIST OF TABLES

ABSTRACT

ARE US GOVERNMENT FOREIGN AID FLOWS AND FDI FLOWS INTERTEMPORALLY RELATED? AN INVESTIGATION OF TWENTY-THREE COUNTRIES IN SUB-SAHARAN AFRICA

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In this thesis, I test my central hypothesis that United States government foreign aid flows and FDI flows from anywhere in the world to Sub-Saharan Africa are intertemporally related; thus, I test to what extent FDI flows follow—and, thus, are caused by—aid flows or to what extent aid flows follow—and, thus, are caused by—FDI flows. My panel dataset includes twenty-three Sub-Saharan countries and spans 1991 to 2018. Based on the results of pooled-OLS and panel fixed-effects regressions, and panel Granger causality tests, I show that aid and FDI are intertemporally related. Additionally, Granger-causality is bidirectional: FDI Granger-causes United States government foreign aid and this aid Granger-causes FDI. Two important policy implications follow from my findings. One, evidence that FDI Granger-causes United States government foreign aid reveals a possible geostrategic motive behind the decisions of United States agencies to deploy aid to Sub-Saharan Africa. And two, evidence of bidirectional intertemporal relationships between United States government foreign aid flows and FDI flows could inform policy makers intent on deploying aid or incentivizing FDI as policy instruments to improve economic well-being in recipient countries, based on whether policy makers reason aid or FDI flows are beneficial.

1.0. Introduction

In this thesis, I analyze intertemporal relationships between United States government foreign aid flows and foreign direct investment (FDI) flows from anywhere in the world to twenty-three Sub-Saharan African countries. FDI is investment a private entity into businesses located in other countries establishing foreign business operations. In Figure 1, I include a map of Africa; in Table 1, I name the twenty-three countries in my dataset. For the purposes of my analysis, I define aid to include United States Agency for International Development (USAID) deployed foreign aid plus all foreign aid deployed separately by other United States government agencies such as the Departments of Agriculture, Defense, Health and Human Services, and State, as well as the African Development Foundation and the Peace Corps. In every case, the United States Congress appropriates the foreign-aid funds to these agencies, which deploy these funds according to their respective agency objectives.

Figure 1. Map of Africa

In principle, the answer to my research question is independent of whether United States government foreign aid and FDI individually promote or inhibit economic growth and well-being in the recipient countries. Nevertheless, understanding each of these relationships—that is, aid and growth, and FDI and growth—is important to understanding the implications of my findings. For example, if United States government foreign aid and FDI individually promote economic growth and well-being, and meanwhile aid induces FDI or vice versa, then the two flows could form a virtuous circle of economic development; likewise, if aid or FDI flows individually inhibit economic growth and well-being, and meanwhile aid induces FDI or vice versa, then the two flows could form a vicious circle. Understanding these intertemporal relationships would allow policy makers intent on deploying aid or incentivizing FDI as policy instruments to craft policies to direct the appropriate flows—that is, aid or FDI—accordingly. In this thesis, I measure aid and FDI in terms of the money received by countries based on data I retrieve from USAID and UNCTAD.

Sub-Saharan Africa's history of colonialism has long compromised the region's economic growth. For the last several hundred years, European nations, including for example the United Kingdom, France, and Belgium, colonized the continent in search of markets, raw materials, and, most tragically, forced labor (Ocheni and Nwankwo 2012). Colonizers commanded, controlled, and exploited local communities and their people, administering their lives, and profiting accordingly. In his work, *The West and Rest of Us*, Chinweizu (1975) explains that European colonizers exploited Africa's resources for power and profit. Colonialism shaped African cultures and economies in ways that disrupted the original trajectory of economic growth on the continent.

Today, Sub-Saharan Africa is an area rich with untapped potential in the forms of oil, diamonds, and gold, for example. These resources have the promise to develop the region beyond its current state to a better future. From poor health conditions to low human capital and physical capital accumulation to low investments in infrastructural development, Sub-Saharan Africa faces several challenges.

Health conditions on the continent continue to hinder sustainable long-term economic growth. Male and female life expectancies are 57 and 59 years for western Africa, 72 and 75 years for northern Africa, 63 and 67 years for eastern Africa, and 61 and 67 years for southern Sub-Saharan Africa, respectively (Statista 2011). Based on these statistics, the potential to grow human capital in the region is substantial. Moreover, investments in physical capital and prudent stewardship of natural resources could further improve production possibilities and create jobs in the region. Human capital and physical capital and natural resources are the principal factors of production, upon which economic growth depends, ceteris paribus.

For better or worse, the international community has often heralded aid and FDI as solutions to the Sub-Saharan challenges. For example, since 1960, Sub-Saharan Africa has received more than one trillion dollars in aid from the rest of the world. Since the Second World War, the United States government alone has regularly deployed foreign aid to several countries on the African continent. In 2019, the Sub-Saharan Africa received roughly $7.1 billion in aid (CRS Report 2020). Contributors have intended much of the aid to Sub-Saharan Africa since 2010 to improve health conditions.

In principle, foreign aid can contribute to improving sanitation, food distribution, and infrastructure. Meanwhile, foreign direct investment ostensibly stimulates competition and

introduces new technology domestically (Alfaro et al., 2010). In any case, the evidence that aid and FDI achieve their objectives is mixed. For example, in the case of aid, Kosack and Tobin (2006) argue that foreign aid strongly influences human development and economic growth; while Gatune (2010) emphasizes that development in Sub-Saharan Africa stretches beyond the influence of foreign aid. And in the case of FDI, Blomstrom and Kokko (1996) conclude that FDI could promote economic development by improving productivity growth; while Okechukwu et al. (2018) finds the positive relationship between FDI and economic growth in Nigeria is driven by oil exports, only.

In only a few peer-reviewed studies do researchers examine the relationship between aid and FDI. And the results of those studies are mixed: some conclude, if anything, aid attracts FDI, though not consistently so. Based on my panel dataset of twenty-three Sub-Saharan countries and the results of pooled-OLS and panel fixed-effects regressions, and panel Granger causality tests, I show that aid and FDI are intertemporally related, and that political stability, government effectiveness, and corruption control measures affect the inflow of aid and or FDI to countries in my sample. Additionally, I show that Granger-causality is bidirectional: FDI Granger-causes United State government foreign aid and this aid Granger-causes FDI. Perhaps most interestingly, evidence that FDI Granger-causes United States government foreign aid reveals a possible geostrategic motive behind the decisions of United States agencies to deploy aid to Sub-Saharan Africa.

Finally, my evidence of the bidirectional intertemporal relationships between United States government foreign aid flows and FDI flows could inform policy makers intent on using aid or FDI as policy instruments to improve economic well-being in recipient countries, based on whether policy makers reason aid or FDI flows are beneficial. For

example, considering my evidence that United States government foreign aid flows induce FDI flows, if policy makers reason FDI flows improve economic well-being in recipient countries, then policy makers would do well to understand this intertemporal relationship when they decide how and where to deploy aid.

2.0. US Aid

In this thesis, I study the intertemporal relationships between United States government foreign aid flows and FDI flows from anywhere in the world to twenty-three Sub-Saharan African countries. I define United States government foreign aid to include United States Agency for International Development (USAID) deployed foreign aid plus foreign aid deployed separately by other United States government agencies such as the Departments of Agriculture, Defense, Health and Human Services, and State, as well as the African Development Foundation and the Peace Corps. In every case, the United States Congress appropriates the foreign-aid funds deployed by these agencies. In Appendix 2, I list all such United States government agencies. In Table 1, I list the twenty-three Sub-Saharan countries in my sample.

Table 1. Countries in the Balanced Panel

Angola	Guinea	Nigeria
Benin	Guinea-Bissau	Rwanda
Burkina Faso	Kenya	Senegal
Cabo Verde	Lesotho	Sierra Leone
Chad	Malawi	Tanzania
Cote d'Ivoire	Mozambique	Togo
Gambia	Namibia	Uganda
Ghana	Niger	

The source of my data on United States foreign aid flows is USAID, which is an independent agency responsible for reporting to Congress and to the Organization for Economic Cooperation and Development (OECD) information related to all official United States government foreign aid activities by all United States government agencies. As such, USAID regularly publishes its *Publication of the Annual U.S. Loans and Grants for Congress* and its annual assistance report to the Development Assistance Committee (DAC) of the OECD (CRS Report 2020). Thus, USAID both reports information on United States government foreign aid on behalf of all United States government agencies and USAID deploys foreign aid funds in its role as a government agency. Hereafter, to avoid confusion, I refer to the sum of USAID-deployed foreign aid plus foreign aid deployed separately by other United States government agencies as *United States government foreign aid*.

For example, in Table 2, I report United States government foreign aid flows to Ghana, Kenya, and Senegal—three Sub-Saharan countries in my sample—for 2005. For each agency listed in Table 2, I report the share of foreign aid flows deployed by that agency. Take, for example, the case of the Department of Agriculture and Ghana: according to Table 2, in 2005, the Department of Agriculture deployed 25.1 percent of United States government foreign aid flows (of $74.6 million listed in the final row of Table 2) to Ghana. In the case of Ghana, Kenya, and Senegal in 2005, then, based on Table 2, the United States government agencies that deployed most funds to these countries were USAID, the Department of Health and Human Services, the Department of State, and the Department of Agriculture. Finally, in Figure 2, I illustrate the time series of United States government foreign-aid flows for the same 3 countries from 1990 to 2018; the total amounts of United

States government foreign aid flows deployed in 2005—the $74.6 million (Ghana), $227.4 million (Kenya), and $49.9 million (Senegal) that I report in the last row of Table 2—appear in Figure 2 as data points associated with the year 2005.

Table 2: United States Government Foreign-Aid Flows to Ghana, Kenya, and Senegal in 2005 [% distribution]

Sources of funding (Department)	**Ghana**	**Kenya**	**Senegal**
African Development Foundation	2.4	-	1.6
Department of Agriculture	25.1	30.6	5.38
Department of Defense	1.8	1.7	3.7
Department of Health and Human Services	2.7	4.4	3.5
Department of State	8.6	42.9	0.76
Department of the Interior	0.1	0.1	-
Department of the Treasury	0.7	-	1.1
Department of the Commerce	0.02	-	-
Millennium Challenge Corporation	0.4	-	0.20
Peace Corps	2.7	1.12	5.8
Trade and Development Agency	0.3	0.5	0.002
USAID	55.2	18.6	78.6
Total Funds Allocated (US million Dollars)	74.6	227.4	49.9

Source: https://explorer.usaid.gov/cd.

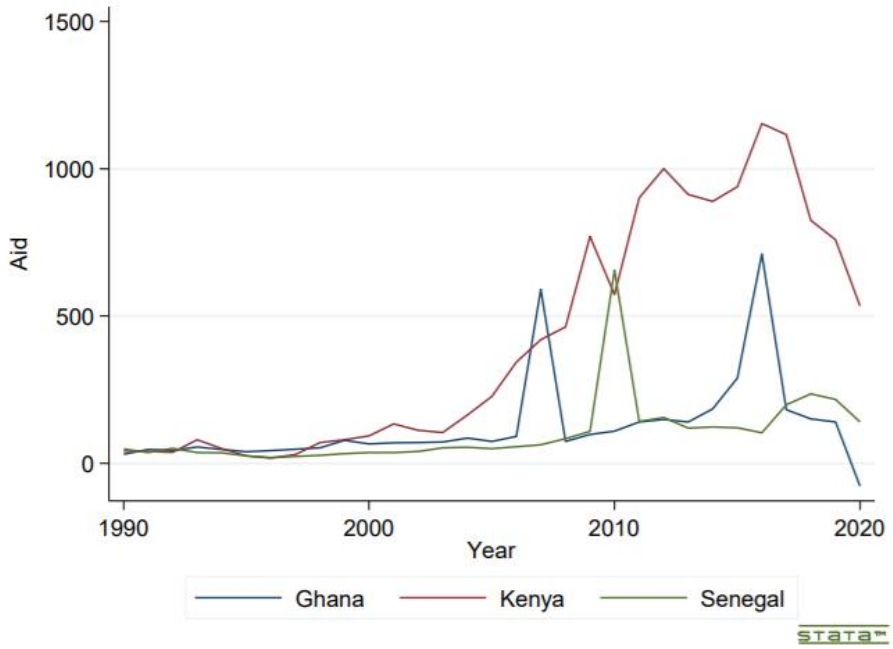


Figure 2. United States Government Foreign-Aid Flows to Ghana, Kenya, and Senegal from 1990 to 2018 in million USD. [Source: World Bank]

In Table 3, I report total United States government foreign aid flows to all twenty-three countries in my sample combined for 2005. As in the case of Table 2, in Table 3, for each agency, I report the share of foreign aid flows deployed by that agency.

For example, according to the information in Table 3, in the year 2005, the Department of Agriculture deployed 24.8 percent of United States government foreign aid flows (of $1,558.7 million) to the twenty-three countries in my sample combined. Finally, in Figure 3, I illustrate in a pie chart the distribution of these aid flows to all twenty-three countries combined; here I focus on three principal agencies: namely, the Departments of Agriculture and State, and USAID. Next, I discuss the outcomes these principal agencies intend their respective foreign-aid flows to achieve.

Table 3: United States Government Foreign-Aid Flows to Twenty-Three Sub-Saharan Countries [year 2005]

Sources of funding (Department/agency)	**% of distribution**
African Development Foundation	0.55
Department of Agriculture	24.84
Department of Defense	1.92
Department of Health and Human Services	4.44
Department of Labor	0.90
Department of State	35.03
Department of the Interior	0.04
Department of the Treasury	0.24
Department of the Commerce	0.001
Millennium Challenge Corporation	0.11
Peace Corps	1.99
Trade and Development Agency	0.31
USAID	29.62
Total Funds allocated (US Million Dollars)	**1558.7**

Source: https://explorer.usaid.gov/cd.

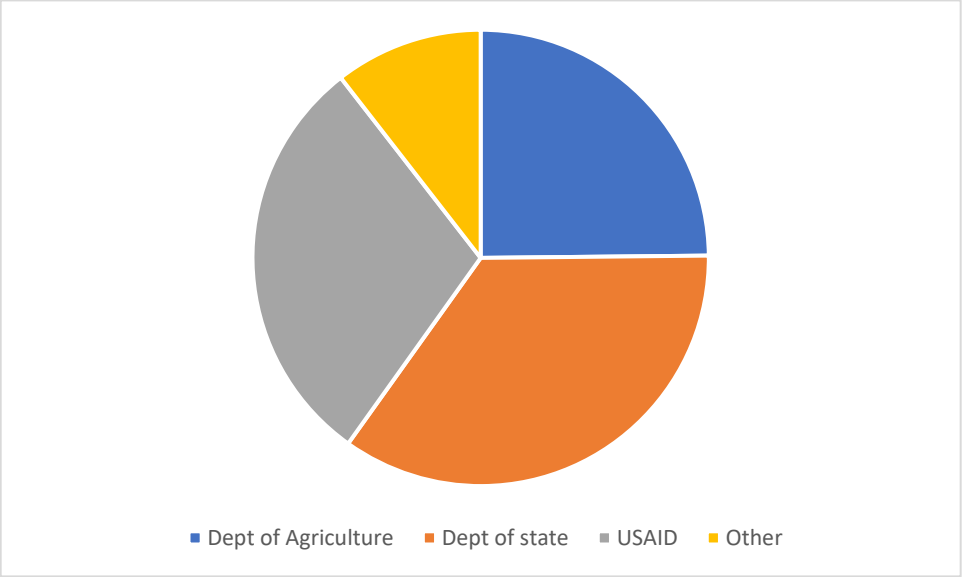


Figure 3. Distribution of United States Government Foreign-Aid Flows to Twenty-Three Sub-Saharan Countries. [Source: USAID]

Generally, the United States government deploys its foreign aid based on three key rationales: namely, national security, commercial interests, and humanitarian concerns. As such, the United States aims to strengthen its security by promoting its values, including good governance, peace and stability, humanitarian assistance, and investment in economic development.

The United States government intends USAID-deployed funds to assist the recipient country and support technical-assistance programs aimed at improving trade regionally and between recipient countries and the United States. Further, examples of the intended outcomes of such technical-assistance programs include improving trade infrastructures like energy and transportation facilities. Several bilateral USAID missions support projects such as supporting private farmers, advancing nutrition, and treating child blindness (USAID 2021 and 2021a; CRS Report 2020). Thus, the United States government intends its foreign aid to assist the recipient country as well as the United States, because improving trade infrastructures like energy and transportation facilities could ultimately benefit the donor country. In any case, several bilateral USAID missions support projects in specific African countries (CRS Report, 2020).

In May 2020, the Congressional Research Service outlined the objectives of USAID-deployed aid to Sub-Saharan Africa. According to a CRS Report (2020), between 70 and 75 percent of annual USAID-deployed funds since 2010 were directed towards health assistance. Addressing the growing concerns around HIV/AIDS, malaria, nutrition, and maternal and child health, much of the assistance was delivered via disease-specific initiatives. Aid was also directed to improve agricultural development, economic growth, and strengthen peace and security in the recipient countries.

Thus, an important objective for USAID is to encourage economic growth in developing countries, in part by supporting domestic private sector development, which may, in turn, attract FDI (CRS Report 2020). This helps to develop or deepen markets for exports from the United States. Additionally, USAID deploys foreign aid to complement the economic-growth effects of FDI, including FDI from the United States. In this way, USAID-deployed foreign aid indirectly benefits economic growth in the United States (USAID 2018). Put differently, United States government foreign aid aims to encourage investment and development in developing countries and achieve strategic priorities of the United States.

The U.S. Department of State (DOS) represents American foreign policy globally; thus, ultimately, the agency intends its deployed foreign aid to improve the security of the American people. Additionally, the DOS intends to assist American businesses operating in foreign countries (US Department of State 2021). The DOS has developed a framework built on five objectives that inform how the agency deploys United States government foreign aid. The five objectives are economic growth, humanitarian assistance, peace and security, investing in people, and governing democratically (CRS Reports 2019). Sub-Saharan Africa is important to the national security of the United States because of the continent's business and trade opportunities, and its oil, gas, and precious-metal reserves. Increasingly, neutralizing cybercrimes and other such threats, which may emanate from the continent as the number of internet users there increase, is also important to the United States (Harris, 2017).

Finally, the Department of Agriculture intends its deployed foreign aid to drive farm conservation and food safety efforts (USDA, 2021). Along with the DOS, USAID, and

Department of Agriculture, several other federal agencies like the Department of Homeland Security, for example, also support aid programs in Sub-Saharan Africa (CRS Reports, 2008 and 2008a).

3.0. Literature Review

Sub-Saharan Africa is a region with a wealth of natural resources. Several factors explain why the region is underdeveloped. From poor institutions—consequences of a tragic history of colonization and exploitation to which I refer in my introduction (Chapter 1)—to poor infrastructure to disease outbreaks, regions of Sub-Saharan Africa are very poor and underdeveloped. Two forms of foreign-capital inflows, foreign aid, and foreign direct investment (FDI), have, for years, shaped for better and for worse economic growth and development on the continent. Economic growth refers to increase in production of economic goods and services while economic development refers to creation of wealth from which a community benefit. In theory, because FDI and aid flows bring new technology, which essentially improves and deepens the domestic physical and human capital stocks, these flows accelerate economic development (Fambom 2013).

As I demonstrate in this chapter, the current literatures on aid and FDI largely focus on the respective relationships of aid and FDI to economic growth. To my knowledge, in only a handful of peer-reviewed articles do researchers examine the relationship between aid and FDI: this is to say, the extent to which FDI flows follow—and, thus, are caused by—aid flows or to what extent aid flows follow—and, thus, are caused by—FDI flows. Moreover, those studies find mixed results: some studies find, if anything, aid attracts FDI, though not consistently so. Simple correlations of time series of United States government foreign-aid flows and FDI flows to the twenty-three Sub-Saharan African countries in my

sample are mostly, though not uniformly, positive (Appendix 1). And, in any case, whether over time one of these flows induces the other is not clear.

In principle, my research question is independent of whether Untied States government foreign aid and FDI individually promote or inhibit economic growth and well-being in the recipient country. Nevertheless, understanding—and, so, separately reviewing the literature on—each of these relationships (in sections 3.1 and 3.2, respectively) is important to understanding the implications of my findings. For example, if United States government foreign aid and FDI individually promote economic growth and well-being, and meanwhile aid induces FDI or vice versa, then the two flows could form a virtuous circle of economic development; likewise, if aid or FDI flows individually inhibit economic growth and well-being, and meanwhile aid induces FDI or vice versa, then the two flows could form a vicious circle. Understanding these intertemporal relationships would allow policy makers to craft policies directed towards the appropriate flow—that is, aid or FDI. In the following sections, I review separately the literature on aid and FDI, and the intertemporal relationships, if any, between the two.

3.1. Aid

The developing world's countries, especially the least-developed countries, have received foreign aid for decades. Neoclassical economic theory implies that investments in physical capital, human capital, and new and improved technology generate economic growth. And because health and education are important aspects of human capital, investing in health and education (and, specifically, literacy) could have a positive impact on an economy by increasing labor productivity (Mushkin, 1962). Also, Sachs (2006) points to the positive impact of aid directed towards sustainable growth and development—

a normative outlook that, according to the author, recommends a set of goals for which to aspire. The author finds that aid improves growth among poor countries.

At the same time, a rich literature exists that demonstrates the negative effects of aid on recipient countries. For example, Farag et al. (2009) argues that aid's fungibility—and, thus, a recipient country's government's tendency to offset donor spending for a particular purpose by reducing its own expenditures on the same purpose—results in aid replacing instead of supplementing local spending. This replacement compromises foreign aid's effectiveness, in part because of differences in the policy priorities of donors and recipients; this is particularly true in the health sector, which contributes to human capital. Results from the study suggest that donor and recipient governments' incentives need to align with the donor agency to see a positive effect of aid being directed to a country. Thus, fungibility of aid can result in a negative impact on growth. In this way, foreign aid effectively influences government fiscal behavior. Indeed, Morrissey (2015) shows that the amount of aid a country receives will not necessarily translate to an equivalent increase in government spending by the recipient country. This is because the government is not aware of all aid available when making budget decisions to finance public goods.

Wamboye et al. (2013) emphasize that quality of aid—whether it is geostrategic or non-geostrategic—and quantity of aid matters to economic growth in Africa's least-developed countries. Geostrategic aid is aid directed by the donor agency that helps build investment and trade opportunities with the recipient country that benefit the recipient country and the donor agency. Non-geostrategic aid is aid directed by the donor agency solely for the benefit of the recipient country. The authors introduce a new explanatory variable, legal origin, to capture the roots of common law in a country, and whether that law is based on

continental civil law or the Anglo-Saxon law tradition. These variables allow the authors to learn whether aid is geostrategic in nature or not.

Moreover, Wamboye et al. (2013) present three relationships between aid effectiveness and economic growth: the takeoff hypothesis, the conditionality requirement, and the aid-quality argument. The takeoff hypothesis states that when the amount of the capital stock crosses the level an economy requires, meaningful growth enhancing effects are seen. Additionally, a sustained flow of foreign aid can help countries access additional resources required to takeoff into sustainable growth. The conditionality requirement states that foreign aid is effective when the economy has good fiscal, monetary, and trade policies. Finally, the aid-quality requirement states that aid effectiveness is based on geostrategic and non-strategic considerations. The authors argue that non-geostrategic aid has growth enhancing effects while geostrategic aid has a neutral effect. Finally, the authors conclude that macroeconomic policy management aimed at fiscal, monetary, and trade policies is critical to the effectiveness of foreign aid. As an additional source of domestic finance, aid increases the recipient country's investment potential. In this case, aid presents an opportunity to tackle poverty.

On the matter of geostrategic aid, Minoiu and Reddy (2009) find the UK and France predominantly direct aid to their former colonies. Separating developmental and non-developmental aid, the authors conclude developmental aid promotes long-term growth. The authors conduct their analysis using data from 1960 to 2000. They conclude that non-democratic colonies receive more aid than democratic non-colonies. Furthermore, Japanese and French aid favored former colonies or allied partners based on UN General assembly voting patterns. Meanwhile, Boschini and Olofsgard (2002) show the reduction

of aggregate aid levels in the 1990's was due to the Cold War coming to an end. The authors examined a sample of 17 OECD donor countries that were members of the organization during the 1990. Conclusions revealed, contrary to the general norm of aid being altruistic in nature, donor countries gave foreign aid to former allies, a strategy donor country used that prioritized the political loyalties of aid-recipient countries.

A country receives foreign aid in different forms. Maruta and Banerjee (2020) chose seventy-four countries from Africa, Asia, and South America and focus on three industry sectors: namely, agriculture, health, and education, which receive the most foreign aid. Educational aid in the study is a sum of aid transferred to primary, secondary, and post-secondary education. The United Nations directs its systemic development goals (SDGs) to these same three sectors. Additionally, the authors use sectoral foreign aid instead of aggregate foreign aid for their analysis. Results show that aid directed to the educational sector has a positive effect on economic growth. Furthermore, the authors mention that aid efficacy increases as institutional quality improves. In summary, according to the authors, the donor and recipient country must decide which sector has the highest returns and needs immediate attention, all while having a good institutional framework.

Dong and Fan (2020) examined the effect of China's aid and official development assistance to forty-seven African countries in four different categories: namely, economic infrastructure, social infrastructure, governmental budget support, and aid invested in productive sectors, from 2003 to 2013. The authors conclude that aid has a positive and significant impact on Africa's economic growth. However, official development assistance does not play a large role in the countries' development. Interestingly, the authors find that aid for budgetary support has a positive effect on economic growth. At the same time, this

positive effect on growth is conditional on high corruption control. This is because aid to government may encourage corruption.

Furthermore, government variables such as political stability, government effectiveness, corruption control affect the economy. Poor conditions in this regard have dissuaded donor countries from continuing to provide aid. Additionally, low levels of political stability and corruption control also discourage private entities from investing their funds (Alberto and Weder, 2002). On the other hand, having continuous support from a donor country helps the recipient country build foreign relations with the donor and potentially other countries.

In any case, an increase in aid can alter the recipient country's real exchange rate, and hence lead to a situation of Dutch disease, where the recipient country initially benefits from large increases in development and income in one sector (for example, natural resources) only to deal with declines in development and income in other sectors. Obviously, a recipient country is best to avoid this paradoxical outcome in which improvements in one sector have a negative impact of the country's overall economy. In principle, Africa's wealth of natural resources poses a risk of Dutch disease, because large amounts of aid directed to only one sector—in this example, natural resources—could result in high initial returns in one sector followed by a decline in returns in other sectors.

In a sample of five African countries, Hussain et al. (2009) examine the macroeconomic challenges that aid presents. The authors identify macroeconomic constraints such as inflationary pressures, human capital constraints, and sectoral and administrative capacity as challenges a nation experiences as aid levels surge in the country. Additionally, the authors look at whether a rise in aid leads to real exchange rate appreciations and how fiscal policy should be altered with a rise in aid. The authors find no evidence of real exchange

rate appreciation and thus a Dutch disease. Furthermore, the authors highlight the implications of aid absorbed versus aid spent. Aid absorption refers to the extent to which the current account deficit excluding aid widens in response to an increase in aid inflows. Aid spent refers to the widening of the government fiscal deficit, net of aid, that accompanies an increase in aid. The authors conclude that neither aid absorbed nor spent is a good strategy in the short run when aid inflows are unstable.

There is evidence that aid affects the fiscal behavior of the recipient country. Morrissey (2015) investigates the effect of taxes levied by the recipient country's government on the recipient country's behavior since 2005. The author concludes that a given amount of aid to a country will not lead to an equivalent increase in that recipient country's government spending. Additionally, an increase in aid to the recipient country can influence domestic (recipient-country) tax rates, thus influencing tax revenues. For example, an increase in aid can lead to higher tax rates; and higher tax revenues and, thus, expenditures could improve the efficacy of aid.

Despite the ostensible benefits of foreign aid that I have reviewed so far, several researchers question whether foreign aid benefits the recipient country. Easterly and Tobias (2008) examine the best and worst practices in foreign aid. The authors argue three types of aid are particularly ineffective: food aid, technical assistance, and tied aid. Tied aid must be used by the recipient country to procure goods from the donor country, potentially overpricing goods to the recipient country. Food aid could compromise the effectiveness of aid by effectively dumping goods—often excess agricultural production from the donor country—on to recipient countries, thus stunting the development of industries in the recipient country. Finally, technical assistance includes activities intended to improve

general knowledge, skills, and technical know-how in the recipient country. While such aid may benefit the recipient country, technical assistance often reflects, and thus advantages, donor-country—and not necessarily recipient-country—priorities.

Easterly (2007) questions whether development assistance is a mistake. Based on his analysis of the extant literature, the author reasons that development assistance failed to achieve its objective of stimulating development. For example, despite Sub-Saharan Africa receiving $568 billion dollars (in 2007 US dollars) over the period of 42 years since 1965, per capita growth of the median African nation was close to zero over this time. According to the author, the only country to develop as intended because of aid inflows and technical assistance is South Korea. And even in this case, development occurred when aid to the country fell off. Based on Easterly (2007), Easterly and Tobias (2008), and others, the effects of aid on the recipient country are ambiguous.

In her book *Dead Aid*, Dambisa Moyo (2009) argues that aid has not helped Africa; instead, aid worsened the situation on the continent. According to the author, aid has been a political, economic, and humanitarian disaster. Aid has impoverished many of its recipients and reduced economic growth. Moyo (2009) gives a brief history of aid to Sub-Saharan Africa for each decade since 1960. Aid in the 1960s was directed toward industrialization. By 1965, aid to Sub-Saharan Africa crossed $900 million. However, by the end of the decade, infrastructural development remained insufficient. In the following decade, donor countries directed aid to alleviate poverty.

Further, Moyo (2009) cites reasons for why aid has not worked in Africa. Sub-Saharan Africa received more than $1 trillion in aid from rich countries. One reason Moyo (2009) cites for why aid has not worked in Sub-Saharan Africa is the Marshal Plan. Funds from

the Marshal Plan were directed to European countries post the Second World War. This helped European countries re-establish their economic, social, and political institutions. Aid was directed to Sub-Saharan Africa using the Marshal Plan achievements as a blueprint. However, Moyo (2009) points to the fact that European countries benefitted from aid because they had the institutional framework in place and only needed funds to help these institutions work again. Additionally, Marshal plan funds were finite. However, Sub-Saharan Africa received aid continuously since 1960, causing governments there to view aid as a continuous source of income and, thus, stopping institutions from long-term financial planning.

Moyo (2009) also points to an institutional framework that can help Africa. She argues that although democratic regimes have several positive effects such as reducing corruption, protecting businesses, and promoting transparent economic policies, poor countries need a decisive dictator who can push for economic policies for economic development. Furthermore, the author mentions that democracy is not a prerequisite for economic growth and that economic growth does not require aid. Additionally, the author mentions that aids effectiveness is compromised because of aid being fungible, an argument like the one made by Farag et al. (2009). Finally, Moyo (2009) mentions that results of aid-driven interventions have led to a drastic drop of countries into poverty.

In summary, aid to Sub-Saharan Africa has had mixed—and often unambiguously negative—outcomes for recipient countries. Such results show that aid efficacy in Sub-Saharan Africa is highly questionable. Furthermore, governance issues may explain some of these negative outcomes. Research suggests that the governance environments of recipient and donor countries must align for aid to be effective. And such alignment is

difficult to achieve; as Pomerantz (2004) argues, knowledge and understanding of local cultures and institutional ineffectiveness make it challenging for donor agencies to direct funds effectively.

3.2. Foreign Direct Investment (FDI)

Several researchers have examined the relationship between FDI and economic growth. Like aid, in principle, FDI could have a positive impact on growth. As firms invest abroad, they introduce new technology and skilled labor and stimulate competition between domestic (in-country) producers. Thus, FDI could benefit the economy, in part by producing positive externalities. However, a recipient country could disadvantage itself by depending too much on these investments. Too much reliance on FDI leaves the domestic market vulnerable and susceptible to global markets. As reliance on FDI increases, domestic firms' progress is hindered as foreign firms' capital and technical advancement take precedence. Furthermore, domestic governments may redirect funds towards the efforts and objectives of foreign firms, so the benefit of FDI to the domestic economy is at best short term. More importantly, FDI dependency can worsen income inequality, social unrest, and political instability (Kosak and Tobin 2006). Moreover, political instability could negatively affect the investment climate in the recipient country, in turn negatively affecting FDI inflows (Nazeer and Masih 2017).

Several authors have investigated the causal relationships between FDI and economic growth and economic development. For example, Blomstrom and Kokko (1996) examine the effect of FDI on host countries. They conclude that FDI could promote economic development by improving productivity growth, thereby increasing the value of domestically produced goods, and increasing exports. Despite the claim that FDI could

promote economic growth, the authors state that the recipient country's institutional framework is an important determinant of FDIs efficacy.

Blomstrom et al. (1996) show that fixed investments (in physical capital and technology, for example) prove more effective for economic growth when additional factors such as economic policies, the institutional framework, and the political climate are strong. Bolmstorm and Kokko (1996) agree that FDI drives economic growth in the recipient economy provided the institutional conditions there are strong.

Based on a panel dataset of 179 countries from 1980 to 2011, Herzer et al. (2015) find that FDI has a positive effect on health at low levels of recipient-country income, but the sign changes as income levels increase. Additionally, the authors mention that while morbidity and mortality are correlated, the lack of data on morbidity variables such as doctor visits and healthy life expectancy, does not allow them to focus on morbidity. Morbidity refers to an acute illness like respiratory infection or diabetes, while mortality refers to the number of deaths caused by fatal conditions. The authors identify the relation between FDI and health as non-linear.

Giammanco and Gitto (2019) offer an alternative take on FDI and health. Examining the relationship between health expenditures and FDI in 28 countries of the European Union, the authors find population health, health systems, and governance infrastructure are important factors that attract FDI. Furthermore, the authors consider health in terms of quality of life as opposed to life expectancy. Finally, they emphasize the need to improve population health, an important factor for attracting FDI.

Arbatli (2011) examines the indicators of FDI in emerging market economies and, in doing so, focuses on economic policies. The author concludes that pull factors, such as political conflicts, inflation, the real exchange rate, and economic policy variables such as corporate tax and tariff rates, significantly impact FDI. The author finds that politically unstable countries attract lower amounts of FDI compared to politically stable countries.

Africa, despite its abundant natural resources, presents several reasons for low FDI inflow compared to other nations. Reasons such as poor infrastructure to poor institutional qualities to low domestic savings, hamper the inflow of foreign capital in the form of FDI. At the same time, Sub-Saharan Africa is also a region where large amounts of foreign aid are directed to fulfill several global requirements (Alesina and Dollar, 2000)

The African Continental Free Trade Area (ACFTA), 2018, brokered by the African Union, was introduced with the objective to increase regional co-operation, to promote trade and to reduce tariffs between African countries. Regional cooperation is where the governments, local and national, collaborate to work together and promote national interests. I reason that such cooperation improves governance. This can be a positive incentive for foreign investors and donor countries directing FDI and aid, respectively. The UNCTAD 2019 reports that FDI to Sub-Saharan Africa increased by 11 percent in the previous year. This is evidence that regional cooperation between African countries helped attract FDI (Bezuidenhout, 2009).

Another question addressed by a few authors is whether FDI crowds in or crowds out domestic investment. Crowding out is a phenomenon where one type of spending—for example, government spending—lowers another type of spending—for example, private-sector spending. Crowding in, on the other hand, is one where one type of spending attracts

the other. Agosin and Mayer (2000) examine three developing regions in Asia, Africa, and Latin America; and they examine two time periods, 1976-1985 and 1986–1996. The authors conclusions differ by region: they find that FDI crowds-in domestic investment in Asia and in Africa. However, the results for Latin America are inconclusive. In conclusion, the authors found no certainty in the effect of FDI on domestic investment.

In a study of twenty-two African countries, Asiedu (2002, 2006) shows that natural-resource endowments, large local market size, and healthy infrastructure promote FDI in Africa. The author examines market size in relation to the government policies and institutional variables which attract FDI. Using data from 2000 to 2002, the author demonstrates that South Africa's domestic markets contribute 46 percent to Sub-Saharan Africa's GDP. Whereas corruption and political instability have a negative effect on economic growth and development and reduce FDI inflows throughout the region.

FDI, like aid, is a double-edged sword. A certain amount of FDI could have positive effects in the recipient economy (for example, by improving physical capital and human capital and growing skilled labor), while dependence on FDI could have negative effects on the recipient economy (for example, by driving private firms out of business and increasing income inequality). And like aid, the incentives a potential recipient country establishes to attract FDI could alter the dynamics of the recipient country's economy (Kosack and Tobin, 2006). For example, foreign firms entering the domestic economy could help domestic firms improve by augmenting their efficiency, knowledge and skills, and productivity. However, too much dependence on foreign firms could have negative results and hamper the domestic economy. Kosack and Tobin (2006), who demonstrate the effect of FDI on human development, conclude that FDI's impact on human development

is largely dependent on characteristics of the recipient economy, such as economic freedom, competition, opportunity for growth.

Furthermore, the existing literature demonstrates that democracies spend more on human development compared to autocracies. Zweifel and Navia (2003) show that democracies cater to their citizens' needs better than autocracies do. Additionally, the knowledge that a democratic country's government is superior in terms of political justice and basic well-being attracts FDI. Brown and Hunter (1999), who examine Latin American countries from 1970 to 2000, find that a democratic regime is important in the long run for health and education spending. Moreover, democratic principles and practices allow for resources to be directed towards education and primary schooling. Such schooling improves human development.

Technological spillovers because of FDI could lead to economic growth of the recipient country because technological advancements result in competition between domestic firms, forcing them to improve. As Robert M. Solow's (1957) foundational work on economic growth demonstrates, long-run (steady-state) growth in output per person is due to technical changes rather than capital deepening or other such increases in factor inputs.

Furthermore, Sumner (2005) shows that FDI is good for aggregate growth, which increases income earned by workers. However, income inequality rises as the returns to skilled labor rise above the returns for unskilled labor and, thus, reduce the income growth of the poor. Moreover, in their study of the impact of FDI on income inequality in Africa, Kaur et al. (2018) identify local conditions such as technology diffusion, quality of institutions, and human capital availability as important determinants of the impact of FDI on income inequality.

Okechukwu et al. (2018) find mixed results when looking at the effect of FDI on Nigeria's export economy. Initial results, looking at the aggregate effect of FDI, are significant and positive in the long run. However, when the authors disaggregate the effects of FDI by export categories, oil and non-oil, the authors report a positive relationship between FDI and economic growth for oil exports only.

Finally, some critics of FDI argue that foreign firms' vast organizational outreach could result in foreign firms promoting self-serving interests at the expense of recipient-country interests, effectively manipulating domestic markets, and thereby negatively affecting domestic firms (Porter, 2005). According to Porter (2005), in such cases, foreign firms do not completely transfer technology to recipient countries; instead, these firms use the recipient country's relatively inexpensive labor for low-skilled activities and preserve high-value-added activities in the foreign firm's home-country.

3.3. Intertemporal Relationships between Aid and FDI

The separate literatures on aid and FDI that I review above raise an important question: are aid and FDI complements, substitutes, or neither? In theory, the effective usage of aid could attract FDI and, thus, deepen the capital stock of the recipient country. Aid that promotes this complementary relationship is termed *catalytic aid*. Aharsjo (2016) finds that development aid and FDI are indeed complements. Based on a sample of 35 largely middle-income countries between 1987 and 2013, the author finds that a one-percent increase in aid stimulates a 0.5 percent increase in FDI after 3 years.

Wang and Balasubramanyam (2011) show that aid complements FDI and, in so doing, promotes economic growth. The authors investigate the relationship between aid and FDI in provinces in Vietnam. Based on the results of this study, the authors conclude that

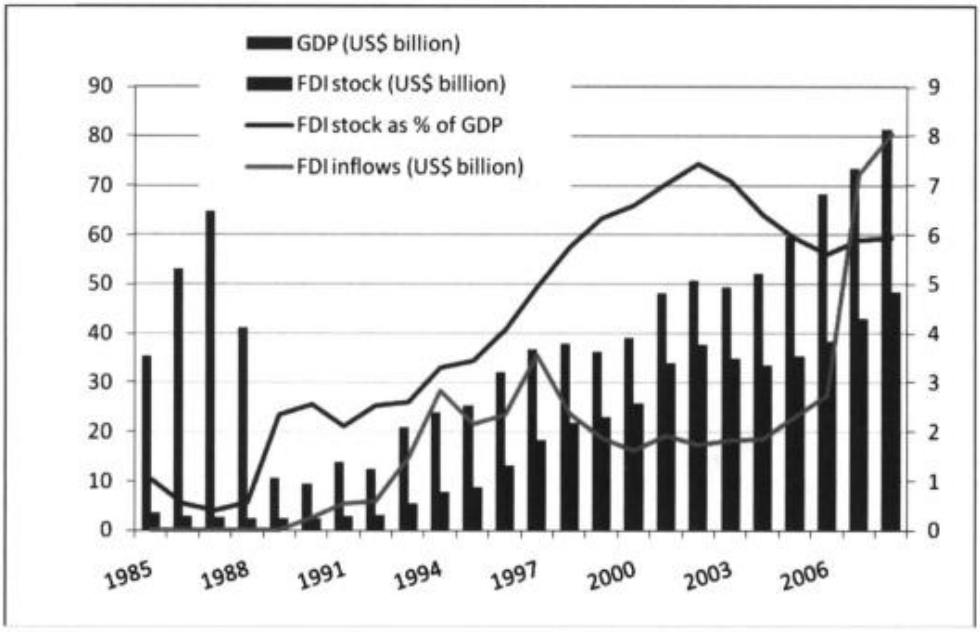
foreign firms are attracted to provinces that have received aid and improved their infrastructure accordingly. Furthermore, this complementarity promotes economic growth and development in the provinces. Additionally, the authors reason that their results have policy implications: for example, they propose that countries invest aid flows in public goods such as transportation facilities and education.

Garriga and Phillips (2014) add to a growing literature on the effect of aid on FDI. They show how investment firms use data from recipient countries, specifically post-conflict countries, and show that aid to countries with little information availability—such as market size and or potential, institutions that affect investment—is a signal which can negatively influence investors' behavior.

Blaise (2005) and Kimura and Todo (2010) investigate whether FDI flows follow aid flows; this is to say, the authors investigate whether aid attracts FDI. Blaise (2005) considers how FDI responds to Japanese-government aid in select provinces of China, and whether Japanese aid influences the location choice of Japanese private investors. The author examines data from select provinces from 1980 to 1999. Considering aid in the form of physical capital and human capital and infrastructural development, the author concludes that aid and FDI are complements rather than substitutes.

Kimura and Todo (2010) examine the complementarity between aid and FDI in Vietnam. Using data from different provinces in Vietnam, the authors conclude that aid has a positive impact on FDI inflows. Furthermore, the authors point to the positive impact of economic reforms that allowed Vietnam to reduce inflation from 160 percent to less than 10 percent from 1988 to 1997, reduce poverty, and improve trade policies. In Figure 4, I illustrate the rise in FDI to Vietnam from 1988 to 2006. The (accumulated) stock of FDI

as a percent GDP has increased since 1988. This upward trend reveals the positive effects of economic reforms put in place by the government of Vietnam. Additionally, in Figure 4, I illustrate the country's GDP, a measure of the size of the economy that can incentivize investors to direct FDI to the country.



Notes: Figures calculated based on data from World Development Indicator and UNCTADSTAT online databases. FDI = Foreign direct investment. GDP and FDI inflows and stock are measured at 2008 constant prices. The first three series follow the left side vertical axis and the forth series, i.e. FDI inflows, follows the right side vertical axis.

Figure 4. FDI in Vietnam
Source: Wang and Balasubramanyam, V.N., (2011).

Selaya and Sunesen (2012) show that aid draws in higher amounts of FDI when aid is invested in inputs that are complementary to physical capital; such inputs include, for example, education and health. However, when aid is invested directly in physical capital, aid crowds out private foreign investment. Thus, the complementarity of aid and FDI

depends crucially on the composition of aid. The study includes ninety-nine countries with data between 1975 and 2001. On balance, the authors conclude that the combined impact of aid and FDI is positive.

Other studies that examine the relationship between aid and FDI empirically include Harms and Lutz (2006) and Karakaplan et.al (2005). Harms and Lutz (2006) use a sample of low- and middle-income countries whose population is greater than 1 million. They find mixed results. Based on the bivariate case, which does not include controls for recipient-country governance, the authors find the effect of aid on FDI to be significant but negative. However, based on the multivariate case, which includes controls for governance, the authors find the effect of aid on FDI to be insignificant. Additionally, multivariate results lead the authors to conclude that all governance variables are significant.

Bhavan et al. (2010) investigate whether aid attracts FDI in South Asian economies. The authors classify aid as aid for human capital, infrastructural development, and physical capital. Further, based on available data, the authors study the period from 1995 to 2007. The authors draw their results from four different analyses: namely, co-integration, Granger causality, fixed-effect panel regressions, and instrumental-variable techniques. Their sample contains four countries: Bangladesh, India, Sri Lanka, and Pakistan. The authors conclude that aid in the forms of physical capital, human capital, and infrastructural development attracts FDI; this is to say, FDI is a complement to aid and not a substitute.

Karakaplan et. al (2005) propose that aid gives rise to FDI inflows to countries where good governance and developed financial markets exist. Examining a panel data set of 97 countries from 1960 to 2004, the authors hypothesize that countries that receive aid are, in turn, more likely to receive FDI. The authors use political instability and government

effectiveness as indicators that can influence FDI inflows. Finally, the authors conclude that FDI does not necessarily flow to countries that receive aid. Rather, they claim that FDI flows to countries with good governance and developed financial markets.

Garriga and Phillips (2014) conclude that development aid, one type of foreign capital, can attract FDI. However, this conclusion is dependent on whether the nation could use the aid efficiently. Political instability, corruption, and ineffective governance could reduce the efficacy of FDI. Meanwhile, Hooper and Kim (2007) find that high opacity—that is, a lack of transparency—negatively influences firms' decisions to invest abroad. The authors examine three broad categories of international capital flows: namely, FDI, portfolio flows, and international bank lending. The authors show that high levels of opacity in accounting and reporting requirements lead to low levels of financial investment inflows. Ironically, opacity can increase profits for firms that invest abroad, because these firms can exploit opacity in accounting and reporting requirements.

Thangami (2010) examines the relationship between FDI and aid in Southeast Asia and, in doing so, finds mixed results. The author finds aid inflows for human capital and infrastructure Granger cause FDI inflows to Bangladesh, Sri Lanka, and India. Simultaneously, FDI inflows Granger cause aid inflows in the form of physical capital to Sri Lanka, Pakistan, and India. Thus, the direction of intertemporal precedence between aid and FDI is not entirely clear: each flow tends to Granger cause the other.

The literature on the potential intertemporal relationships between aid and FDI that I have reviewed suggests that aid and FDI flows may be related over time. For example, foreign aid directed towards infrastructure and human capital development may create an environment that is conducive to FDI flows. Perhaps investing firms reason that aid

effectively renders a country's economy more conducive to the economic outcomes that FDI-induced improvements in technology, infrastructure, and physical capital could otherwise produce. Of course, FDI flows may attract aid, as well.

4.0. Conceptual Framework

In my analysis, I denote United States government foreign aid to Sub-Saharan African country i at time t as, $aid_{i,t}$; and I denote FDI (from anywhere in the world) to Sub-Saharan African country i at time t as, $FDI_{i,t}$. To model the relationship(s) between $FDI_{i,t}$ and $aid_{i,t}$, I begin with Equation 1, in which I specify in general one possible relationship between the two flows.

$$FDI_{i,t} = f(aid_{i,t}) \qquad \textbf{(1)}$$

Equation 1 implies $FDI_{i,t}$ is a function of $aid_{i,t}$; or, put differently, Equation 1 implies that $aid_{i,t}$ effectively attracts or causes $FDI_{i,t}$. Thus, in Equation 1, I assume the function, $f(.)$, reflects the institutional frameworks of the Sub-Saharan African economies in my sample. In this first specification, these frameworks are, in effect, the processes that determine how, say, country i produces $FDI_{i,t}$ (the output) from United States government foreign aid, ($aid_{i,t}$; the input). For the simplicity of this exposition, I suppress notation reflecting unobserved heterogeneity in the form of differences in institutional frameworks across countries; though, I control for this heterogeneity in my corresponding (fixed effect) panel regressions.

I reason that FDI follows aid based on the work of Kosack and Tobin (2006) and Alfaro et al. (2010). For example, Kosack and Tobin (2006) show that foreign aid positively affects human capital and human development. Additionally, Alfaro et al. (2010) report

that an increase in foreign direct investment stimulates competition domestically and introduces new technology. Finally, I reason that before relying on technical assistance, it is important to have an educated and healthy human capital stock in place that can exploit the technical assistance associated with aid for the highest possible returns. For example, an interpretation of Equation 1 is that foreign aid directed to Nigeria improves human capital, effectively increasing labor supply. This pattern, in turn, attracts foreign private investors who direct FDI to Nigeria.

Of course, Equation 1 reflects one side of the argument. In Equation 2, I specify an alternative relationship between the two flows.

$$aid_{i,t} = g(FDI_{i,t}) \qquad \textbf{(2)}$$

Equation 2 implies $aid_{i,t}$ is a function of $FDI_{i,t}$; or, put differently, Equation 2 implies that $FDI_{i,t}$ causes $aid_{i,t}$. Thus, in Equation 2, I assume the function, $g(.)$, reflects the institutional frameworks of the Sub-Saharan African economies in my sample. In this second specification, these frameworks are, in effect, the technologies that determine how, say, country i produces United States government foreign aid ($aid_{i,t}$; the output) from $FDI_{i,t}$ from the rest of the world (the input). Again, for the simplicity of this exposition, I suppress notation reflecting unobserved heterogeneity in the form of institutional frameworks across countries, which I control for in my corresponding (fixed effect) panel regressions.

I reason that aid follows FDI based on the work by Asiedu (2002, 2006). The author shows that natural-resource endowments and strong infrastructure together induces FDI in Sub-Saharan Africa and thereby improves physical capital accordingly. I reason that for

economic growth to take place, both physical capital and human capital are necessary. With physical capital in place because of FDI, foreign aid could follow FDI. For example, an interpretation of Equation 2 is that Angola—which exports petroleum and diamonds, natural resources that require advanced technology to extract—benefits from FDI that builds the necessary technological infrastructure and transfers the necessary knowledge. This FDI coupled with aid inflows deepens human capital. In this way, private firms and government agencies could effectively work together to deploy FDI and aid.

Perhaps a more intriguing interpretation of Equation 2 is that aid and the positive economic outcomes it intends also benefits the donor country—in my case, the United States. Thus, for example, because United States government foreign aid seeks to improve trade relations between the United States and the recipient countries as well as to bolster national security and reduce cybercrime, United States aid agencies may be drawn to countries where economic activity is rising due, in part, to FDI flows.

In any case, I reason, based on the work of Harms and Lutz (2006) and Karakplan et al. (2005), that the effects of governance variables on aid and FDI flows can be significant. Because the extant literature indicates that institutional variables affect flows of aid and FDI, in my estimable versions of Equations 1 and 2, I include three institutional controls: namely, corruption control, government effectiveness, and political stability, which are likely related. For example, government effectiveness and or corruption control increases with high political instability.

Finally, I also include GDP as a control. Broadly speaking, GDP is an indicator of an economy's performance. As such, GDP could influence foreign aid and FDI inflows. FDI brings in new technology that domestic firms could use. Apart from technology, FDI also

brings in new knowledge—on-the-job training, for example. The returns to these investments and the returns to aid may depend on the recipient-country GDP.

With this reasoning, I investigate whether aid and FDI are intertemporally related in Sub-Saharan Africa. Additionally, I check whether, over time, aid follows FDI or vice versa; to do so, I use a panel Granger-causality test that I describe in section 5.2.

5.0. Data, Empirical Results, and Robustness Checks

5.1. Data

I collected data on United States government foreign aid and FDI from USAID and UNCTAD, respectively. I collected data on institutional governance variables—namely, corruption control, government effectiveness, and political stability—from the World Bank. I begin my data set in 1991 and I end my data set in 2018. My balanced panel consists of twenty-three countries from Sub-Saharan Africa; in Table 1, I list the twenty-three countries. I use the data available to make a balanced panel consisting of the twenty-three countries in Table 1.

5.2. Empirical Results

In Table 4, I report select summary statistics for the principal variables associated with the twenty-three Sub-Saharan countries in my sample. These variables are United States government foreign aid (aid), FDI, GDP, a (recipient) government effectiveness index (g_eff), a corruption-control index (c_con), and a political-stability index (p_stab). According to Table 4, since 1991, the mean annual amount of United States government foreign aid to the twenty-three countries in my sample is $108 million. The corresponding mean annual amount of FDI is $379.8 million. Finally, the mean annual level of GDP across the twenty-three countries is over $200 million.

Table 4. Summary Statistics of Balanced Panel [in US $ millions]

Variable	Obs	Mean	Std Dev	Min	Max
Aid	644	108	180	0.0598	1150
FDI	644	379.8	1153.7	-7397.3	10028.2
GDP	643	200	58800	206	547000
G_eff	414	30.30	18.85	0.51	80.30
C_con	414	31.66	19.41	1.50	75.50
P_stb	414	33.92	20.31	0.97	93.75

Source: USAID, UNCTAD, World Bank

For the governance variables, each is an index in which a value of 100 indicates the highest level of governance, the mean annual percentile for government effectiveness index is 30.30 percent. Mean percentile rank for corruption control is 31.66 percent. Finally, mean annual percentile rank of the political stability index 33.92 percent.

The range for all government variables is between 0.51 to 93.75. Thus, measures of the institutions of government vary substantially across countries and time. In Table 5, I report country-specific summary statistics for a sub sample of countries in my dataset; I report the full list in Appendix 3. Measures of institutions—g_eff, c_con, and p_stb—are percentile ranks that indicate where a country is positioned in relation to others with respect to institutional framework. For example, Chad's government-effectiveness index (g_eff) is 11.16, thus 88.4 percent of countries to which this index applies rank higher than Chad. Mean annual measures of political stability (p_stb) and government effectiveness (g_eff) are 16.58 and 25.64, respectively. Senegal's corruption control ranked at 61.61; this implies that 38.38 percent of the countries to which this index applies ranked higher than Senegal.

Political stability and government effectiveness ranked at 57.65 and 46.6, respectively, for Senegal. Table 4 shows when all 23 countries are considered, corruption control ranked at 75.50; this implies 24.5 percent ranked higher.

In any case, these summary statistics on the institutions of government are important, because countries with weak institutions presumably dissuade donor countries and private investment interests from deploying funds to those countries. Put differently, we would expect donor countries and private interests to direct funds to countries where indicators such as government effectiveness, corruption control, and political stability are high.

Thus, based on the results from Tables 4 and 5, I reason that institutions of government are important drivers of United States government foreign aid and FDI. As I indicate in my review of literature (Chapter 3), Zweifel and Navia (2003) show that democracies (with presumably strong institutions) fare better than autocracies (with presumably weak institutions); and Farag et al. (2009) show that aid fungibility can negatively affect the economy. Thus, having a strong institutional framework is important.

Furthermore, the institutional fragilities are likely correlated through time. In Figures 5 and 6, I illustrate, for five select countries in my sample, times series of the government-effectiveness index and the corruption-control index, respectively. Take Guinea-Bissau as an example. The government-effectiveness and corruption-control indexes for Guinea-Bissau are each relatively low. I reason low corruption control can lead to government ineffectiveness. This is because low corruption control can lead both domestic institutions and donor and private agencies to exploit the institutional framework in place.

Table 5. Country Specific Statistics [in US $ million]

Angola

Variable	Obs	Mean	Std Dev	Min	Max
Aid	28	71.1	31.1	6.85	165
FDI	28	-60.0109	3567.685	-7397.3	10028.22
GDP	28	53500	50000	4440	146000
G_eff	18	11.58006	3.812441	3.589744	17.22488
C_con	18	5.679884	2.306732	1.522843	11.53846
P_stb	18	27.20703	9.997511	1.587302	37.91469

Chad

Variable	Obs	Mean	Std. Dev.	Min	Max
Aid	28	70.9	66.5	1.866	214
FDI	28	186.7042	340.4556	-675.545	924.1192
GDP	28	6190	4630	1180	13900
G_eff	18	7.787425	6.035307	2.427185	25.64103
C_con	18	4.874872	2.397414	1.456311	11.16751
P_stb	18	9.837072	3.819301	4.326923	16.58768

Gambia

Variable	Obs	Mean	Std Dev	Min	Max
Aid	28	5.926	5.018	1.916	19.1
FDI	28	31.74732	23.54257	-27.7	82.20818
GDP	28	1070	357	487	1670
G eff	18	29.24358	5.465048	18.75	37.94872
C con	18	31.94687	7.366658	21.63461	46.9697
P stb	18	47.57738	8.16363	30	69.31217

Senegal

Variable	Obs	Mean	Std Dev	Min	Max
Aid	28	97.7	123	20.4	657
FDI	28	214.5099	208.3392	-7.44398	847.8416
GDP	28	121000	586	4910	23200
G eff	18	43.42549	6.468632	34.44976	57.65306
C con	18	49.66724	9.737055	30.47619	61.61616
P stb	18	38.67662	4.434365	27.51323	46.60194

Full list of countries in appendix 3

Nazeer and Masih (2017), Kosack and Tobin (2006), and Karakaplan et al. (2005) demonstrate the importance of a good institutional framework. Karakaplan et al. (2005) found countries with good governance received more aid in a panel of ninety-seven countries. Kosack and Tobin (2006) showed that aid effectiveness increased in countries where the institutional framework is sound—practically speaking, index measures such as political stability and corruption control are high. Finally, Nazeer and Masih (2017) showed that FDI inflows to Malaysia were negatively impacted by low levels of political stability.

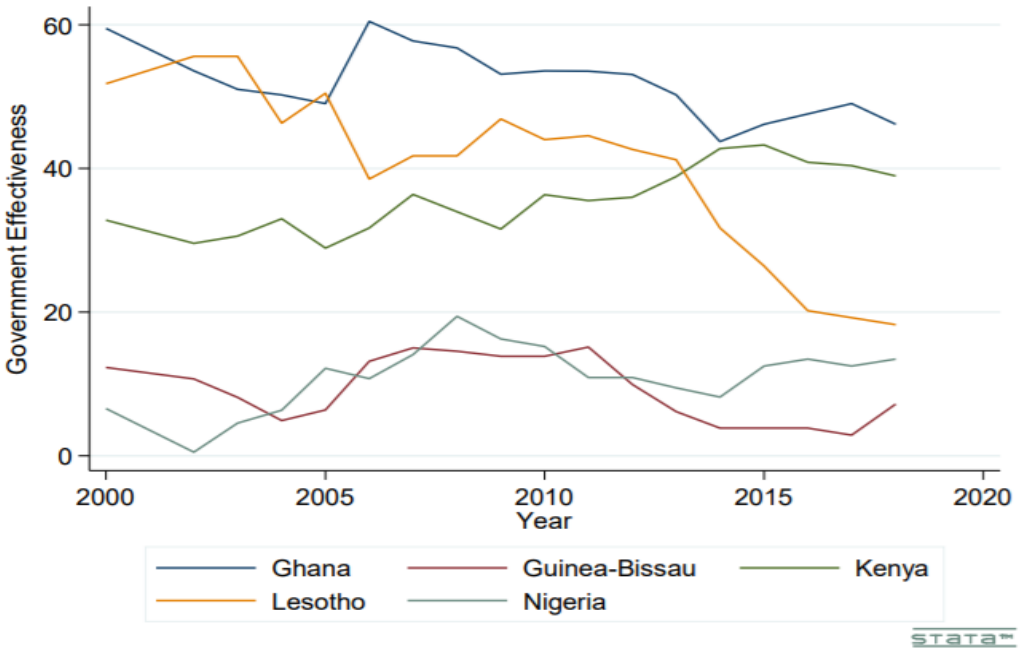


Figure 5. Government Effectiveness Percentile Rank
[Source: World Bank]

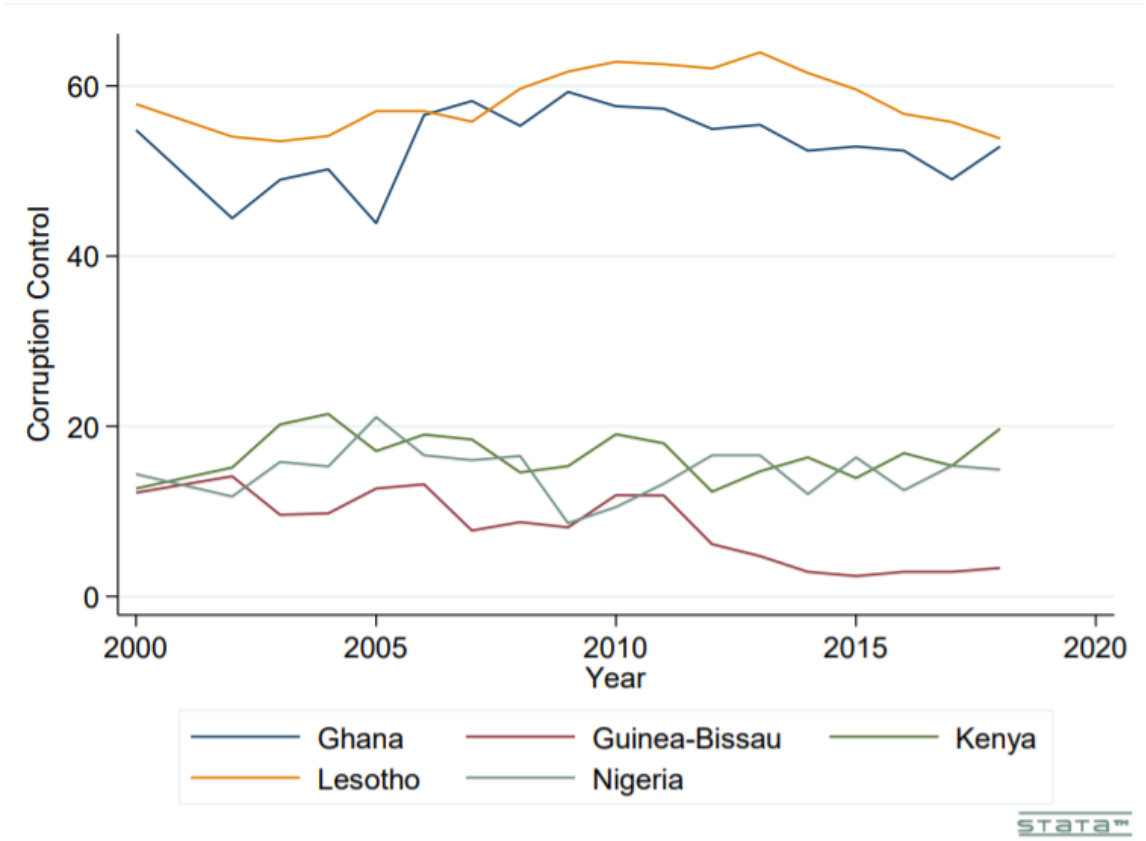


Figure 6. Corruption Control Percentile Rank
[Source: World Bank]

To test my central hypothesis that United State government foreign aid flows and FDI flows are intertemporally related in the ways that I propose in Equations 1 and 2 of my conceptual framework (Chapter 4), I estimate fixed-effects panel-regression models that take the general forms of Equations 3 and 4, where $x_{i,t}$ is the vector of observable institutional-control variables—namely, corruption control, government effectiveness, and political stability—that vary across country i and across time t; c_i captures unobserved heterogeneity across countries, and $u_{i,t}$ is an idiosyncratic error.

$$FDI_{i,t} = x_{i,t}\alpha + \beta_1 aid_{i,t-1} + \beta_2 gdp_{i,t} + c_{i,t} + u_{i,t} \quad (3)$$

$$aid_{i,t} = x_{i,t}\delta + \gamma_1 FDi_{i,t-1} + \gamma_2 gdp_{i,t} + c_{i,t} + u_{i,t} \quad (4)$$

Finally, based on Equations 3 and 4, I also conduct a (panel) Granger-causality test to determine the extent of temporal precedence between aid and FDI. To the extent that institutions of government are time invariant (across the relatively short timeframe that my dataset includes), their effects on aid and FDI flows may be captured by fixed-effects estimators, in which case I would not expect the indexes on their own to be significant.

I model the intertemporal relationships between aid and FDI by lagging the independent variable: namely, $aid_{i,t-1}$ in Equation 3 and $FDI_{i,t-1}$ in Equation 4. Before reporting the results of my panel regression tests, I report unit-root test results for aid and FDI. A unit root test is important because it indicates whether the data are stationary or not. The panel regressions and Granger-causality tests that follow are not appropriate if the data contain unit roots. I perform four panel unit-root tests: namely, Levin-Lin-Chu, Harris Tzavalis, Breitung, and Fisher. For each test, I have chosen a (default) lag length of 1. The null hypothesis of each test is that the panels contain unit roots; the alternative hypothesis is that the panels are stationary.

Taken together, the results of the unit-root tests are somewhat inconclusive. The p-values (of 0.1935 and 0.8047, respectively) for Levin-Lin-Chu and Breitung unit-root tests for aid are greater than 0.01, hence based on these tests, I fail to reject the null hypothesis that the panel contains unit roots. However, the p-values for the Harris-Tzavalis and Fisher tests are each 0.00; thus, based on these tests, I reject the null hypothesis and conclude the panel is stationary.

Similarly, in the case of FDI, the p-values (of 0.0841 and 0.0834, respectively) for Levin-Lin-Chu and Breitung unit-root tests are greater than 0.01 (though not greater than 0.10), hence based on these tests, I fail to reject the null hypothesis and conclude the panel contains unit roots. However, the p-values for Harris-Tzavalis and Fisher tests are 0.000 and 0.0005, respectively; thus, based on these tests, I reject the null hypothesis and conclude the panel is stationary.

For now, I presume the times series data in my panel regressions are stationary and I proceed accordingly. In my robustness checks (section 5.3), I address the inconclusive nature of my unit-root tests. Thus, in Tables 6 and 7, I report the results of my fixed-effects panel-regressions in which I include United States government foreign aid and FDI in levels.

In Table 6, I report results based on equation 3, where the dependent variable is $FDI_{i,t}$. In column 1, I report the results of a baseline OLS (pooled) regression. In this case, I obtain a coefficient estimate of β_1, the term attached to the lagged independent variable, $aid_{i,t-1}$, of 2.712; this coefficient estimate is statistically significant at the 0.01 percent level. I interpret this coefficient estimate to mean a $1 increase in United States government foreign aid to the recipient country is correlated with a $2.71 increase in FDI from anywhere in the world to the recipient country. In this regression, I obtain an R-squared value of 0.162; this implies the model explains 16.2 of the variation in the dependent variable $FDI_{i,t}$.

Table 6. Panel Regression Results, FDI as Dependent Variable

VARIABLES	(1) FDI	(2) FDI	(3) FDI	(4) FDI	(5) FDI	(6) FDI	(7) FDI
l_aid	2.712***	2.540***	1.837***	1.463**	1.449**	1.471**	1.476*
	(0.468)	(0.900)	(0.582)	(0.549)	(0.541)	(0.541)	(0.839)
l_GDP			0.00539**	0.00603***	0.00612***	0.00616***	0.00536***
			(0.00241)	(0.00212)	(0.00212)	(0.00194)	(0.00179)
G_eff				-2.311e+07	-2.779e+07*	-2.384e+07*	-2.379e+07
				(1.412e+07)	(1.559e+07)	(1.366e+07)	(1.520e+07)
C_con					7.867e+06	1.075e+07	1.089e+07
					(8.817e+06)	(9.325e+06)	(1.085e+07)
P_stb						-1.256e+07	-1.145e+07
						(1.074e+07)	(1.095e+07)
Constant	1.089e+08**	1.261e+08	9.599e+07	8.681e+08*	7.604e+08*	9.716e+08	9.249e+08
	(4.473e+07)	(8.993e+07)	(5.631e+07)	(4.272e+08)	(4.334e+08)	(5.717e+08)	(6.032e+08)
Observations	644	644	642	414	414	414	414
R-squared	0.162	0.122	0.151	0.102	0.103	0.112	0.146
Country FE	No	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	No	No	No	No	No	No	Yes
Robust SE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Number of countries		23	23	23	23	23	23

Robust standard errors in parentheses: *** p<0.01, ** p<0.05, * p<0.1
Aid: Current Aid; FDI: Foreign Direct Investment; GDP: Gross Domestic Product
G_eff: Government Effectiveness; C_con: Corruption Contribution.
P_stab: political Stability

In column 2, I report results of my first fixed-effects panel regression. I obtain a coefficient estimate of β_1 2.54. This coefficient estimate is statistically significant at the 0.01 percent level. I interpret this coefficient estimate to mean a $1 increase in United States government foreign aid to the recipient country is correlated with a $2.54 increase in FDI from anywhere in the world to the recipient country. In this regression, I obtain an R-squared value of 0.122; this implies the model explains 12.2 percent of the variation in the dependent variable, $FDI_{i,t}$.

In column 3, I report fixed-effects results where I include GDP as an independent variable. I reason that a country's GDP is an important indicator to donor agencies and

private investment interests alike. A country's GDP is an indicator of the economy's size, something donor agencies and private entities likely use to estimate returns on investment. I obtain a coefficient estimate on $gdp_{i,t}$ of 0.00539; this coefficient estimate is statistically significant at the 0.05 percent level. I interpret this coefficient to mean a $1 increase in GDP of the recipient country is correlated with a $0.0054 increase in FDI from the rest of the world to the recipient country. Additionally, I obtain an R-squared value of 0.151; this implies the model explains 15.1 percent variation in the dependent variable, $FDI_{i,t}$.

In columns 4 through 7, I add additional controls. Here, I discuss the results I obtain in column 6, based on a fixed-effects panel regression in which I include all three institutional-control variables but no year fixed effects. I obtain a coefficient estimate on $aid_{i,t-1}$ of 1.471; this coefficient is statistically significant at the 0.05 percent level. I interpret this to mean a $1 increase in United States government foreign aid results in a $1.47 increase in FDI from the rest of the world to the recipient country. I obtain an R-squared value of 0.112; thus, this model explains 11.2 percent in the independent variable, $FDI_{i,t}$.

In Table 7, I report results based on Equation 4, in which my dependent variable is $aid_{i,t}$. In column 1, I report the results of a baseline OLS (pooled) regression. In this case, I obtain a coefficient estimate of β_1, the term attached to the independent variable, $FDi_{i,t-1}$, of 0.0659; this coefficient estimate is statistically significant at the 0.01 percent level. I interpret this coefficient to mean a $1 increase in FDI from anywhere in the world to the recipient country is correlated with a $0.07 increase in United States government foreign

aid to the recipient country. In this regression, I obtain an R-squared value of 0.157: thus, this model explains 15.7 percent of the variation in the dependent variable, $aid_{i,t}$.

In column 3, I report fixed-effects panel regression results of the effect of GDP on aid. I obtain a coefficient estimate on $gdp_{i,t}$ of 0.00158; this coefficient estimate is statistically significant at the 0.01 percent level. I interpret this coefficient to mean a $1 increase in the GDP of the recipient country is correlated with a $ 0.0016 increase in United States government foreign aid to the recipient country. Finally, in this regression, I obtain an R-squared value of 0.272; thus, the model, when I consider lagged FDI and lagged GDP, explains 27.2 percent of the variation in the dependent variable $aid_{i,t-1}$.

In columns 4 through 7, I add additional controls. Here, I discuss the results I obtain in column 6, based on a fixed-effects panel regression in which I include all three institutional-control variables but no year fixed effects. I obtain a coefficient estimate on $FDi_{i,t-1}$ of 0.0210. This coefficient is not statistically like those in columns 1 through 5 and 7. I interpret this to mean a $1 increase in GDP of the recipient country will result in $0.02 increase in FDI to the recipient country from the rest of the world. I obtain an R-squared value of 0.202; thus, this model explains 20.2 percent in the dependent variable, $aid_{i,t}$.

Table 7. Panel Regression Results, Aid as Dependent Variable

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
VARIABLES	AID	AID	AID	AID	AID	AID	AID
l_FDI	0.0659***	0.0512	0.0337*	0.0211*	0.0212*	0.0210	0.0159**
	(0.0132)	(0.0307)	(0.0173)	(0.0121)	(0.0120)	(0.0124)	(0.00622)
l_GDP			0.00158***	0.00157***	0.00158***	0.00158***	0.00101***
			(0.000392)	(0.000382)	(0.000376)	(0.000380)	(0.000182)
G_eff				-1.445e+06	-2.203e+06	-2.159e+06	42,535
				(2.290e+06)	(2.994e+06)	(3.134e+06)	(3.205e+06)
C_con					1.284e+06	1.319e+06	-890,782
					(2.189e+06)	(2.154e+06)	(2.294e+06)
P_stb						-154,137	-36,593
						(1.209e+06)	(1.070e+06)
Constant	8.490e+07***	9.012e+07**	6.672e+07***	1.441e+08*	1.262e+08*	1.289e+08*	5.789e+07
	(7.075e+06)	(1.092e+07)	(9.714e+06)	(7.328e+07)	(6.438e+07)	(6.272e+07)	(5.295e+07)
Observations	643	643	641	414	414	414	414
R-squared	0.157	0.118	0.272	0.200	0.202	0.202	0.345
Country FE	No	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	No	No	No	No	No	No	Yes
Robust SE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Number of countries		23	23	23	23	23	23

Robust standard errors in parentheses: *** p<0.01, ** p<0.05, * p<0.1
Aid: Current Aid; FDI: Foreign Direct Investment; GDP: Gross Domestic Product
G_eff: Government Effectiveness; C_con: Corruption Contribution.
P_stab: political Stability

The results that I report in Tables 6 and 7 show that lagged FDI has a larger effect on United States government foreign aid than aid has on FDI. In any case, these results do not show whether United States government foreign aid and FDI are intertemporally related (in the sense of Granger causality). To assess causality between aid and FDI, I perform a panel Granger-causality test (Thangami, 2011; Bhavan et al. 2010). The panel Granger-causality test is used to investigate causality, in the sense of temporal precedence, between two time series variables in a panel regression; in my case, these two variables are United States government foreign aid and FDI.

Granger (1969) investigated the causal relationship between variables econometrically. In an analysis consisting of two variables X and Y, the author demonstrates that if the null hypothesis is rejected, where the null hypothesis is X does not Granger cause Y, one can conclude that X Granger causes Y. Results from the test show the Wald statistic (W-bar), standardized statistic (Z-bar), and approximated standardized statistic (Z-bar tilde). To test the null hypothesis that X does not Granger-cause Y, I use the Z-bar and Z bar tilde test statistics. In either case, if the p-value is less than that associated with the appropriate significance level, I reject the null hypothesis (that X does not Granger-cause Y).

I report the results of my panel Granger-causality tests in Tables 8 and 9. In Table 8, I report test results for the null hypothesis, United States government foreign aid does not Granger-cause FDI. I test this causal relationship with 7 lags of the hypothesized independent variable in this case, *aid*, based on the Akaike Information Criterion. In this case, the p-value is less than the significance level; therefore, I reject the null hypothesis and accept the alternative hypothesis: that is, United States government foreign aid does Granger-cause FDI in at least one country in the panel.

Table 8. Granger Causality Test Results: Whether Aid Granger-causes FDI

Optimal number of lags (AIC): 7 (lags tested: 1 to 7)

W-Bar	25.5402	
Z-Bar	23.7637	(p-value = 0.0000)
Z-bar tilde	3.3739	(p-value = 0.0007)

H0: Aid does not Granger-cause FDI.
H1: Aid does Granger-cause FDI for at least one country in the panel.

This test implies that, at least for some countries in my panel dataset, FDI flows from anywhere in the world follow United States government foreign aid flows. These results also imply that foreign aid is required before FDI, I presume because human capital improvement (to which aid is relatively well suited) is needed before technical advancement (to which FDI is relatively well suited). Furthermore, having technical assistance once human capital is in place benefits the country. Aid directed towards human capital and human capital development allows the recipient country to build its labor force so as take full advantage of technical advancements.

In Table 9, I report test results for the null hypothesis, FDI does not Granger-cause United States government foreign aid. Again, I test this causal relationship with 7 lags of the hypothesized independent variable in this case, *FDI*, based on the Akaike Information Criterion. In this case, the p-value is again less than the significance level; therefore, I reject the null hypothesis and accept the alternative hypothesis: that is, FDI Granger-causes United States government foreign aid in at least one country in the panel.

Table 9. Granger Causality Test Results: Whether FDI Granger-causes Aid

Optimal number of lags (AIC): 7 (lags tested: 1 to 7)

W-Bar	81.9327	
Z-Bar	90.0442	(p-value = 0.0000)
Z-bar tilde	17.0882	(p-value = 0.0000)

H0: FDI does not Granger-cause Aid.
H1: FDI does Granger-cause Aid for at least one country in the panel.

I interpret evidence that FDI Granger- causes United States government foreign aid to mean that technical advancement, knowledge transfer, and physical capital improvements attract aid, in part in the form of improvements in human capital, presumably. Kosack and Tobin (2006) show that aid significantly influences human development and human capital, and FDI impacts physical capital. Therefore, having the necessary technical assistance in place initially is important. If human capital improves without technical advancements and knowledge transfer, the marginal returns of improved human capital will be less than otherwise. Results from Table 8 support this reasoning.

Additionally, Table 8 results could reflect the geostrategic dynamic of foreign aid. Garriga and Phillips (2014) and Wamboye et al. (2013) mention geostrategic aid does not help the country progress. However, non-geostrategic aid does. I mention in chapter 3 that United States aid could benefit the United States firms that rely on developing countries for production. That is, aid could effectively expand markets and deepen human capital, thus improving prospects for United States firms operating in countries that receive United States government foreign aid.

Furthermore, I reason that US government foreign aid follows FDI in the case of Sub-Saharan Africa because that region is important to the United States. In chapter 2, I mention that for national security concerns, business opportunities, and natural resources, Sub-Saharan Africa is important to the United States, independently of whether aid benefits the recipient countries.

In summary, the Granger-causality results that I report in Tables 8 and 9 imply bidirectional Granger causality between United States government foreign aid and FDI. These results are qualitatively like those that Thangami (2010) report for the case of Southeast Asia, for example. Finally, because the Granger-causality tests indicate an optimal lag length of 7 based on the Akaike Information Criterion, in Tables 10 and 11, I report panel regression results akin to those I report in Tables 6 and 7, though in this case I use a lag length of 7. Based on the 5-percent significance level, my results are substantively like those I report in Tables 6 and 7.

Table 10. Panel Regression Results, FDI in First Differences as Dependent Variable

FDI	Coef	Std Err	t	P>|t|	95% Conf	Interval
l_aid	0.4847203	0.4406004	1.10	0.283	-0.429029	1.39847
l2_aid	0.9752847	0.3258908	2.99	0.007	0.299428	1.651141
l3_aid	0.4829491	0.3278186	1.47	0.155	-0.196905	1.162803
l4_aid	1.08822	0.5827738	1.87	0.075	-0.120379	2.296819
l5_aid	0.74483	0.5435407	1.37	0.184	-0.382404	1.872064
l6_aid	-0.0507479	0.4932815	-0.10	0.919	-1.073751	.9722552
l7_aid	-0.0210876	0.4225025	-0.05	0.961	-0.8973042	.8551289
_cons	7.33e+07	1.31e+08	0.56	0.583	-1.99e+08	3.46e+08
Sigma U	4.574e+08					
Sigma e	9.790e+08					
Rho	.17914751	(fraction of variance due to u_i)				

Table 11. Panel Regression Results, Aid in First Differences as Dependent Variable

Aid	Coef	Std Err	t	P>|t|	95% Conf	Interval
l_FDI	0.0222375	0.0090257	2.46	0.022	0.0035194	0.0409556
l2_FDI	0.0132903	0.0063827	2.08	0.049	0.0000533	0.0265272
l3_FDI	0.0337292	0.010292	3.28	0.003	0.0123849	0.0550735
l4_FDI	0.0192407	0.0073514	2.62	0.016	0.0039948	0.0344866
l5_FDI	0.0251857	0.0080571	3.13	0.005	0.0084764	0.041895
l6_FDI	0.0082161	0.0077538	1.06	0.301	-0.0078644	0.0242965
l7_FDI	0.0352074	0.0289537	1.22	0.237	-0.0248388	0.0952537
_cons	6.74e+07	1.42e+07	4.76	0.000	3.80e+07	9.67e+07
Sigma U	96705187					
Sigma e	1.273e+08					
rho	.36609051	(fraction of variance due to u_i)				

5.3. Robustness Checks

The unit-root test results that I report in section 5.2 are somewhat inconclusive. In that section, I presume the time series data in my panel regressions are stationary and I proceed accordingly. Here, I address the inconclusive nature of my unit-root tests. To do so, I take first differences of the time series (namely, United States government foreign aid and FDI), test for unit roots in these first-differenced data, and test for Granger-causality accordingly. Again, the unit root tests I perform are the Levin-Lin-Chu, the Harrais-Tzavalis, the Breitung, and the Fisher unit root tests. In each test, I reject the null hypothesis (based on a p-value of 0.00 in each case) that the panel contains unit roots and, thus, I conclude that the panel of first-differenced series is stationary.

Next, I test my panel of first-differenced (and stationary) data for Granger-causality. In Tables 12 and 13, I report results. In Table 12, I report test results for the null hypothesis, United States government foreign aid does not Granger-cause FDI. I test this causal relationship with 7 lags of the hypothesized independent variable in this case, the first difference of *aid*, based on the Akaike Information Criterion. In this case, the p-value

associated with the Z-bar test statistic is less than the significance level; therefore, I reject the null hypothesis and accept the alternative hypothesis: that is, United States government foreign aid does Granger-cause FDI in at least one country in the panel.

Table 12. Granger Causality Test Results: Whether Aid Granger-Causes FDI, in First Differences

Optimal number of Lags (AIC): 7 (lags tested: 1 to 7)

W-Bar	17.0652	
Z-Bar	12.9010	(p-value = 0.0000)
Z-bar tilde	1.3129	(p-value = 0.1892)

H0: dAid does not Granger-cause dFDI.
H1: dAid does Granger-cause dFDI for at least one country in the panel.

Table 13. Granger Causality Test Results: Whether FDI Granger-Causes Aid, in First Differences

Optimal number of Lags (AIC): 7 (lags tested: 1 to 7)

W-Bar	57.4732	
Z-Bar	64.6935	(p-value = 0.0000)
Z-bar tilde	11.1398	(p-value = 0.0000)

H0: dFDI does not Granger-cause dAid.
H1: dFDI does Granger-cause dAid for at least one country in the panel.

In Table 13, I report test results for the null hypothesis, FDI does not Granger-cause United States government foreign aid. Again, I test this causal relationship with 7 lags of the hypothesized independent variable in this case, the first difference of *FDI*, based on the Akaike Information Criterion. In this case, the p-value is less than the significance level; therefore, I reject the null hypothesis and accept the alternative hypothesis: that is, FDI

does Granger-cause United States government foreign aid in at least one country in the panel.

Finally, because the Granger-causality test indicates an optimal lag length of 7 based on the Akaike Information Criterion, in Tables 14 and 15, I report panel regression results akin to those I report in Tables 10 and 11. Based on the 5-percent significance level, my results are substantively like those I report in Tables 10 and 11.

Table 14. Panel Regression Results, FDI in First Differences as Dependent Variable

dAid	Coef	Std Err	t	P>|t|	95% Conf	Interval
l_dFDI	-0.0058402	0.0063162	-0.92	0.365	-0.0189392	0.0072589
l2_dFDI	0.005613	0.0033453	1.68	0.108	-0.0013248	0.0125508
l3_dFDI	0.0043677	0.0045887	0.95	0.352	-0.0051487	0.0138842
l4_dFDI	0.0059155	0.0043667	1.35	0.189	-0.0031405	0.0149715
l5_dFDI	0.0038594	0.0032276	1.20	0.245	-0.0028342	0.0105531
l6_dFDI	0.0043149	0.005963	0.72	0.477	-0.0080516	0.0166813
l7_dFDI	0.0198265	0.016914	1.17	0.254	-0.015251	0.0549039
_cons	7617940	435899.5	17.48	0.000	6713940	8521941
Sigma U	9771108					
Sigma e	1.012e+08					
rho	.00924153	(fraction of variance due to u_i)				

Table 15. Panel Regression Results, Aid in First Differences as Dependent Variable

dFDI	Coef	Std Err	T	P>|t|	95% Conf	Interval
l_daid	-0.3203692	0.1856533	-1.73	0.098	-0.7053906	0.0646522
l2_daid	0.4525449	0.2155658	2.10	0.047	0.0054889	0.8996009
l3_daid	0.3127614	0.3222192	0.97	0.342	-0.3554804	0.9810033
l4_daid	0.9947003	0.5735539	1.73	0.097	-0.1947777	2.184178
l5_daid	0.9451505	0.5471751	1.73	0.098	-0.1896212	2.079922
l6_daid	0.1287615	0.3636228	0.35	0.727	-0.6253459	0.882869
l7_daid	0.2075158	0.2322174	0.89	0.381	-0.2740737	0.6891052
_cons	1.07e+07	1.02e+07	1.04	0.308	-1.05e+07	3.19e+07
Sigma U	69357802					
Sigma e	8.913e+08					
rho	0.00601845	(fraction of variance due to u_i)				

6.0 Conclusion

In this thesis, I test my central hypothesis that United States government foreign aid flows and FDI flows (from anywhere in the world) to Sub-Saharan Africa are intertemporally related; this is to say, I test the extent to which FDI flows follow—and, thus, are caused by—aid flows or to what extent aid flows follow—and, thus, are caused by—FDI flows. Additionally, I argue why and test whether governance variables such as political stability, government effectiveness, and corruption control affect how much United States government foreign aid and or FDI a country attracts.

My panel dataset of twenty-three Sub-Saharan countries spans 1991 to 2018. Based on the results of pooled-OLS and panel fixed-effects regressions, and panel Granger causality tests, I show that aid and FDI are intertemporally related, and that political stability, government effectiveness, and corruption control measures affect the inflow of aid and or FDI to countries in my sample. Additionally, Granger-causality is bidirectional: FDI Granger-causes United States government foreign aid and this aid Granger-causes FDI.

Perhaps most interestingly, evidence that FDI Granger-causes United States government foreign aid reveals a possible geostrategic motive behind the decisions of United States agencies to deploy aid to Sub-Saharan Africa. In principle, such motives include improving trade relations—and, thus, expanding export-market opportunities for United States firms—and strengthening national security. Given the strong evidence that I present indicating United States government aid and FDI are intertemporally related and given that FDI presumably generates returns for firms that provide FDI, an additional motive behind the decisions of United States agencies

to deploy aid to Sub-Saharan Africa could be to advantage United States firms that direct FDI to the region.

In any case, evidence of bidirectional intertemporal relationships between United States government foreign aid flows and FDI flows could inform policy makers intent on using aid or FDI as policy instruments to improve economic well-being in recipient countries, based on whether policy makers reason aid or FDI flows are beneficial. For example, considering my evidence that United States government foreign aid flows induce FDI flows, if policy makers reason FDI flows improve economic well-being in recipient countries, then policy makers should be aware of this intertemporal relationship when they decide how and where to deploy aid.

Finally, the limitations of my study point to at least two important directions for future research. First, my panel regression specification in which I include FDI as the dependent variable and United States government foreign aid as the independent variable (of primary interest) likely suffers from an omitted-variable bias: for example, aid from outside the United States government—a variable I omit—may very well be correlated with FDI and United States government foreign aid; thus, my estimated coefficient on aid may be biased. An instrumental-variable approach is one way that future research might address this limitation.

Second, I define aid in the aggregate—the sum of USAID-deployed foreign aid plus foreign aid deployed separately by other United States government agencies such as the Departments of Agriculture and Department of Health and Human Services, for example. Thus, I cannot identify the intertemporal relationships between types of United States government foreign aid and FDI. Disaggregating aid to the

agency level is one way that future research might address this limitation. Additionally, I only include twenty-three countries because I want to construct a balanced panel. Future studies can include more countries based on the availability and accuracy of the necessary data.

7.0. References

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Appendix 1: Correlations of United States Government Foreign Aid and FDI

Country	Correlation
Angola	-0.0066
Benin	0.4768
Burkina Faso	0.2719
Burundi	0.0632
Cabo Verde	0.0895
Chad	0.3327
Cote d'Ivoire	0.7566
Gambia	-0.0782
Ghana	0.5897
Guinea	0.3255
Guinea-Bissau	0.0855
Kenya	0.8857
Lesotho	0.3474
Liberia	0.5225
Malawi	0.4484
Mozambique	0.5930
Namibia	0.6027
Niger	0.5175
Nigeria	0.9037
Rwanda	0.8306
Senegal	0.5112
Sierra Leone	0.2519
Tanzania	0.8423
Togo	-0.1284
Uganda	0.9042
Zimbabwe	0.6359

Source: UNCTAD and USAID.

Appendix-2 Alphabetical listing of US Funding Agencies

Data base contains support to various countries under following headings. support from following agencies is listed in alphabetical order. The funding data base is "US aid data". This econometric analysis of USAID-Administered aid obligated. The data is taken from https://explorer.usaid.gov/cd

African Development Foundation
Agency for International Development, Capital Investment Fund
Agency for International Development, Child Survival and Health Programs Fund
Agency for International Development, Complex Crises Fund
Agency for International Development, Development Assistance
Agency for International Development, Development Assistance, Sub-Saharan Africa
Agency for International Development, Development Credit Authority
Agency for International Development, Gifts and Donations
Agency for International Development, HIV/AIDS Working Capital Fund
Agency for International Development, International Assistance Program, Transition Initiatives
Agency for International Development, International Disaster Assistance
Agency for International Development, Office of Inspector General, Operating Expenses
Agency for International Development, Operating Expenses
Agency for International Development, Property Management Fund
Animal and Plant Health Inspection Service, Agricultural Quarantine Inspection User Fee Account
Animal and Plant Health Inspection Service, Salaries and Expenses
Bureau of Alcohol, Tobacco, Firearms and Explosives, Salaries and Expenses
Centers for Disease Control and Prevention, CDC Working Capital Fund
Centers for Disease Control and Prevention, Emerging and Zoonotic Infectious Diseases
Centers for Disease Control and Prevention, Global Health
Centers for Disease Control and Prevention, HIV/AIDS, Viral Hepatitis, Sexually Transmitted Diseases and Tuberculosis Prevention
Centers for Disease Control and Prevention, Immunization and Respiratory Diseases
Centers for Disease Control and Prevention, Public Health Preparedness and Response
Centers for Disease Control and Prevention, Public Health Scientific Services
Centers for Disease Control, Disease Control, Research, and Training
Civilian Stabilization Initiative
Commodity Credit Corporation Fund
Department of State, Migration and Refugee Assistance
Department of Defense, Cooperative Threat Reduction Account
Department of Defense, Defense Health Program
Department of Defense, Drug Interdiction and Counter-Drug Activities
Department of Defense, Operation and Maintenance, Defense-Wide
Department of Defense, Overseas Contingency Operations Transfer Fund
Department of Defense, Overseas Humanitarian, Disaster, and Civic Aid

Department of Energy, Defense Nuclear Nonproliferation
Department of Homeland Security, Customs and Border Protection, Border and Transportation Security
Department of Homeland Security, Transportation Security Administration, Aviation Security
Department of Justice, General Legal Activities
Department of Labor, Departmental Management, Salaries and Expenses
Department of State, Democracy Fund
Department of State, Diplomatic and Consular Programs
Department of State, Educational and Cultural Exchange Programs,
Department of State, Embassy Security, Construction and Maintenance
Department of State, Global Health Programs
Department of State, Global HIV/AIDs Initiative
Department of State, National Endowment for Democracy
Department of the Air Force, Air Force Cadet Fund
Department of the Army, Operations and Maintenance
Department of the Navy, Operation and Maintenance
Department of Transportation, Transportation Planning, Research, and Development
Departmental Administration, Energy Programs, Energy
Drug Enforcement Administration, Salaries and Expenses
Economic Support Fund
Environmental Protection Agency, Environmental Programs and Management
Environmental Protection Agency, Science and Technology
Excess Defense Articles
Federal Bureau of Investigation, Salaries and Expenses
Federal Trade Commission, Salaries and Expenses
Food and Drug Administration
Food Safety and Inspection Service
Food Safety and Inspection Service
Foreign Agricultural Service, Salaries and Expenses
Foreign Military Financing Program
Foreign National Employees Separation Liability Fund
Gifts and Donations, Centers for Disease Control
International Affairs Technical Assistance
International Assistance Program, Working Capital Fund,
International Military Education and Training
International Narcotics Control and Law Enforcement
McGovern-Dole International Food for Education and Child Nutrition Program Grants
Military Assistance Programs (Old Code)
Millennium Challenge Corporation, Expenses
National Forest System, Forest Service
National Institute of Food and Agriculture, Integrated Activities
National Oceanic and Atmospheric Administration, Operations, Research and Facilities
Nonproliferation, Anti-Terrorism, Demining and Related Programs
Patent and Trademark Office, Salaries and Expenses
Peace Corps

Peace Keeping Operations
Public Health and Social Services Emergency Fund
Public Law 480 Title I Direct Credit and Food for Progress Program Account
Public Law 480 Title II Grants
Sahel Development Program
State and Private Forestry, Forest Service
Sub-Saharan Africa Disaster Assistance
Trade and Development Agency
U.S. Emergency Refugee and Migration Assistance Fund
U.S. Fish and Wildlife Service, Contributed Funds
U.S. Fish and Wildlife Service, Multinational Species Conservation Fund
U.S. Fish and Wildlife Service, Resource Management
Weapons Activities, National Nuclear Security Administration, Energy

Appendix-3: Individual Country Wide Statistics (Aid and FDI) (In US $ millions)

Angola

Variable	Obs	Mean	Std. Dev.	Min	Max
Aid	28	71.1	31.1	6.85	165
FDI	28	-60.0109	3567.685	-7397.3	10028.22
GDP	28	53500	50000	4440	146000
G_eff	18	11.58006	3.812441	3.589744	17.22488
C_con	18	5.679884	2.306732	1.522843	11.53846
P_stb	18	27.20703	9.997511	1.587302	37.91469

Benin

Variable	Obs	Mean	Std. Dev.	Min	Max
Aid	28	59.3	91.8	13.7	419
FDI	28	116.9267	108.7352	1.405551	405.7373
GDP	28	158	832	785	3170
G_eff	18	36.70131	5.927274	25.96154	47.44898
C_con	18	32.31339	5.845016	20.4878	41.34615
P_stb	18	56.93645	9.387671	41.42857	74.60317

Burkina Faso

Variable	Obs	Mean	Std. Dev.	Min	Max
Aid	28	49.1	92.4	9.154	504
FDI	28	108.1104	148.2463	0.57	490.4034
GDP	28	7120	4660	1900	16100
G_eff	18	32.21749	3.679448	24.75728	38.34951
C_con	18	48.49377	7.069122	36.49289	59.09091
P_stb	18	34.63388	13.68194	13.33333	54.58937

Carbo Verde

Variable	Obs	Mean	Std. Dev.	Min	Max
Aid	28	11.9	238	0.963	119
FDI	28	81.24989	66.4961	.450472	209.2175
GDP	28	1100	606	320	1970
G_eff	18	76.85419	2.918055	70.2439	80.28846
C_con	18	58.59019	4.116398	48.03922	65.64103
P_stb	18	74.58304	6.617913	58.57143	90.47619

Chad

Variable	Obs	Mean	Std. Dev.	Min	Max
Aid	28	70.9	66.5	1.866	214
FDI	28	186.7042	340.4556	-675.545	924.1192
GDP	28	6190	4630	1180	13900
G_eff	18	7.787425	6.035307	2.427185	25.64103
C_con	18	4.874872	2.397414	1.456311	11.16751
P_stb	18	9.837072	3.819301	4.326923	16.58768

Cote d'Ivoire

Variable	Obs	Mean	Std. Dev.	Min	Max
Aid	28	58.9	57.8	1.76	216
FDI	28	350.2382	204.6087	18.52489	975.015
GDP	28	22100	13900	8310	58000
G_eff	18	15.66412	7.244814	7.177033	31.73077
C_con	18	22.39591	11.84251	8.780488	42.30769
P_stb	18	9.922773	5.427458	.9708738	20

Gambia

Variable	Obs	Mean	Std. Dev.	Min	Max
Aid	28	5.92	5.02	1.9	19.1
FDI	28	31.74732	23.54257	-27.7	82.20818
GDP	28	1070	357	487	1670
G_eff	18	29.24358	5.465048	18.75	37.94872
C_con	18	31.94687	7.366658	21.63461	46.9697
P_stb	18	47.57738	8.16363	30	69.31217

Ghana

Variable	Obs	Mean	Std. Dev.	Min	Max
Aid	28	136	157	39.4	711
FDI	28	1283.903	1445.196	20	3485.3
GDP	28	23600	21000	4980	65600
G_eff	18	51.92549	4.69467	43.75	60.4878
C_con	18	53.1621	4.439397	43.90244	59.33014
P_stb	18	45.16422	4.882776	33.33333	52.60664

Variable	Obs	Mean	Std. Dev.	Min	Max
Aid	28	43.9	32.0	16.0	184
FDI	28	210.5575	356.901	0.21	1618.4
GDP	28	5410	2560	2830	10900
G_eff	18	13.81824	4.363924	6.829268	25
C_con	18	14.66998	5.394581	6.796116	29.79798
P_stb	18	13.22939	9.553703	1.932367	32.85714

Guinea-Bissau

Variable	Obs	Mean	Std. Dev.	Min	Max
Aid	28	4.2	3.99	0.059	14.8
FDI	28	10.90699	9.824944	.04	33.22383
GDP	28	644	389	206	1460
G_eff	18	9.218429	4.452095	2.884615	15.16588
C_con	18	8.069186	4.097405	2.403846	14.14141
P_stb	18	26.1127	4.321092	18.00948	33.86243

Kenya

Variable	Obs	Mean	Std. Dev.	Min	Max
Aid	28	414	402	17.7	1150
FDI	28	490.7758	591.1178	2	1625.919
GDP	28	30700	24200	57509	87800
G_eff	18	35.64811	4.460791	28.92157	43.26923
C_con	18	16.67825	2.628774	12.32228	21.46342
P_stb	18	12.49128	2.610077	9.047619	17.46032

Lesotho

Variable	Obs	Mean	Std. Dev.	Min	Max
Aid	28	33.2	68.3	2.03	364
FDI	28	50.47651	47.24217	7.242913	206.5
GDP	28	1560	694	704	2620
G_eff	18	39.83651	11.94395	18.26923	55.61224
C_con	18	58.33198	3.49397	53.53535	63.98104
P_stb	18	46.44527	10.01919	30.91788	62.08531

Malawi

Variable	Obs	Mean	Std. Dev.	Min	Max
Aid	28	133	131	285	580
FDI	28	85.04819	115.0133	-28.7	509.6792
GDP	28	4000	2809	1180	8000
G_eff	18	31.22459	7.746767	21.95122	44.10257
C_con	18	31.8472	7.959333	18.18182	47.20812
P_stb	18	43.76281	5.569966	30.47619	50

Mozambique

Variable	Obs	Mean	Std. Dev.	Min	Max
Aid	28	207	175	53.1	751
FDI	28	1308.413	1894.129	9.2	6175.125
GDP	28	8710	4890	2590	17700
G_eff	18	31.35982	7.864904	17.78846	43.36735
C_con	18	32.51256	7.040584	17.78846	40.47619
P_stb	18	44.6488	17.01937	12.85714	68.72038

Namibia

Variable	Obs	Mean	Std. Dev.	Min	Max
Aid	28	54.7	71.1	6.39	382
FDI	28	362.7397	300.7017	19.60625	1060.807
GDP	28	7320	3810	2990	13500
G_eff	18	59.64745	2.692435	55.82524	64.79592
C_con	18	65.64447	3.691565	60	73.78641
P_stb	18	70.20469	12.82185	35.97884	93.75

Niger

Variable	Obs	Mean	Std. Dev.	Min	Max
Aid	28	72.8	11.3	4.48	581
FDI	28	268.9572	353.266	-34.3513	1065.79
GDP	28	5660	3510	194	12800
G_eff	18	25.77942	4.793025	11.28205	31.10048
C_con	18	26.49661	5.20183	15.65657	33.17535
P_stb	18	23.22238	13.77237	9.047619	51.32275

Nigeria

Variable	Obs	Mean	Std. Dev.	Min	Max
Aid	28	268	274	2.31	853
FDI	28	2187.993	2280.362	189.165	8649.53
GDP	28	220000	176000	27800	547000
G_eff	18	10.96082	4.520095	0.505050	19.41748
C_con	18	14.67262	2.855347	8.61244	21.07843
P_stb	18	5.047204	1.755473	2.415459	9.523809

Rwanda

Variable	Obs	Mean	Std. Dev.	Min	Max
Aid	28	113	68.4	22.6	269
FDI	28	114.8371	151.1592	.001	458.9
GDP	28	4280	2930	754	9640
G_eff	18	46.39046	14.44095	16.83673	64.90385
C_con	18	58.79633	15.52106	31.70732	75.48077
P_stb	18	31.48916	14.30652	5.820106	53.33333

Senegal

Variable	Obs	Mean	Std. Dev.	Min	Max
Aid	28	97.7	123	20.4	657
FDI	28	214.5099	208.3392	-7.44398	847.8416
GDP	28	12100	5860	4910	23200
G_eff	18	43.42549	6.468632	34.44976	57.65306
C_con	18	49.66724	9.737055	30.47619	61.61616
P_stb	18	38.67662	4.434365	27.51323	46.60194

Sierra Leone

Variable	Obs	Mean	Std. Dev.	Min	Max
Aid	28	39.1	40.0	8.01	210
FDI	28	142.5424	229.8509	-7.46292	950.4783
GDP	28	2090	1420	636	5020
G_eff	18	9.501352	2.225416	4.102564	12.19512
C_con	18	20.95049	5.59846	13.65854	37.01923
P_stb	18	34.76613	9.967388	5.291005	45.71429

Tanzania

Variable	Obs	Mean	Std. Dev.	Min	Max
Aid	28	255	268	12.2	1010
FDI	28	714.385	623.1645	.01	2087.3
GDP	28	23600	17300	4260	58000
G_eff	18	34.52945	6.718371	21.15385	42.85714
C_con	18	33.84287	7.540339	22.74882	48.78049
P_stb	18	33.84863	8.820025	22.11055	47.8673

Tago

Variable	Obs	Mean	Std. Dev.	Min	Max
Aid	28	5.57	3.85	1.7	20.1
FDI	28	68.48294	146.2086	-183.387	711.0875
GDP	28	2670	1320	983	5360
G_eff	18	7.40925	3.516076	2.926829	12.98077
C_con	18	20.15471	4.652271	15.16588	28.36539
P_stb	18	33.60008	10.03192	7.76699	47.61905

Uganda

Variable	Obs	Mean	Std. Dev.	Min	Max
Aid	28	285	240	38.3	762
FDI	28	405.796	381.903	-5.91	1205.388
GDP	28	14800	11300	2860	32900
G_eff	18	36.07516	4.245277	29.80769	43.84237
C_con	18	18.50316	4.077831	12.98077	24.39024
P_stb	18	16.7266	4.849727	6.532663	26.19048

Aid: Current Aid; FDI: Foreign Direct Investment; GDP: Gross Domestic Product
G_eff: Government Effectiveness; C_con: Corruption Contribution.
P_stab: political Stability