Institutions and Foreign Aid Effectiveness in Sub-Saharan Africa

By

CEESAY, Adama

THESIS

Submitted to

KDI School of Public Policy and Management

In Partial Fulfillment of the Requirements

For the Degree of

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Committee in charge:

Professor Kim, Hyeon-Wook, Supervisor _____

Professor Park, Jongho _____

Approval as of May, 2021

DECLARATION

I CEESAY Adama, hereby declare that this study was entirely a product of my work with the

support of my two supervisors. This study has not been submitted for any academic award to

the best of my knowledge All reference to external sources is rightly cited.

DEDICATION

I dedicate this work to a guardian angel I once had, the Late "Aji Mariam Ceesay" for

believing in me at a time when I have not yet figured even who I was; and My mother for

constantly being my support system in every step of the way.

ACKNOWLEDGEMENT

ABSTRACT

Many African countries heavily depend on foreign aid, however, the fact that most countries in the region record low income per capita despite receiving huge amounts of aid resources brings an obvious question about the validity of aid as a means to supporting economic growth and consequently eradicating extreme poverty in Africa. This study sought to examine the effect of six different dimensions of institutional/governance quality on aid effectiveness in Sub-Saharan Africa. The findings indicate that overall aid has a positive but small effect on economic growth in the sub-region. Furthermore, the effect of institutions on foreign aid effectiveness is positive above a threshold level of aid and negative below the threshold. Among the six dimensions of institutional quality examined *'control of corruption'* has the most significant influence on aid effectiveness followed by *'rule of law'* and *'regulatory quality'*. The main policy recommendation this paper provides is that increasing aid inflows to the region must be complemented by efforts to control corruption, advance rule of law, and improving regulatory quality for foreign aid to have a significant effect on economic growth.

Keywords: Foreign Aid, Institutions, Economic Growth, Sub-Saharan Africa

ABSTRACT

많은 아프리카 국가들은 해외 원조에 크게 의존하고 있지만, 이 지역의 대부분의 국가들이 막대한 양의 원조 자원을 제공받음에도 불구하고 1 인당 낮은 소득을 기록하고 있다는 사실은 경제 성장의 뒷받침 요소로 원조의 타당성에 대한 분명한 의문을 가져왔고 결과적으로 극도의 빈곤을 근절하는 데 도움을 주는 도구이다. 이 연구는 원조가 경제성장에 미치는 영향에 대해 널리 알려진 경험적 질문을 다루려고 했다. 우리의 연구는 보다 최신 데이터를 활용했고 새로운 성장 문헌의 중요한 특징 대부분을 포함했다. 우리는 시스템 GMM 을 동등하게 사용하여 사하라 이남 아프리카(SSA)의 지원 효과에 대한 품질 기관의 부분적인 영향을 조사하였다. 시스템 GMM 추정기를 사용함으로써, 이 연구는 원조와 성장 관계가 비선형적이라는 것을 보여주었다. 관계의 비선형성은 원조가 성장에 부정적인 영향을 미치는 아래의 해외 원조에 대한 문턱을 나타내며, 원조가 경제 성장에 긍정적인 영향을 미친다는것을 알려준다. 본 논문의 경험적 결과는 지원금을 받는 국가에서 부패, 규제 품질 및 법치를 잘 통제할 때 매우 효과적일 수 있다는 번사이드와 달러의 연구 결과를 뒷받침한다. 우리는 또한 원조가 효과가 있다고 결론짓지만, 아프리카의 지속 가능한 원조의 효과를 보장하는 것은 현재 제도적 환경의 질에 크게 달려있다.

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Table 4. 1 Summary Statistic for all variables

ACRONYMS

AB	Arellano and Bond
AEL	Aid Effectiveness Literature
AR	Autoregressive
AU	African Union
DAC	Development Assistant Countries
FE	Fixed Effects
FDI	Foreign Direct Investment
GDP	Gross Domestic Product
GMM	Generalized Method of Moments
GNI	Gross National Income
ICOR	Incremental Capital-Output Ratio
IV	Instrumental Variable
LDC	Least Developed Countries
ODA	Official Development Assistant
OECD	Organization for Economic Co-operation and Development
OLS	Ordinary Least Squares
PPP	Purchasing Power Parity
RE	Random Effect
SSA	Sub-Saharan Africa
Sys-GMM	System Generalized Method of Moments
TFP	Total Factor Productivity
WDI	World Development Indicators
WGI	World Governance Indicators

CHAPTER 1
Institutions and Foreign Aid Effectiveness in Sub-Saharan Africa

1.1 Background

Least Developed Countries (LDCs) need foreign assistance for a myriad of reasons, chief among which is the inadequate economic resource needed to accumulate enough human and physical capital to embark on a path of economic prosperity and poverty alleviation. Foreign assistance or Official Development Assistance (ODA) ranges from capacity-building support to development financing mainly from members of the Development Assistant Committee (DAC) of the Organization for Economic Cooperation and Development (OECD) such as the United States (US), France, the United Kingdom, Germany, Japan, South Korea to developing countries and other multilateral institutions. Globally, total ODA is at its highest level since the 1960s; the amount of ODA disbursed in 2018 prices increased from US$40 billion in 1960 to around US$160 billion in 2019 (OECD Stat, 2021). Although this represents a significant increase over time even in real terms, data from OECD shows that the share of ODA as a fraction of combined donors' GNI steadily decreased from 0.50% in 1960 to about 0.3% in 2019.

Figure 1-1 Annual trend of ODA by DAC members (left). and ODA as a percentage of donors' combined gross national income (GNI) (right)
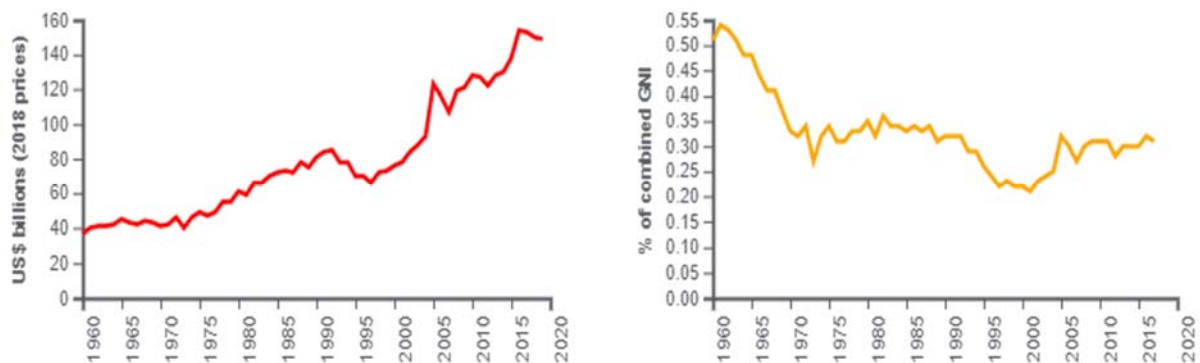
Historically, Sub-Saharan Africa (SSA) – henceforth Africa – has been the largest recipient of ODA in the world; except for brief periods in 1999 and 2005 when it was overtaken by Asia (see figure 1.2 below). In 1990, Africa accounted for about 45% of total ODA received although the continent's share of total net ODA has been declining in recent years. This trend of a declining share of aid to the world's poorest has been a great concern to multilateral and donor agencies who fear it may exacerbate economic distress and widen income inequality within and among countries. The United Nations (UN) Sustainable Development Goal 10 (SDG 10) aims to halt and reverse this trend by encouraging more development assistance to the most vulnerable countries.

The most relevant question or concern perhaps should be whether foreign aid has led to any improvement in the economic progress of recipient countries. The debate on the effectiveness of foreign aid has been in existence for decades; questions abound as to whether aid works or not? A famous debate on macro-level analysis of aid effectiveness is that of two prominent scholars, William Easterly and Jeffrey Sachs which set the stage for a large-scale academic adventure into the field (wilderness) of aid effectiveness. Sachs, a well-known economic scholar in support of foreign aid, recognized that poor countries are stuck in a poverty-trap and that they need physical and human capital investment through aid to escape this trap and achieve economic prosperity. Sachs 'argument' is in part motivated by the successes of small development projects launched and implemented by international organizations, which he believes can be successfully replicated across countries or a continent at large. Easterly, on the other hand, refutes Sachs' claim of poverty-traps depriving developing countries of growing and argues that it is bad governance instead. Easterly contends that aid creates incentives for corruption, and it fails because its implementation does not respond to the people it intends to serve. Although both scholars criticize each other, Easterly acknowledges that aid does

sometimes work, and Sachs also concedes that most aid implementation systems are not perfect. This notable closure has shifted the focus of current research on aid effectiveness from whether aid works or not to when and how it works.

This study draws insights from the discussion above to re-examine the role of institutions on aid effectiveness in Africa. The study adopts governance measures by Daniel Kaufmann and Aart Kraay available from the World Bank's World Governance Indicator (WGI) database as a measure of institutional quality. The composite measures namely – control of corruption, regulatory quality, rule of law, political stability and absence of violence, and voice and accountability – capture the quality of different dimensions of good governance. First, we examine the broad impact of institutions on aid effectiveness in Africa. Secondly, we look closely at the impact of each of the different measures on aid effectiveness to identify which of the institutional variables have the most significant impact on aid effectiveness.

Our main contribution is to identify the dimensions of good governance or institution that matters more for aid effectiveness in Africa. This approach is very relevant since most countries in Africa suffer from severe resource constraints which make large-scale improvement in all aspects of institutional quality nearly impossible. It may be prudent for such countries to concentrate on the most sensitive type of institution empirically proven to improve aid effectiveness.

1.2 Statement of the Problem

Sub-Saharan Africa (SSA) continues to receive the largest share of aid among regions even as it remains the poorest continent in the world. Such unencouraging fact is not lost on the lack of resilience of the economies of most African countries as evidenced by their vulnerability to most global crises, be it economic, climate or health. More so, there remain varying degrees of individual country economic constraints such as inefficient public institutions, weak or

nonexistent socioeconomic infrastructure that guarantees dignified wellbeing for citizens. These challenges could explain the low level of aid effectiveness in the region vis-à-vis the relative success of aid in the development of the Asian tigers. International organizations such as the OECD whose aim is to shape policies that foster prosperity and economic wellbeing have allied with policymakers in establishing evidence-based international standards to find solutions to such development constraints developing countries are facing.

Figure 1-2 Regional share of total net ODA as a percentage of total ODA
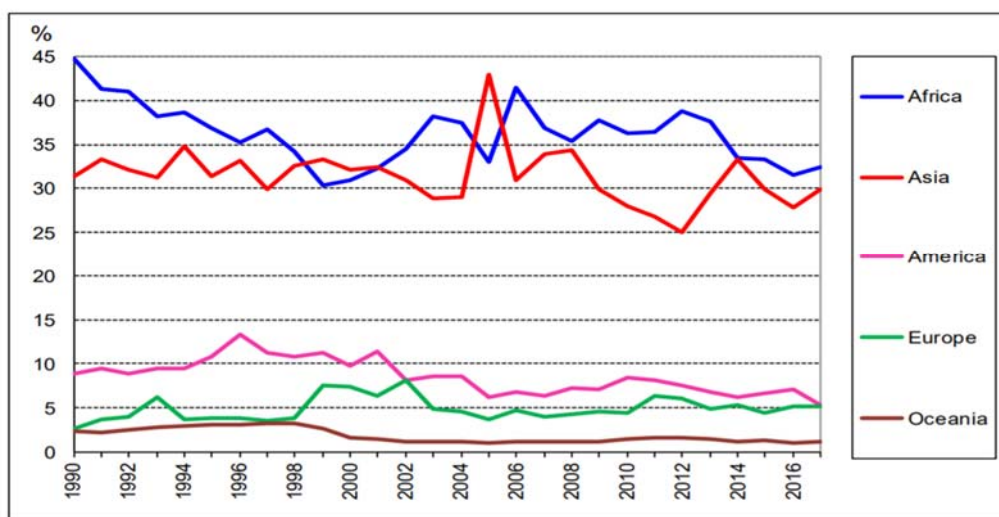
Source: OECD (2021), Net ODA (indicator). (Accessed on 01 March 2021)

While the narrative about economic progress began to improve at the beginning of the century, economic growth in recent years has been rather volatile despite continuous strong aid flows. This could be due to the prevailing social, political, and environmental rife on the continent. Resolving these challenges has been slow because of weak institutions that have made development almost elusive to African countries. Often, public institutions in Africa have been unable to fully ensure efficient implementation of development programs financed by foreign aid due to corruption and government ineffectiveness; and also, their failure to develop rules

and institutional capacity necessary to bring about structural transformation (Commission, 2015).

A 2005 Commission for Africa Report attributes the subpar implementation of development programs in Africa to the quality of foreign aid and poor conditions of governance. Unlike countries like Korea and China amongst others, where aid has supported economic development even in the face of seemingly bad public institutions, a series of research have shown the disappointing results of aid in LDCs especially in Sub-Saharan Africa. Babalola and Shittu (2020) focusing on a sample of West African countries found that weak institutions are the major killers of foreign aid objectives.

1.3 Significance of the study

Easterly's (2005) argument on development in Africa is in line with a group of studies on institutions and development, which claim that the poor state of African development is owed to poor institutions, weak judicial system, political instability, and corruption. Moyo, (2009) also argues that aid kills growth in developing countries by promoting corruption, preventing institutional growth, and deteriorating global competitiveness.

On the other hand, Hansen and Tarp (2001) investigates the aid-growth link and found an unconditional positive effect of aid on growth. Burnside and Dollar (2000) conclude that aid works in LDCs where sound macroeconomic policy is present. The debate on aid effectiveness remains inconclusive despite the presentation of empirical evidence from both sides.

Recently, development economic scholars have joined the debate and are examining aid effectiveness through mechanisms such as geography, climate change, human capital investment, physical capital investment, politics, and macroeconomic environment. Gyimah-Brempong, Racine, and Gyapong (2010) argue that there could be a positive and significant impact of foreign aid on growth through physical capital investment. Durbarry, Gemmell, and

Greenaway (1998) conclude that foreign aid favors economic growth conditional on sound macroeconomic policies. Measures of institutional quality such as control of corruption, rule of law, and regulatory quality are also interesting channels to consider. Quality institutions have been proven in many growth studies to be critical to economic growth and citizens' well-being (Efendic et al., 2011; Valeriani et. al, 2011).

In this study, we examine how six different dimensions of institutions and good governance, namely – control of corruption, regulatory quality, rule of law, political stability, and voice and accountability – affects aid effectiveness in Africa. We argue that the inability of aid to promote growth over the years could be attributed to the poor state of governance institutions on the continent. Policies that strengthen government effectiveness and increase citizen participation in governance among others have the tendency to reduce or eliminate misappropriation of aid resources which could greatly impact aid effectiveness. Our approach allows us to identify specific aspects of governance that are relevant for ensuring aid effectiveness in the region.

1.4 Research questions

This paper will attempt to answer these research questions:

1. To what extent does institutional quality affect aid effectiveness on growth?
2. Does the type of institution matter?

1.5 Organization of the study

The paper is structured as follows: chapter 2 of this paper will thoroughly examine the existing theoretical and empirical literature. Chapter 3 will lay out the methodology for analysis. Chapter 4 presents the results. The final chapter concludes and gives policy recommendations.

CHAPTER 2

Literature Review

2.1 Introduction

This chapter presents the theoretical and empirical literature on aid, institutions, and economic growth. The chapter is organized into five sections. Section 2.2 provides an overview of the main theoretical arguments underlying foreign aid and economic growth. The empirical literature is organized into three different sections; section 2.3 discusses the literature on aid disbursement, section 2.4 presents the literature on aid effectiveness, section 2.5 discusses the literature on aid, institutions, and growth.

2.2 Theoretical Argument: Foreign aid and Growth

The basics of traditional economic growth theory is that investment is only possible in the presence of prior savings, and only when investment occurs can there be an expansion in growth, otherwise, the economy remains stagnant or even shrink (Weils, 2005). It is clear the empirical literature on aid effectiveness suffers from perspicuous theory to provide a clear link on the impact of aid on economic growth (Easterly, 2003). Earlier studies on aid and growth were based on the "two-gap" model developed by Chenery and Strout (1966). The model posits that developing countries are faced with two types of constraints; one is the gap between domestic savings and the level of investment needed for growth, and the second is that between foreign exchange earnings and the import of capital goods needed for development. Central to this model is that foreign aid is needed to fill in the financial gap faced by developing countries that lack the capacity to save and invest and are also faced with limited foreign exchange for the importation of capital goods to enhance sustainable development. The two-gap model is built on the Harrod-Domar growth model in which growth depends on investment as a ratio of capital-output ratio.

The two-gap model has been challenged by subsequent studies that reveal that the growth process depends on a multiplex set of independent variables which the model fails to capture (Moreira Barthault., 2005). Further, Easterly, (2003) refutes the two-gap model by charging that foreign aid can only finance investment if there is an incentive to invest, otherwise, it will finance consumption rather. He concludes that the financing gap where foreign aid fuel investment and then investment increases economic growth is theoretically unreliable and have a lot of empirical gaps. This argument is consistent with the finding of Boone, (1996) in a cross-country analysis.

Rajan and Subramanian, (2008) propose a model[1] that incorporates foreign aid in a standard Solow-Swan growth model. According to the model, aid can be allocated to productive use by financing public investment or used otherwise. Aid promotes growth when government allocates aid resources toward public investment, misappropriation of aid resources towards unproductive activity will not yield growth. Consequently, the magnitude of the impact of aid on growth depends on the proportion of aid that is actually invested by the government. The model thus provides a direct theoretical justification for the role of government or government institutions in ensuring aid effectiveness.

2.3 The Distribution of Foreign Aid Resources

Selective disbursement of aid resources has attracted great attention towards the study of aid effectiveness. The choice of aid allocation can be justified through different motives; aid allocation could be informed by either international development agenda, global crisis (for example Health or financial crisis), recipient country need, or donor's self-economic or political interest (Cooray & Shahiduzzaman, 2004; Radelet 2006; Tarp, 2006). Contrary to popular belief, Cooray and Shahiduzzaman (2004) and Tarp (2006) charged that donor's

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[1] Detailed mathematical derivation of the model is presented in section 3.2 under theoretical framework.

economic self-interest and political interests when coupled with the recipient's need, can be beneficial for the economic progress of developing countries.

Donors may also choose to assist countries with a good institutional environment. Donor agencies might need assurance that countries they assist, can effectively manage aid resources to achieve major goals of its development agenda. Donors may have to conduct a rigorous assessment of the quality of institutions in the recipient country, and the result will inform their decision to allocate resources to that country or not. Disbursing aid this way ensures that aid resources are used for what they were intended for. Donor agencies may also decide to allocate foreign aid to countries with low growth and poor institutions. In such cases, the primary goal for allocating aid resources is most likely to strengthen weak institutions in the recipient countries for more progressive growth.

Based on a large body of empirical evidence, development economists are advocating for donor agencies to deviate from relying on political and economic self-interest to a more need-driven approach to disbursing aid, whilst still emphasizing strong institutional structures to ensure the effective use of aid resources to promote growth. For instance, Lensink and White, (2000) and Dollar and Collier, (2002) concur that country need (poverty reduction) should not be the only criteria to be prioritized in aid allocation, but also sound policy environment in recipient countries should be considered.

Disbursing aid solely based on institutional quality or government effectiveness could be counter-productive since the poorest countries are also most likely to have the worse form of governance institutions. A more effective approach will be that which prioritizes need but also has in-built conditionalities that urge countries to build strong institutions over time.

2.4 Empirical literature: Aid Effectiveness

Hansen and Tarp, (2000) offer an extensive re-examination of the commonly known first, second and third generation of the aid effectiveness literature (AEL). The two early generations (first and second – generation) relate aid effectiveness to investment and savings, then further relate either savings or investment to economic performance. The theoretical casual chain channeling from aid to growth through savings and investment is influenced by the Harrod-Domar growth model. The first-generation studies centered on models which assume a direct linear channel from aid to savings then to growth. They investigate whether aid influences increased savings. The first-generation studies have been criticized for being oversimplistic and optimistic with regard to their results and conclusions. According to Hansen and Tarp (2000), their model fails to account for the fungibility of foreign aid. The second-generation studies, on the other hand, focused on the linkage between aid and investment. They assume a closed economy with perfectly competitive markets. Investment was the principal determinant of economic growth, as a result, the influx of foreign aid fuels increased investment which consequently promotes growth (Hansen & Tarp, 2000).

The later generation (the third and current generation) studies re-examine the effectiveness of foreign aid extensively using several approaches. Some studies examine aid effectiveness taking into account the macroeconomic environment. Others go further to look at the intermediary variables between aid and growth, and also the mechanisms through which aid affects growth. One major distinction between the current generation and the early studies is that they allow for a non-linear relationship between aid and economic growth. The current generation studies also explicitly recognize and make effort to tackle endogeneity issues using different techniques.

Burnside and Dollar (2000) policy conditionality hypothesis represents one of the new themes of debate in AEL. In their paper, they model the aid-growth relationship as non-linear and

introduced an interaction of aid and policy into the growth regression. They estimate policy environment using inflation (as a measure of monetary policy) budget surplus as a (fiscal policy) and openness (trade policy). Burnside and Dollar's finding is that aid spurs growth in developing countries with a good macroeconomic policy environment but has little effect in countries with bad policy environment. Alvi, Mukherjee, and Shukralla (2008) provide evidence that partially supports Burnside and Dollar (2000). They found that although policy affects aid effectiveness above a certain threshold policy level, below that, it has no significant effect on aid effectiveness,

Another group of studies have argued for the unconditional effect of aid on growth. Studies like Hansen and Tarp (2000, 2001), and Commission for Africa Report (2005) argue that foreign aid has the potential of influencing growth and this is not conditional on macroeconomic policy environment. Hansen and Tarp (2000) nevertheless caution that care must be taken in interpreting regression results of aid effectiveness because it is very sensitive to model specification and choice of control variables. They call for more theoretical work in AEL before such findings are used for policy purposes. Similarly, Easterly (2003) charged that by simply extending the data and using alternative definitions of variables one can reject the findings of Burnside and Dollar (2000) that aid promotes economic growth conditional on sound macroeconomic policies. This finding is also supported by studies such as Jensen and Paldam (2006) and Murph and Tresp (2006).

Another angle in which AEL is currently investigated amongst scholars is by comparing the effectiveness of foreign aid across time periods and types of donors. One major argument in this aspect is associated with that of Bearce and Tirone (2010). They provided evidence that foreign aid fueled economic growth only after the 1990s because this was the time when the self-interest motivation for given foreign aid by western donors dwindled drastically. Sectoral aid is another dimension the current debate also looked at. For example, foreign aid for trade.

This area in the aid effectiveness debate is still emerging however, studies like (Gyimah-Brempong et al. (2010) are amongst the few recent ones already claiming that aid resources entirely targeted for trade improvement can enhance positive growth.

2.5 Empirical Literature: Aid, Institutions and Economic Growth

Strong institutions and a sound macroeconomic policy environment theoretically play an essential role in fostering growth and the economic wellbeing of a country. Empirical evidence gives further credence to the claim institutional environment is a major determinant of long-run economic growth. Economic institutions determine the incentives of effective implementation of development plans and the constraints on economic players and determine economic outcomes (Acemoglu, Johnson, & Robinson, 2005).

The influence of institutions in economic development have long been recognized. Acemoglu, et al. (2005) document implications of changes in political institutions on economic institutions quoting that in the UK, the Second Reform Act 1867 radically changed the economic institutions in favor of skill development through education which consequently had a positive impact on the labor market.

Gyimah-Brempong (2002) examines the impact of corruption on income growth and income distribution in Africa. The study charged that corruption disrupts growth and it also increases income inequality, hence concluding that corruption hurts the poor more than it does the rich in African countries.

Economic scholars have also investigated the implications of an increase in the allocation of aid resources on quality institutions of which corruption increasingly features. For example, scholars like Knack (2001) and Easterly (2006) argue that increased aid weakens government accountability, encourages rent-seeking behaviors, instigates dispute over control of aid resources, and reduces pressures to change inefficient government policies and institutions – thereby undermining quality governance and public sector institutions.

Nonetheless, there exist limited empirical studies particularly examining the statistical and economic impact of quality institutions and governance on foreign aid.

A recent study by Babalola and Shittu (2020) suggests that efficient institutions are essential to reducing the adverse effect of aid and enhancing domestic and international competitiveness in Africa.

Corruption can harm aid effectiveness, Christianne et al., (2018) found that high rates of corruption in the Central African Economic and Monetary Community (CEMAC) zone kills aid efforts on economic growth. They conclude that improving the quality of governance is crucial to ensuring the effective use of aid resources in central Africa. Santiso (2001) contends that the impact of governance on aid effectiveness is stronger in countries with a low level of development. They, therefore, argued that for efficient use of aid resources to promote sustainable long-term economic growth, a more radical approach is needed in countries where governance is substantially weak – it may be preferred for donors to take control and act according to agreed development objectives. Asongu and Nwachukwu (2014) also charge that aid particularly decreases corruption especially in countries where corruption is not severe.

A common theme in the literature exploring the influence of quality institutions or governance on aid effectiveness is that they either rely on composite measures of institutions or use a much narrower measure such as corruption. Policy recommendations based on composite measures are usually not very informative for public policy practitioners. Often, they may not know what to do at all or where to start from. Studies based on single measures might be better in this regard, although, they limit understanding of how different aspect of governance affects aid effectiveness and also do not offer alternatives to policymakers.

There is no gainsaying that the academic debate on aid effectiveness is inconclusive. It is also not far-fetched to infer that aid has not met its overarching objective; even aid proponents and donors would be prudent in arguing otherwise. Nonetheless, aid has not at all been a waste.

Consequently, whether one is upbeat or pessimistic about the future of aid, examining the efficacy of different yet comparable types of institutions on foreign aid effectiveness is a welcome push towards ensuring best policy practices.

CHAPTER 3

METHODOLOGY

3.1 Introduction

This chapter presents the theoretical model that underpins the aid-growth relationship and proposes an empirical model and strategy to answer the main questions of this study – That is, do quality institutions influence aid effectiveness in Africa? And make an extension to the existing literature by assessing the efficacy of six different dimensions of institutional quality and good governance on the effectiveness of foreign aid in Africa.

The chapter is structured as follows; the theoretical framework is presented in section 3.2, followed by the empirical model (section 3.3), variable description and source of data (section 3.4), and econometric methodology (section 3.5). Section 3.6 concludes.

3.2 Theoretical Framework

To understand the mechanism through which foreign aid affects growth, this study borrows a simple model developed by Rajan and Subramanian (2008) which is presented below. The model describes how foreign aid augments public investment for productivity growth.

Assumption 1

The principal link through which foreign aid affects growth is by increasing public investment: the model posits that a portion of aid is put towards funding public investment and this eventually spurs growth in the long run through capital accumulation.

The possible quantitative impact of aid can be derived from the standard Solow-Swan growth model.[2]

$$Y = AK^{\alpha}L^{1-\alpha} ; \ 0 < \alpha < 1$$

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[2] Note: this assumption only holds in an economy where consumption is sufficient enough that additional foreign assistance can be used to finance investment (recipient country should have the incentive to invest)[2]

Equation (3.1) is a standard production function of the Cobb-Douglas type where α represents the portion of capital in income and A represents technology. Y is income, K is capital and L represents labor.

Dividing up both sides of equation (3.1) by L, equation (3.1) can now be written in per worker terms:

$$y = Ak^\alpha$$

(3.2)

Capital accumulation is presented as.

$$K = I - \delta(K), \quad since \ I = \ I_p + I_g \ and \ K = \ K_p + K_g$$

$$K = I_p + I_g - \delta(K_p + K_g)$$

(3.3)

Where the subscript g represents the government sector, p private sector, and δ is the rate at which capital depreciates.

Assuming β represents that proportion of aid influx that the government uses to finance investment, with the remaining aid used otherwise. Including aid in the capital accumulation equation (3.3) gives:

$$K = \beta aid + I_p - \delta(K)$$

$$Where \ I_g = \beta aid$$

(3.4)

By adding population growth (n) and dividing both sides by L we derive capital stock per worker(k)

$$k = \frac{\beta aid}{L} + \frac{I_p}{L} - (n + \delta)(k)$$

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Then to derive the rate of growth of output per worker (γ_y) they took the natural logarithm of equation 3.2 *and* differentiated it with respect to *t:*

$$\gamma_y = \frac{\dot{y}}{y} = \alpha\left(\frac{\dot{k}}{k} + \frac{\dot{A}}{A}\right)$$

By substituting equation (3.5) in (3.6), we derive output growth per worker as

$$\gamma_y = \alpha\left(\frac{\beta aid}{kL} + \frac{I_p}{kL}\right) - \alpha(n + \delta) + \alpha\frac{\dot{A}}{A}$$

Equation (3.7) is multiplied by (Y/Y) to depict the change in growth in relation to the ratio of aid to GDP. Equation (3.7) can then be rewritten as.

$$\gamma_y = \frac{\alpha\beta aid}{Y}\frac{y}{k} + \frac{\alpha I_p}{kL} - \alpha(n + \delta) + \alpha\frac{\dot{A}}{A}$$

By differentiating equation (3.8) with respect to aid-GDP ratio gives:

$$\frac{\partial\gamma_y}{\partial\left(\frac{aid}{Y}\right)} = \alpha\beta\frac{y}{k}$$

Equation (3.9) therefore, is indicative that the estimated coefficient of aid-GDP ratio in a growth regression ought to be related to α – the share of capital in income, β – the portion of aid that is invested, and (y/k) – the output-capital ratio. The implication of this result suggests that even at its most optimistic assumption that the government of the recipient country makes a productive investment of the entire foreign aid received, the magnitude of the impact on GDP will be positive but relatively small since $0 < \alpha < 1$ and $0 \leq \beta \leq 1$

Equation (3.9) however ignores possible spillover effects which may underestimate the coefficient of aid since public investment has a nation-wide productivity impact. Adjusting equation (3.7) to account for spillover effect, they incorporate aid effect on productivity growth into equation (3.9) which now yields:

$$\frac{\partial \gamma_y}{\partial \left(\frac{aid}{Y}\right)} = \alpha\beta\frac{y}{k} + \frac{\partial(\dot{A}/A)}{\partial \left(\frac{aid}{Y}\right)}$$

(3.10)

3.3 Model for empirical estimation

The empirical model below is presented to examine the effect of quality institutions on aid effectiveness and to further examine the efficacy of different dimensions of institutional quality on aid effectiveness in SSA. The model is a slight modification of equation (3.8) presented under the theoretical framework in the previous section.

$$GDPPCg_{it} = \beta_0 + \beta_1(aid/GNI)_{i,t} + \beta_2 IQ_{it} + \beta_3(aid/GNI)^2_{i,t} + \beta_4((aid/GNI) * IQ)_{it}$$

$$+ \beta_5((aid/GNI)^2_{i,t} * IQ_{it}) + X'_{it} + \alpha_i + \gamma_t + {}_{it}$$

(3.11)

The parameters of the model are described as follows; the subscripts i and t represent country and time respectively, $GDPPCg_{it}$ is GDP per capita growth rate, (aid/GNI) is the aid to GNI ratio, IQ_{it} measures institutional quality, $((aid/GNI) * IQ)_{it}$ represents an interaction term of aid-GNI ratio and institutional quality, $(aid/GNI)^2_{i,t}$ is aid to GNI ratio squared, $(aid/GNI)^2_{i,t} * IQ_{it}$ is an interaction term of squared aid-GNI ratio and institutional quality, X'_{it} is a vector of other controls, α_i and γ_t are country and time fixed effects respectively, and ε_{it} is the error term. The control variables used in this model, namely, initial level of per capita GDP, population growth rate, Foreign Direct Investment to GDP ratio, Investment-GDP ratio, and Trade-GDP ratio are widely recognized in the growth literature as

principal determinants of growth within and across countries (Mankiw N., Romer, & Weil N., 1992).

The model includes a squared term for aid and interaction between aid/aid-squared and institutional quality to account for a non-linearity between aid and growth, and to allow for the assessment of the effect of institutions on aid effectiveness. Following several studies in the aid effectiveness literature, foreign aid is treated as endogenous in the growth equation.

3.3.1 **Expected Results**

Suppose our findings show that foreign aid influences growth without quality institution conditionality, then the partial effect of aid GNI is expected to be positive and significant. The estimated impact of aid on growth will therefore rely on the magnitude of the coefficient and signs of the aid-GNI variable. However, if the coefficients of the interaction terms are significant, as we expect, then the interpretation of the results will not be so straightforward given the non-linear nature of our model. In this case, four different scenarios are likely to arise. The coefficients of $(aid/GNI) * IQ$ and $(aid/GNI)^2 * IQ$ could both be positive or negative, the coefficient of $(aid/GNI) * IQ$ could also be positive whilst that of $(aid/GNI)^2 * IQ$ is negative and vice versa. The first (second) scenario implies that the effect of aid on growth is a positive (negative) function of both the level of institutions and the level of aid. The third (fourth) scenario implies that the effect of aid on economic growth depends positively (negatively) on the level of institution and negatively (positively) on the level of aid. Given the inconsistent findings in the literature on the relationship between government policy and aid effectiveness, we expect our result can take any form of the above scenarios. However, as the theoretical model predicts, the average partial effect of aid on growth is expected to be positive and small in magnitude. Furthermore, the coefficients of our institution variables are expected to be positive and significant.

3.4 Variables Description and Data Sources

A comprehensive explanation of the variables used in this paper as well as their sources are presented in this sub-section. We selected GDP per capita growth (annual %) as our dependent variable, the explanatory variables of interests are aid – GNI and institutional quality, other variables widely used in growth regressions and are observed to have significant effect on growth are also introduced as additional controls. All variables except for the measures of institutional quality are obtained from the World Development Indicators (WDI) database managed by the World Bank. The measures of institutional quality are from the World Governance Indicator (WGI) database also managed by the World Bank.

3.4.1 Explained Variable

GDP per capita growth (annual %): Annual GDP per capita growth rate is generally used as a measure of economic growth in cross-country studies. GDP per capita growth is simply the percentage change in GDP per capita from one year to another. GDP per capita is measured as the GDP of a particular country divided by the population of the country. GDP consists of value-added on all goods and services by residents within the borders of a country. It adjusts for taxes and subsidies not included in the final value of products. It must be noted that it does not take into account the degradation of natural resources and depreciation of fabricated assets. The measure is based on constant local currency which means it considers price level differences across time. Without accounting for differences in the price level, GDP per capita of high-income countries is inflated relative to low-income countries since high-income countries have higher price levels (Balassa-Samuelson effect).

3.4.2 Independent Variables

Aid-GNI ratio (Net ODA total, % of GNI): Net official development assistance (ODA) as a ratio of GNI is the main variable of interest and the measure of aid preferred in this study.

Net ODA total (% of GNI) measures aid assistance in the form of loans or grants given by members of the DAC of OECD to developing countries listed on the OECD list of aid beneficiaries. The variable is adopted as a measure of aid in this study because it provides a measure of recipient country's dependency on aid. Notably, however, the variable does not separate the different forms of aid which, in practice, may have different effects on economic development and individual welfare.

Institutional quality: following other studies, examining the impact of institutions on economic development, this study uses measures of institutional quality produced by Kaufmann, Kraay, and Mastruzzi (2010) available in the WGI Database. The dataset contains six indicators each measuring a different dimension of governance or institutions covering 200 countries and a time period of over two decades. The WGI is one of the most comprehensive datasets on institutions and governance and its range also makes it perfect for cross-country comparisons of institutions over time. According to information on the WGI website, the indicators are created based on over 30 sources of data put together by different organizations including private sector firms, think-tanks, survey institutes, NGOs, and international organizations. The indicators are calculated in units of standard normal distribution and they range from -2.5 to 2.5. The description of the indicators from the WGI database are as follows;

Control of corruption: quantifies the degree to which power and/or public authority is used for personal benefit taking into account both major and minor forms of corruption. The indicator also considers and state capture by leaders and private interests.

Government effectiveness: estimates the quality of civil and public service and how insulated they are from political interference. It also measures the quality of policy design and execution and the integrity of the government's dedication to such policies.

Political stability and absence of violence: quantifies the probability of political volatility, violence, and terrorism motivated by political interests. Specifically, the indicator considers the risk that dissent and revolts cause damage to properties, harm people, or interrupt normal economic activities, the use of violence to advance a political cause, and within state conflicts.

Regulatory quality: measures governments' ability to develop and execute appropriate policies and regulations that allow and encourage the growth of the private sector. It takes into account the risk that business operations become more costly due to regulatory compliance, and bureaucratic inefficiency, tax inconsistency, trade policy, investment and financial freedom, unfair competitive practices, and discriminatory tariffs.

Rule of law measures the degree to which agents trust and adhere to the established rules, especially the quality of contract execution, intellectual property rights protection, the courts, and the police, and the probability of lawlessness and violence. It covers variables such as law and order, risk of expropriation, property rights, violent and organized crime, contract enforcement, state contract altercation among others.

Voice and accountability: measure the degree to which nationals are allowed and able to take part in the selection of their government, as well as liberty of expression, and free media. It includes variables such as human rights, confidence in elections, press freedom, trust in parliament, and independence of the media,

Additional Control Variables

To estimate the impact or effect of aid and institutions on economic growth, the ensuing variables are used extensively and have proven to have a substantial impact on growth in the growth literature will be controlled for.

GDP per capita PPP (initial); GDP per capita (PPP) accounts for price level differences across countries making it a suitable measure for comparing income differences

across countries. The initial level of GDP per capita is frequently used in growth regressions to account for convergence or catch-up effect. The hypothesis is that over time, income per capita in poor countries will grow faster and catch-up to those in rich countries. A significant negative coefficient of *initial GDP* variable is evidence of convergence.

Investment-GDP ratio: Physical capital investment is an essential source of economic growth and growth differentials across countries as recognized by a long line of prominent economists (see Harrod, 1939; Solow 1957). Gross Fixed Capital formation as a percentage of GDP is used as a measure of *investment to GDP ratio*. The variable measures purchase of machinery, equipment, and plant, and the building and development of infrastructure as a percentage of GDP.

Population growth: represents the exponential rate of growth of midyear population from the previous year (year t-1) to present one (year t), written as a percentage. Based on its existing description, *population growth* as defined captures all people resident in a country at a particular point whether legal or not.

Foreign direct investment net inflows (% of GDP): FDI consists of investment in a foreign country firm that is equivalent to 10% of the stock of the firm. FDI accounts for the total equity capital, reinvestment of earnings, and other long and short-term capital as presented in the balance of payments. FDI inflow is associated with economic growth through the influx of capital and technology to the recipient country and for most developing countries it is a source of much-needed technology.

Trade (ratio of GDP): is defined as the country's total exports and imports of goods and services usually measured as a fraction of the gross domestic product. It is broadly used in the literature as a measure of the openness of an economy to international trade.

3.5 Econometric Methodology

The Random Effect (RE) and Fixed Effect (FE) models are the standard techniques when it comes to analyzing panel data. Under the Gauss-Markov assumptions the RE is the more efficient estimator, however, if any of the assumptions are violated, as it is expected in the case of our empirical model, then a different estimation technique is needed to provide consistent estimates. The choice between RE or FE depends crucially on whether there is a correlation between country-specific term and the idiosyncratic error which could be a potential source of endogeneity – a violation of the Gauss-Markov assumption. In the presence of such correlation, FE is preferred since by construction it eliminates the country-specific term, thereby removing the source of potential endogeneity. Statistical tools such as the Durbin-Wu-Hausman specification test are mostly used to determine which of the two tests is appropriate. The equation we estimate in this chapter (*equation 3.11*) has other potential sources of endogeneity other than that arising from country-specific fixed effect. The model contains initial GDP per capita and since the growth rate of GDP per capita is the dependent variable, the model assumes a dynamic panel structure. Also as widely recognized in the aid literature there is potential reverse causality between foreign aid and the growth rate of GDP per capita. In such cases, even FE is not consistent. In the presence of such constraints, the Arellano-Bond difference-GMM estimator (Arellano & Bond, 1991) has been generally employed to estimate cross-country economic growth regressions. The estimator adopts lagged levels of endogenous and predetermined independent variables as instruments in a transformed differenced equation. The difference-GMM estimator has been utilized in numerous contemporary empirical growth studies (see Burnside and Dollar, 2000; Easterly, Levine, & Roodman, 2004, etc.). Despite its wide use, the difference-GMM tends to perform poorly in persistent models. In such models, lagged levels of endogenous explanatory variables tend to be correlated with their subsequent

first differences, resulting in a weak instrument problem. Also, like FE, since time-invariant variables get eliminated in differenced equations, difference GMM therefore, cannot estimate time-invariant variables. Blundell and Bond (1998) pioneered the 'systems-GMM' estimator which sought to correct this issue. The authors extend the Arellano-Bond method by introducing an additional levels equation to the transformed differenced equation and using lagged first difference as an instrument for the level equation. It must be noted that the validity of system GMM estimates depends crucially on the absence of second-order autocorrelation (AR2) in the levels equation. It is common practice to present results of the test of second-order autocorrelation when the system GMM estimator is employed. Also, it is prudent to use the Sargan/Hansen (1982) test of over-identification to assess the strength of the instrument sets used in the system GMM estimation.

3.6 Conclusion

A simple theoretical framework of the quantitative effect of aid on growth based on the work by Rajan and Subramanian (2008) was presented in this chapter. This was then followed by an empirical model built on the theoretical framework for estimating the impact of institutions on aid effectiveness. The model controls for known determinants of growth such as initial GDP, Gross fixed capital formation, population growth, FDI, and Trade. A comprehensive description of variables employed in this study and their source was also presented. We later present some econometric methodologies and discuss their potential strengths and weakness. The decision to use system-GMM estimation was based on its specific strengths and potential to produce consistent estimates based on our model.

CHAPTER 4

ESTIMATION RESULTS

4.1   Introduction

This chapter discusses the estimation results based on the empirical model and discussions in chapter 3. The estimation results cover a consistent sample of 43 African countries from 2000 to 2019. The rest of the chapter is organized as follows; section 4.2 displays the summary statistic of all variables used in the estimation results in Tables 2-5. Section 4.3 presents the estimation results and some relevant test results. Section 4.4 concludes.

4.2   Summary Statistic

Table 4.1 below shows the summary statistics of all the variables used in this study covering the period 2000 to 2019. The average *GDP per capita growth* is 1.80%. A closer look at the data shows the maximum growth value of 56.8% over the period was recorded in Equatorial Guinea in 2000 and the lowest per capita growth rate of -47.6% recorded in South Sudan in 2012. The average of *the initial GDP per capita* - that is per capita GDP in 2000 - was US$1,629.24 measured in constant 2010 US$. Gabon had the highest GDP per capita with Ethiopia recording the lowest value of US$208. The standard deviations of GDP per capita growth rate and per capita GDP in 2000 were 4.52 and US$ 2,138 respectively which is indicative of the huge income disparity among African countries.

The average gross capital formation as a ratio of GDP was 21.4%. Most African countries recorded high gross fixed capital formation which is an indication of a growing rate of investment in infrastructure from 2000 through 2019. Nevertheless, very few countries amongst them (e.g., Ethiopia and Sierra leone) had gross fixed capital formation that was way below the average.

The *population growth rate* in African is relatively high, the average population growth rate in the sub-region over the period was 2.5%. For comparison, the world population growth rates averaged 1.2% within the same period.

The largest allocation of aid resources as a percentage of GNI was in Liberia at (92.1%) in 2007 and the lowest was in Mauritius (-0.25%) in 2003. The average and standard deviation were around 7.79 and 7.61 respectively which suggests that there is a high disparity in foreign aid distribution amongst countries in the region.

All the institution variables are measured in standard deviations. As seen from the table, the average values for all our institution variables are negative which indicates that countries in the sub-region rank among the worst in the world when it comes to quality institutions. The average value for *control of corruption* was -0.65 standard deviations over the period. A more detailed review of the summary data shows that Botswana had the highest standard deviation of 1.2 in 2003 with the lowest value fluctuating between Somalia and Equatorial Guinea had some of the worse recorded values for *control of corruption*. It is interesting and worth noting that these two countries fall within different income classifications; Equatorial Guinea falls in the upper-middle-income country category and Somalia is a low-income country. The influence of *control of corruption* on foreign aid effectiveness is something worthy enough to take note of in the results to be presented later in this chapter. The average value for r*egulatory quality* is -0.7 with Mauritius recording the highest value at 1.13 in 2014. This to some extend could explain why the country is one of the few high-income countries in SSA with the ability to invest in productive areas which enhances growth in the economy and stimulate growth through openness for foreign direct investment, increasing efficient use of energy, and developing smart cities and finally efficiently managed the negative impact of the 2008-09 financial crisis (World Factbook 2021).

Table 4.2 Summary Statistic for all _{Variable}

	N	Mean	Std. Dev.	Min	Max
GDP per capita (annual % growth)	837	1.71	4.52	-47.59	56.79
Initial GDP per capita (constant 2010 US$)	837	1621.033	2,188.7	208.08	11159.85
Gross fixed Capital formation (% of GDP)	837	21.50	9.18	1.10	79.46
Trade (% of GDP)	837	68.84	32.32	16.67	311.35
Population growth (annual %)	837	2.47	1.12	-6.77	8.12
Net Foreign Direct Investment (% of GDP)	837	3.70	5.58	-11.62	103.34
ODA received, net (% of GNI)	837	7.79	7.61	-0.25	92.14
Control of corruption	837	-0.65	0.61	-1.87	1.22
Regulatory quality	837	-0.62	0.58	-2.65	1.13
Rule of law	837	-0.68	0.67	-2.61	1.08
Political stability	837	-0.53	0.89	-3.31	1.28
Voice and accountability	837	-0.57	0.70	-2.23	1.00

4.3 Estimation Results and Discussion

4.3.1 Institutions and aid effectiveness

Estimation results showing the relationship between aid, institutions, and economic growth are illustrated in Tables 4.2 to 4.5 below. The lower parts of the table show some important diagnostic tests. Tables 4.2 to 4.4 illustrates estimation results using RE, FE and, system GMM. Finally, Table 4.5 presents the average partial effects of aid and institutions on economic growth.

In all tables in this section, the annual GDP per capita growth rate is employed as the dependent variable. Aid, Aid^2, $Aid * Institution$, and $Aid^2 * Institution$ are the main variables of interest. All tables include initial GDP per capita, Investment-GDP ratio (Gross fixed capital formation as a percentage of GDP), Trade-GDP ratio, annual population growth, and FDI-GDP ratio as additional controls. Estimation results using each of our five institution variables are shown in columns 1 to 5 in each Table, respectively.

Table 4. 3 RANDOM EFFECT ESTIMATE OF THE RELATIONSHIP BETWEEN AID, INSTITUTIONS, AND GROWTH.

Type of Institution	*Corruption Control*	*Regulatory Quality*	*Rule of law*	*Political Stability*	*Voice Accountability*
VARIABLES	(1)	(2)	(3)	(4)	(5)
Dependent variable	*Annual growth rate of GDP per capita*				
Initial GDP per capita*	-0.03***	-0.03***	-0.03***	-0.02	-0.03***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Gross fixed capital formation	0.08*	0.09**	0.08**	0.09**	0.09**
	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)
Trade	-0.00	0.00	-0.00	-0.01	0.00
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Population growth	0.25	0.18	0.17	-0.19	0.27
	(0.35)	(0.34)	(0.35)	(0.37)	(0.37)
FDI	-0.02	-0.02	-0.02	-0.02	-0.03
	(0.03)	(0.03)	(0.03)	(0.04)	(0.03)
Aid	-0.20*	-0.16	-0.17	-0.03	-0.08
	(0.11)	(0.12)	(0.11)	(0.12)	(0.06)
Aid^2	0.01**	0.01	0.01	0.00	0.00
	(0.00)	(0.00)	(0.01)	(0.00)	(0.00)
Institution	2.20***	2.22***	1.91***	0.43	1.99***
	(0.79)	(0.65)	(0.62)	(0.55)	(0.69)
Aid*Institution	-0.22**	-0.26**	-0.17**	-0.05	-0.18**
	(0.10)	(0.12)	(0.07)	(0.07)	(0.09)
Aid^2*Institution	0.01**	0.01	0.01*	0.00	0.00
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Constant	2.05	1.43	2.07	1.45	0.96
	(1.40)	(1.26)	(1.41)	(1.55)	(1.33)
Between r-squared	0.23	0.18	0.20	0.11	0.14
Prob > chi2	0.00	0.00	0.00	0.00	0.00
Observations	837	837	837	837	837
Number of countries	43	43	43	43	43

* coefficient of initial GDP per capita multiplied by 100 to make it visible in the table. All columns contain year-fixed effects.
Robust standard errors in parentheses * p<0.1, ** p<0.05, *** p<0.01

Table 4. 4 Fixed Effect Estimate of the Relationship between Aid, Institutions, and Growth

Type of Institution	*Corruption Control*	*Regulatory Quality*	*Rule of law*	*Political Stability V*	*Voice Accountability*
VARIABLES	(1)	(2)	(3)	(4)	(5)
Dependent variable	*Annual growth rate of GDP per capita*				
Initial GDP per capita	-	-	-	-	-
Gross fixed capital formation	0.11*	0.11*	0.10*	0.10*	0.11**
	(0.06)	(0.06)	(0.06)	(0.06)	(0.05)
Trade	0.01	0.01	0.02	0.02	0.02
	(0.02)	(0.02)	(0.02)	(0.02)	(0.01)
Population growth	0.95	0.97	0.90	0.89	0.84
	(0.72)	(0.71)	(0.68)	(0.68)	(0.69)
FDI	-0.06**	-0.05*	-0.05*	-0.05	-0.06**
	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)
Aid	-0.37***	-0.26*	-0.27	-0.13	-0.22*
	(0.13)	(0.15)	(0.17)	(0.14)	(0.13)
Aid^2	0.01***	0.01	0.01	0.00	0.00
	(0.00)	(0.00)	(0.01)	(0.00)	(0.00)
Institution	4.12***	3.26***	3.11**	1.46*	4.91***
	(1.46)	(1.05)	(1.52)	(0.84)	(1.12)
Aid*Institution	-0.41***	-0.34**	-0.23*	-0.14*	-0.29**
	(0.12)	(0.14)	(0.13)	(0.08)	(0.13)
Aid^2*Institution	0.01***	0.01	0.01**	0.00*	0.00
	(0.00)	(0.01)	(0.00)	(0.00)	(0.00)
Constant	-0.24	-1.35	-0.92	-2.23	0.23
	(2.24)	(2.08)	(2.20)	(2.30)	(2.08)
Hausman test (p-value)	0.00	0.00	0.00	0.00	0.00
Adjusted R-squared	0.11	0.11	0.10	0.10	0.12
Prob > chi2	0.00	0.00	0.00	0.00	0.00
Observations	837	837	837	837	837
Number of countries	43	43	43	43	43

Year fixed effects controlled for in all columns.
*Robust standard errors in parentheses * p<0.1, ** p<0.05, *** p<0.01*

For reasons already discussed above, discussions in this section will primarily focus on system GMM results in Table 4.4 and Table 4.5. RE and FE estimates are presented here to offer some credibility to the system GMM estimates in Table 4.4 and 4.5. Despite the known limitations of RE and FE given our empirical model, the magnitude of the coefficient estimates and signs are not expected to differ starkly between the three estimation strategies. It should also be noted that the Hausman test results shown in the lower part of Table 4.3 indicate that FE is more appropriate than RE in all five columns. The signs of the coefficient in all three tables and

across columns are largely consistent although the magnitudes differ; noticeably, the magnitude of the coefficients are smaller in the system GMM table which could be attributable to potential simultaneity bias in the RE and FE models.

As noted earlier, the validity of the system-GMM estimates in Table 4.4 depends crucially on the second-order autocorrelation (AR(2)) and overidentification tests presented in the lower part of the table. The AR(2) tests fail to reject the hypothesis of no autocorrelation at 10% significance level, hence there is no evidence of second-order serial correlation present in the residuals in all the five (5) equations. Also, the Hansen test for the validity of the full instrument sets fails to reject the overidentification of restriction which confirms the validity of the instruments in our model for all the equations. The coefficient of Aid is only significant in column 1, Aid^2 is significant in columns 1 and 2, $Aid * Institutions$ and $Aid^2 * Institutions$ are significant in all columns, save column 4. This result implies that we cannot reject the hypothesis that the effectiveness of foreign aid hinges on the quality of institutions. Furthermore, the impact of aid on growth is non-linear, it depends both on the amount of aid and the quality of institutions. The signs of the coefficients however tell an interesting story. $Aid * Institutions$ is negative which seems counterintuitive because it implies the effect of institutions on aid effectiveness is negative, however, $Aid^2 * Institutions$ is positive. Put together, the effect of institutions on aid effectiveness is negative at lower levels of aid and positive at higher levels of aid for all types of institutions. That is, there is a threshold level of aid-GNI ratio above which the effect of institutions on aid effectiveness is positive and negative below. Table 4.5 in sub-section 4.3.2 and the discussion under it provide a detailed explanation. *Initial GDP per capita* is negative and significant confirming evidence of convergence in Africa within the sample period, that is, poor African countries are growing at a faster rate than their rich neighbors. This result supports the theory of 'club convergence which hypothesizes that within a group of poor countries, poorer countries will grow at a faster rate than their

relatively richer counterparts. Investment (gross fixed capital formation) has the expected sign; the coefficient suggests that a one percent increase in investment-GDP ratio increases economic growth rate by 0.08 percentage points on average. Trade-GDP and FDI-GDP variables are negative, whereas the population growth variable is mostly positive, although they are all not significant at any conventional level.

Table 4. 5 System GMM Estimates of the Relationship Between Aid, Institution, And Growth

Type of Institution	*Corruption Control*	*Regulatory Quality*	*Rule of law*	*Political Stability*	*Voice Accountability*
	(1)	(2)	(3)	(4)	(5)
VARIABLES	*Dependent variable: GDP per capita growth (annual %)*				
Initial GDP per capita	-0.03***	-0.03***	-0.03***	-0.03*	-0.03***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Gross fixed capital formation	0.072*	0.079**	0.073*	0.089**	0.080**
	(0.041)	(0.040)	(0.040)	(0.044)	(0.040)
FDI	-0.027	-0.026	-0.025	-0.034	-0.035
	(0.036)	(0.035)	(0.037)	(0.040)	(0.037)
Trade	-0.005	-0.002	-0.004	-0.007	-0.001
	(0.009)	(0.010)	(0.010)	(0.009)	(0.009)
Population growth	0.169	0.016	0.021	-0.301	0.046
	(0.373)	(0.347)	(0.371)	(0.389)	(0.369)
Aid	-0.157*	-0.110	-0.113	0.000	-0.054
	(0.089)	(0.088)	(0.100)	(0.110)	(0.075)
Aid^2	0.006*	0.005*	0.005	0.002	0.001
	(0.003)	(0.002)	(0.005)	(0.003)	(0.003)
Institution variable	1.970***	1.890***	1.646***	0.283	1.534**
	(0.701)	(0.566)	(0.566)	(0.537)	(0.611)
Aid*Institutions	-0.201**	-0.205**	-0.145**	-0.046	-0.156*
	(0.094)	(0.086)	(0.072)	(0.068)	(0.087)
Aid^2*Institutions	0.007**	0.006**	0.004	0.002	0.003
	(0.003)	(0.003)	(0.003)	(0.002)	(0.002)
Constant	1.021	0.741	1.137	0.498	0.195
	(1.644)	(1.653)	(1.655)	(1.892)	(1.667)
Sargan/Hansen overidentification test chi2	16.72	20.80	13.00	18.40	19.87
	(1.00)	(1.00)	(1.00)	(1.00)	(1.00)
AR (2)	0.404	0.266	0.220	0.113	0.353
Observations	837	837	837	837	837
Number of countries	43	43	43	43	43

* coefficient of initial GDP per multiplied by 100 to make it visible in the table. All columns contain year-fixed effects. Robust standard errors in parentheses * p<0.1, ** p<0.05, *** p<0.01

4.3.2 Partial effect of aid and institutions on economic growth

The average partial effect of aid and institutions on economic growth is illustrated in Table 4.5 below. The table is extracted from the system-GMM estimates in Table 4.4. Panel A of the table displays the average partial effect of aid on growth holding aid and institutional variables at their mean values. The results in the table show that, at current average levels of institutional quality and aid, a one percent increase in the aid-GNI ratio will increase economic growth by about 0.01 to 0.03 percentage points. The positive effect of aid effectiveness conditional on quality institutions is in line with most of the aid effectiveness literature (Burnside & Dollar, 2000;; Easterly, 2003; Gyimah-Brempong, 2010). Furthermore, since the signs of ($Aid *$ $Institutions$) and ($Aid^2 * Institutions$) are negative and positive respectively, suggesting that the effect of institutions on aid effectiveness is negative at lower levels of aid and positive at higher levels of aid, it is essential to find the point beyond which the impact is positive. To do this, we first find the partial derivative of the growth rate of GDP per capita with respect to aid ($\partial y/\partial aid$) and equate it to zero. For column 1 in Table 4.5, we estimate this point as $-0.157 + (2 * 0.006 * Aid) + (-0.201 * Institution) + (2 * 0.007 * Institution * Aid)$. Taking the average value of *control of corruption* (-0.65), the effect of institutions on aid effectiveness is negative below aid-GNI values of 6.67 and positive above this value. Using data in column 2 and average *regulatory quality of* (-0.62.) $-0.110 + (2 * 0.005 * Aid) + (-0.205 * Institution) + (2 * 0.006 * Institution * Aid)$ also gives a threshold value of 6.68. It is interesting to note that about 46% of country-year aid figures in our dataset are below this threshold.

The finding of this study is that institutions promote aid effectiveness only when aid is above a threshold value. This result partially supports arguments on policy environment or governance on aid effectiveness and also Moyo (2009) and Gyimah-Brempong et al. (2010).

who recommend that donors should consider such a threshold to ensure the amount of aid allocated to developing countries is sufficient to foster economic prosperity.

TABLE 4. 6 Partial Effects of Aid and Institutions on Growth.

	Corruption Control	Regulatory Quality	Rule of law	Political Stability	Voice Accountability
Dependent variable: Annual GDP per capita growth					
Panel A: Average partial effect of Aid on Economic Growth					
Aid	-0.157*	-0.110	-0.113	0.000	-0.054
	(0.089)	(0.088)	(0.100)	(0.110)	(0.075)
Aid^2	0.006*	0.005*	0.005	0.002	0.001
	(0.003)	(0.002)	(0.005)	(0.003)	(0.003)
Aid*Institutions	-0.201**	-0.205**	-0.145**	-0.046	-0.156*
	(0.094)	(0.086)	(0.072)	(0.068)	(0.087)
Aid^2*Institutions	0.007**	0.006**	0.004	0.002	0.003
	(0.003)	(0.003)	(0.003)	(0.002)	(0.002)
Partial effect	0.01	0.03	0.017	0.04	0.030
	Corruption Control	Regulatory Quality	Rule of law	Political Stability	Voice Accountability
Panel B: Average partial effect of institutions on Economic Growth					
Institution variable	1.970***	1.890***	1.646***	0.283	1.534**
	(0.701)	(0.566)	(0.566)	(0.537)	(0.611)
Aid*Institutions	-0.201**	-0.205**	-0.145**	-0.046	-0.156*
	(0.094)	(0.086)	(0.072)	(0.068)	(0.087)
Aid^2*Institutions	0.007**	0.006**	0.004	0.002	0.003
	(0.003)	(0.003)	(0.003)	(0.002)	(0.002)
P-value of joint significance	0.0106	0.0054	0.0107	0.2462	0.1161
Partial effect	0.83	0.657	0.759	0.046	0.50
*Robust standard errors in parentheses * p<0.1, ** p<0.05, *** p<0.01*					

Our second research objective, that is, examining the differential effect of different dimensions of institutional quality on aid effectiveness is based on Table 4.5 Panel B. The average partial effect of institutions on growth is again estimated by finding the partial derivative of the growth rate of GDP per capita with respect to institutions ($\partial y/\partial institution$) holding aid at its mean. For example, the partial effect in column 1 is estimated as $1.970 + (-0.201 * Aid) + (0.007 * Aid^2)$. Two aspects of the table are relevant to answering the second research question – the joint significance of all the variables and the magnitude of the partial effect in each column. Three of five of the institutional variables – namely, *control of corruption (column 1)*, *regulatory quality (column 2)*, and *rule of law (column 3)* – have coefficients that

are jointly significant at 1%; the other two institutional variables- *political stability* and *voice and accountability* - have p-values of 0.25 and 0.12, respectively although their partial effects are positive. Given this outcome, we again fail to reject our second hypothesis and conclude that the type of institution matters for aid effectiveness. Considering the magnitudes of the partial effect, a one standard deviation increase in '*control of corruption*', '*regulatory quality*', and '*rule of law*' is associated with 0.83, 0.66, and 0.8 percentage point increase in the growth rate of GDP per capita respectively holding aid at its mean value. To put this in perspective, this represents about 40%-50% of the average economic growth rate of countries in the sample and about 10 times the effect of investment on growth. Furthermore, judging from the magnitudes of the partial effect we can deduce that the most important type of institution for aid effectiveness is '*control of corruption*', followed by '*rule of law*' and then '*regulatory quality*'.

Our finding supports the vast amount of literature on corruption and aid effectiveness and also highlights the importance of other dimensions of institutional quality such as rule of law and regulatory quality that have received less attention in the aid effectiveness literature in Africa. The results indicate that rule of law is almost as equally important as corruption which has been the focus of most studies and policies on aid effectiveness in Africa.

CHAPTER 5
SUMMARY AND POLICY RECOMMENDATION

5.1 Summary

This paper starts by presenting a famous debate by William Easterly and Jeffrey Sachs on aid and development, and further explained how based on this debate, the focus of the literature has shifted from whether aid works or not to 'when' and 'how' aid works. The paper revisits the argument by examining the effect of institutional quality in determining the effectiveness of foreign aid in Sub-Saharan Africa and extends it by examining the efficacy of different dimensions of institutional quality on aid effectiveness.

A theoretical model based on a standard Cobb-Douglas production function was presented to illustrate how aid can affect economic growth. An empirical model was then proposed based on the theoretical model to estimate the impact of institutions on aid effectiveness. The model controls for known determinants of growth such as initial GDP, Gross fixed capital formation, population growth, FDI, and Trade. Some econometric methodologies were presented and discussed, and their potential strengths and weakness were compared with each other. The decision to use system GMM as the main estimation technique is because of its potential to produce consistent estimates based on our model.

The findings in Chapter 4 confirm the hypothesis that foreign aid effectiveness hinges on both the level of aid and the quality of institutions in the recipient country. Estimating the average partial effect of aid on economic growth, we found that a one percent increase in aid allocated to SSA countries is associated with about 0.03 percentage points increase in GDP per capita growth. This is consistent with the prediction of the theoretical model presented in section 3.2 that shows the effect of foreign aid on GDP is positive but at its best, relatively small in magnitude. The findings also confirm a non-linear relationship between aid and economic growth (consistent with the findings of Ali & Isse, 2005; Gyimah-Brempong, Racine, &

Gyapong, 2010 and Wako Abda., 2017 amongst others). The results indicate a particularly interesting finding - that the impact of aid on growth is negative at lower levels of aid and positive at higher levels of aid. The threshold level of aid above which the impact of aid on growth is positive was found to be around 6.68. A careful glance at the data reveals that 46% of country-year aid figures were below this threshold. This finding shows that when formulating aid allocation policies, it is important to consider both the quality of institutions and the threshold where aid can have a significant impact on growth everything else being equal. Furthermore, the effect of all five dimensions of institutions on aid effectiveness is positive although *corruption*, *rule of law*, and *regulatory quality* were the most statistically significant. In terms of magnitude, *control of corruption* had the largest influence, followed by *rule of law*, and *regulatory quality*. This finding supports the hypothesis that the type of institution matters for aid effectiveness.

 The findings of this study partially support findings by other development economics scholars like Burnside and Dollar that aid can be very effective when there is a good policy environment in the recipient country. The results make so much sense in understanding why despite the increased aid allocation to the SSA region, it has not significantly reflected on economic growth. The conclusion of this study holds the view that institutional quality is very important in ensuring aid effectiveness for economic prosperity in SSA. Aid works, but that is largely dependent on the level of aid and the quality of institutional environment in the recipient country.

5.2 Policy Recommendations

This study reveals that high foreign aid inflows must be complemented with efficient and effective institutional structures to ensure aid effectiveness and growth in Sub-Saharan Africa. As the findings indicate, it is not always the case that aid does not work, sometimes aid is not just enough. Given that the region is known to be heavily dependent on aid to enhance capital

accumulation for productive growth, governments must invest in building quality institutions that guarantee the effective absorption of aid resources for increased and sustainable growth. Policymakers in sub-Saharan Africa must aim at reducing corruption, advancing the rule of law, and improving the regulatory environment that promotes the growth of the private sector to ensure aid effectiveness. Nevertheless, they must also understand that the burden of developing their respective countries lies first and foremost with them and that improving the quality of institutions in the sub-region is not only necessary to improve aid effectiveness, but also a crucial source of continued growth and prosperity. Furthermore, development partners should make achieving some level of institutional quality a condition for receiving aid; however, such a strategy should be carefully and slowly implemented in collaboration with the aid recipients themselves to avoid similar blunders of aid conditionalities in the past.
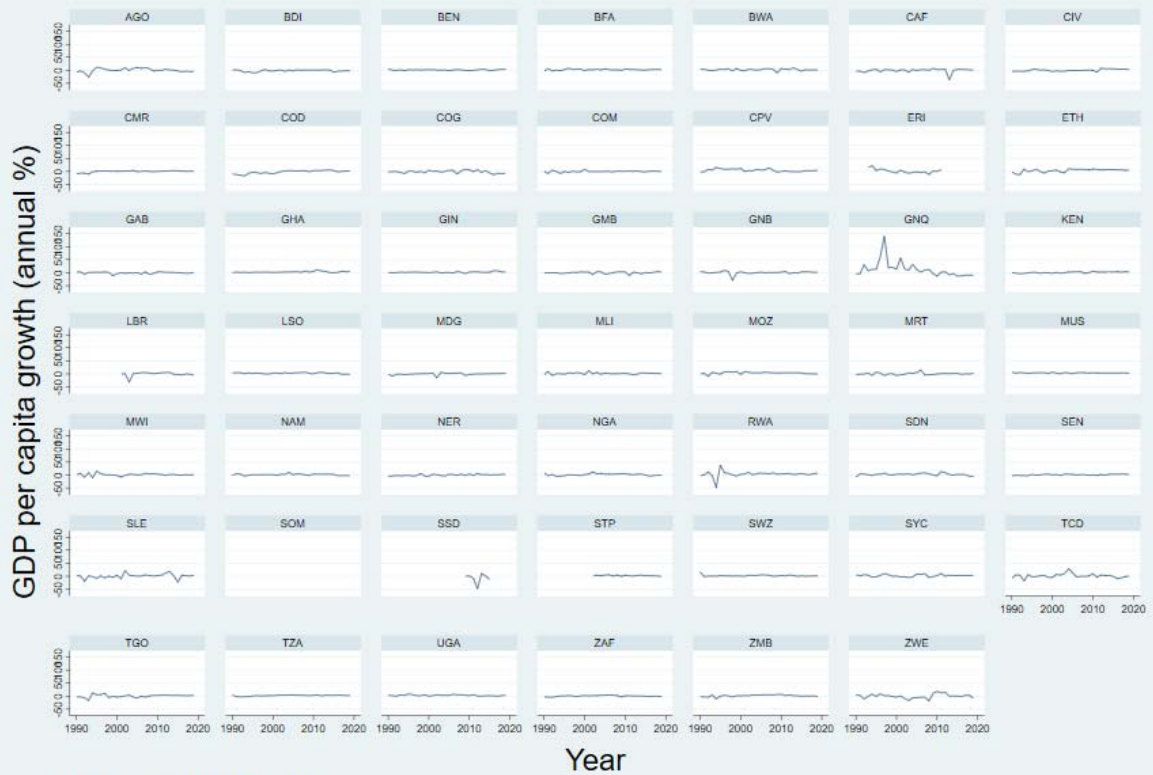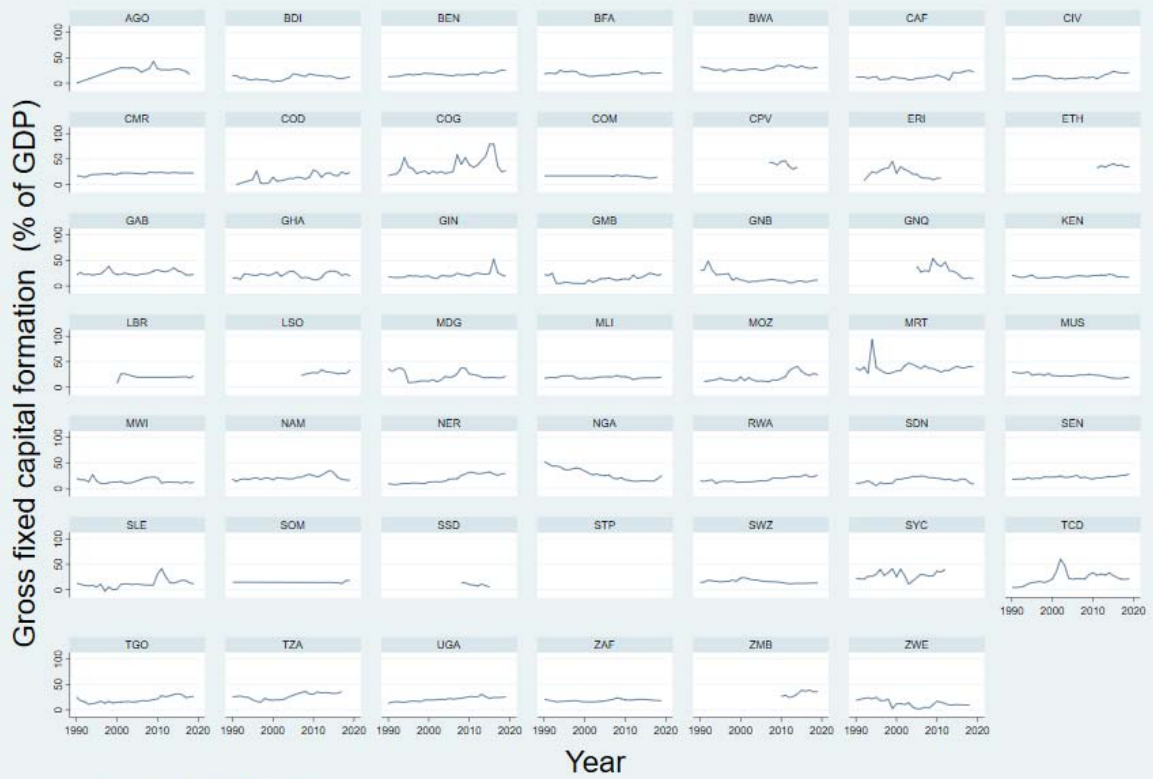
APPENDIX

Table 1

Correlation matrix

	gdppcgr	gfcgpgdp	trade	popgr	fdi	odapgni	cc_est	rq_est	rl_est	pv_est	va_est
gdppcgr	1.00										
gfcgpgdp	0.13	1.00									
trade	0.03	0.36	1.00								
popgr	-0.01	0.11	-0.26	1.00							
fdi	0.01	0.28	0.34	0.06	1.00						
odapgni	0.00	-0.20	-0.02	0.19	0.19	1.00					

cc_est	0.15	0.19	0.23	-0.43	0.03	-0.08	1.00			
rq_est	0.17	0.18	0.08	-0.25	-0.04	-0.23	0.76	1.00		
rl_est	0.16	0.22	0.19	-0.32	0.00	-0.20	0.87	0.87	1.00	
pv_est	0.08	0.22	0.32	-0.20	0.06	-0.19	0.66	0.62	0.75	1.00
va_est	0.15	0.12	0.15	-0.27	0.04	-0.08	0.69	0.76	0.80	0.62	1.00

GDP per capita growth (annual %)
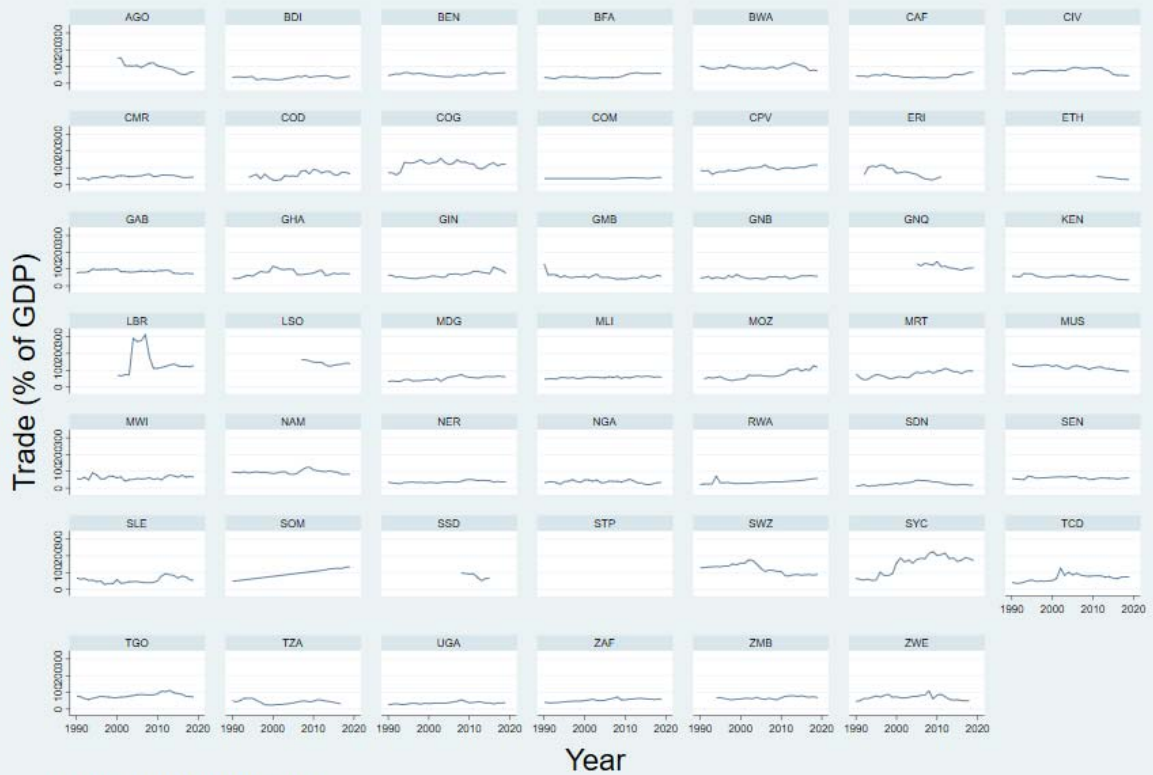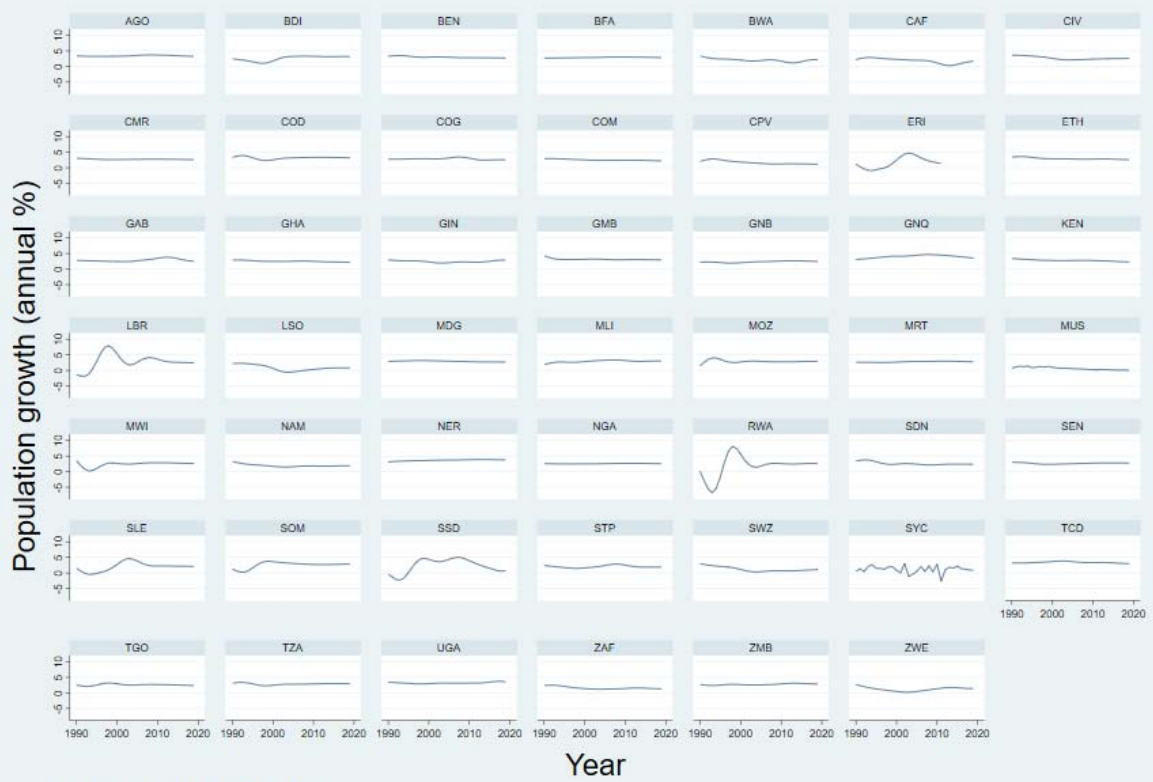
Graphs by Country Code

Gross fixed capital formation (% of GDP)

Graphs by Country Code

49

Trade (% of GDP)

Graphs by Country Code

Population growth (annual %)

Graphs by Country Code

Foreign direct investment, net inflows (% of GDP)

Graphs by Country Code

Net ODA received (% of GNI)

Graphs by Country Code

51

Control of Corruption

Graphs by Country Code

Regulatory Quality

Graphs by Country Code

Rule of Law

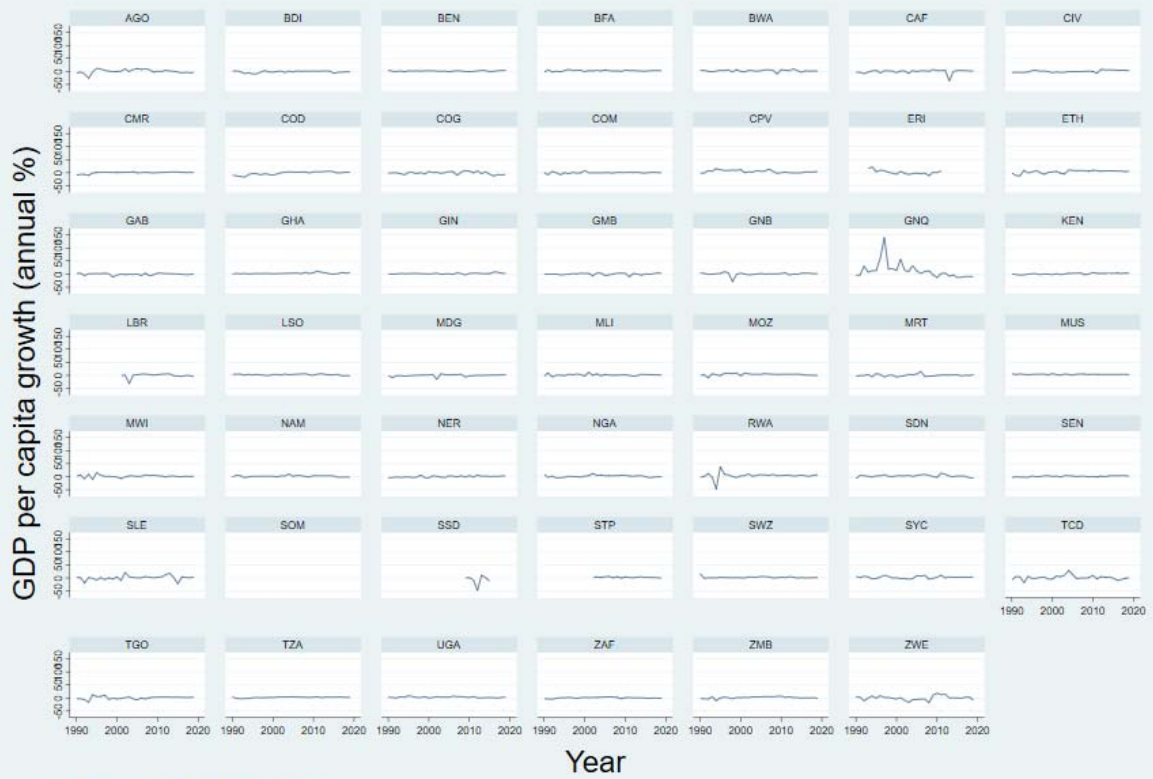Graphs by Country Code

Political Stability and Absence of Violence/Terrorism
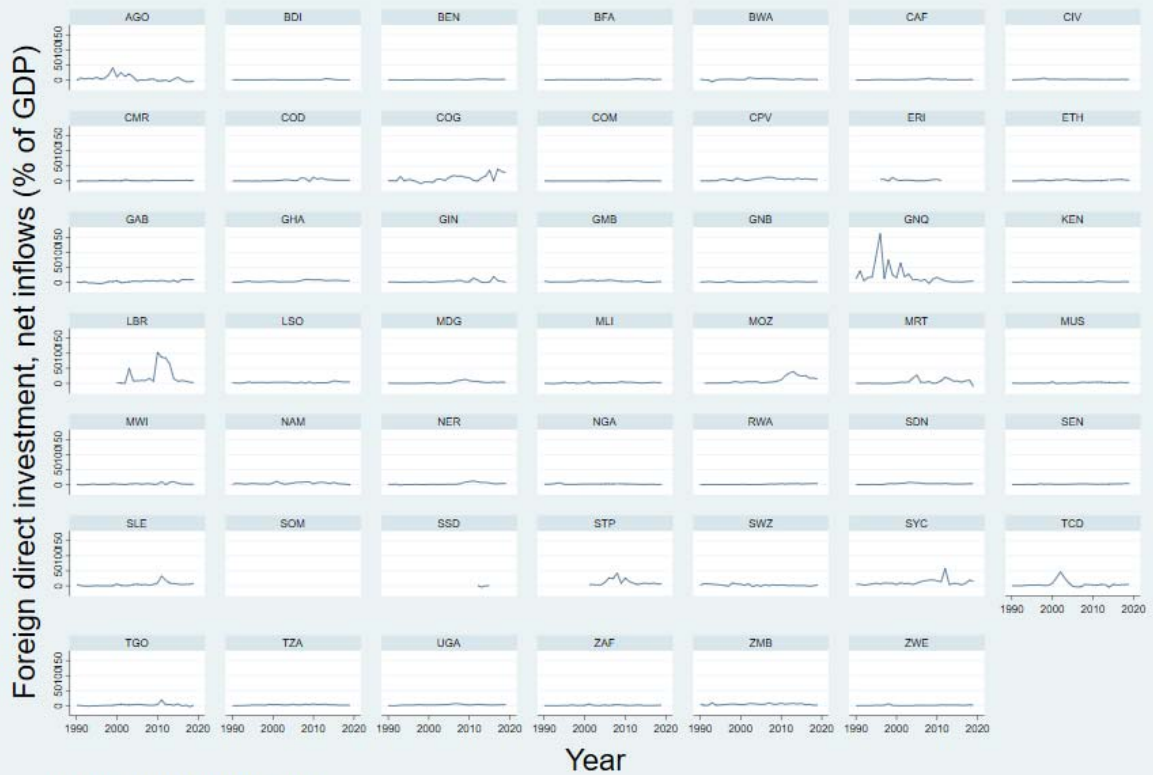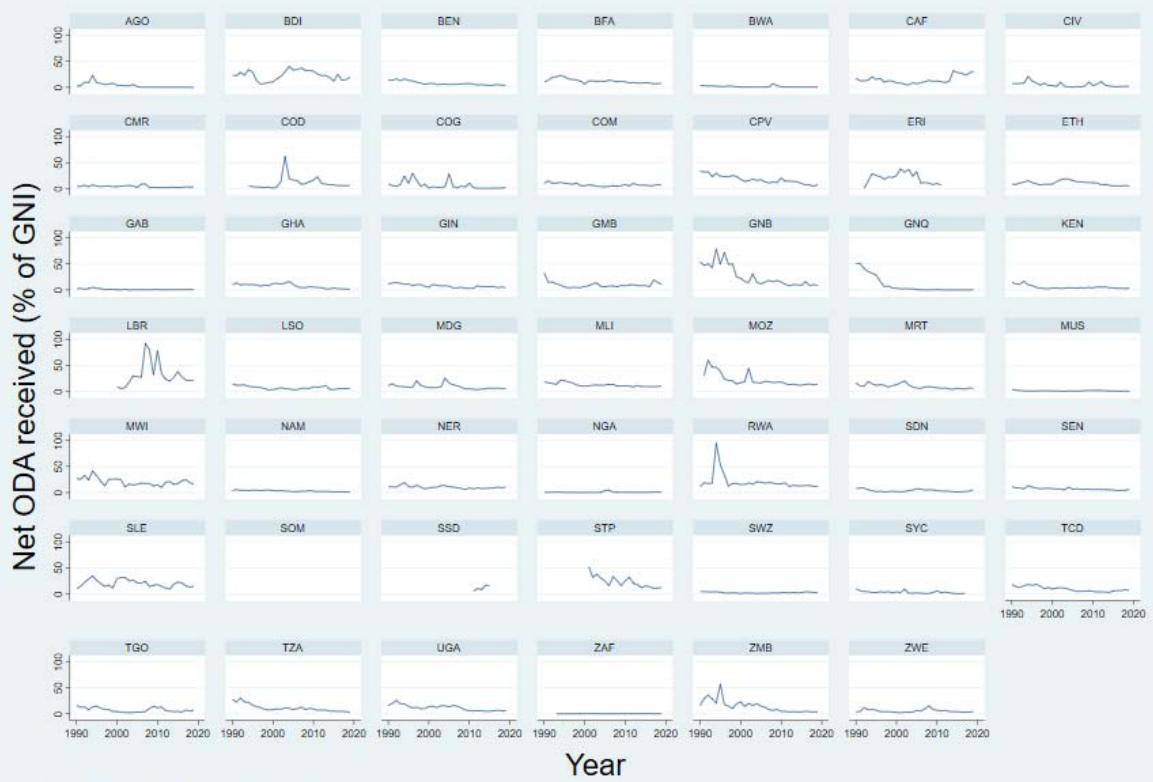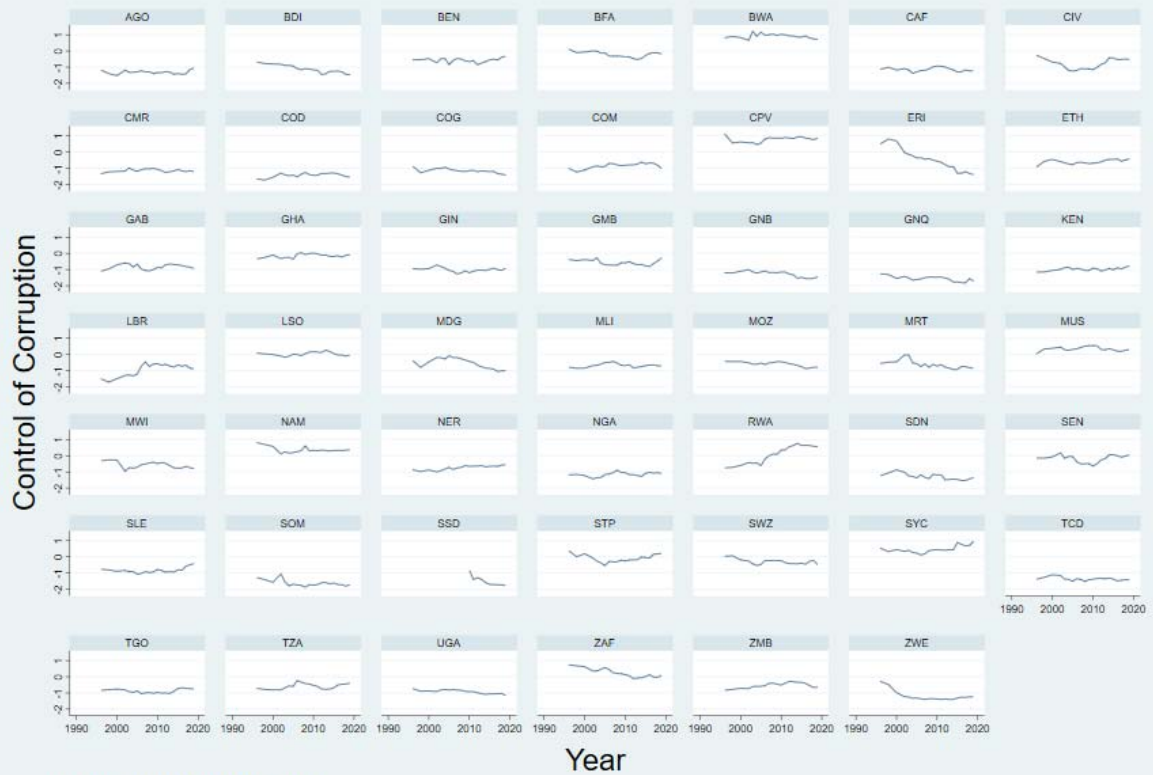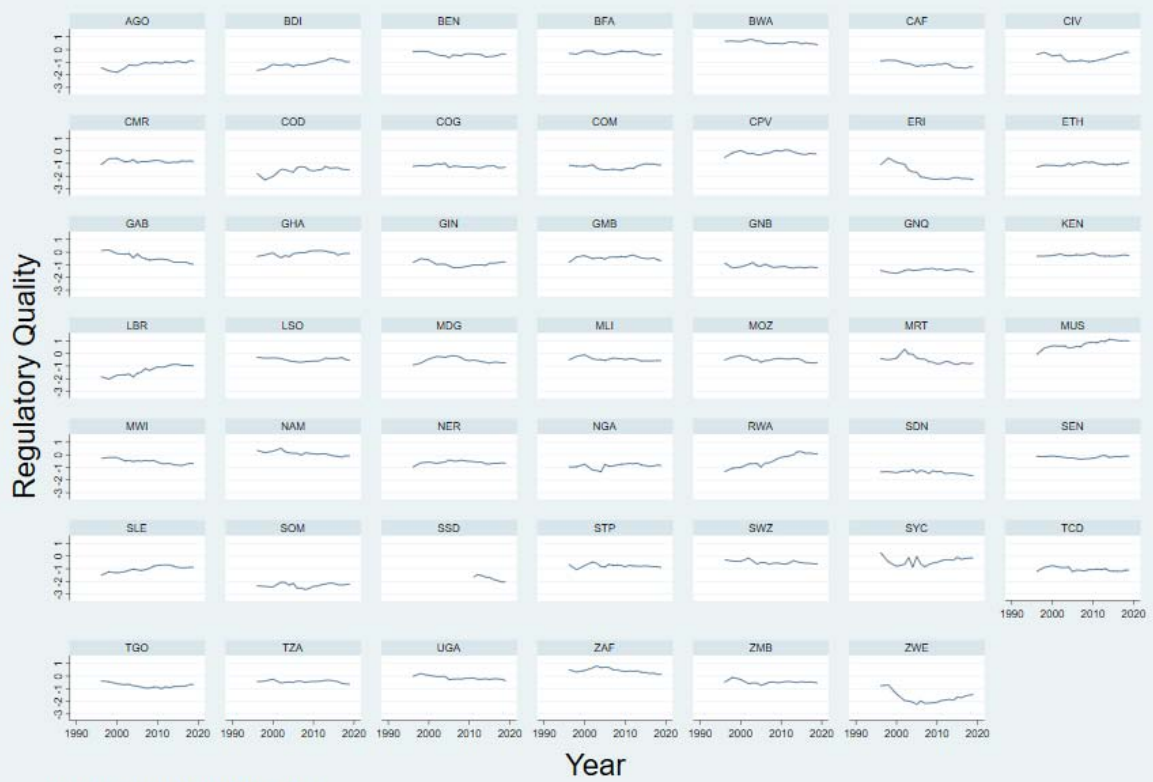
Graphs by Country Code
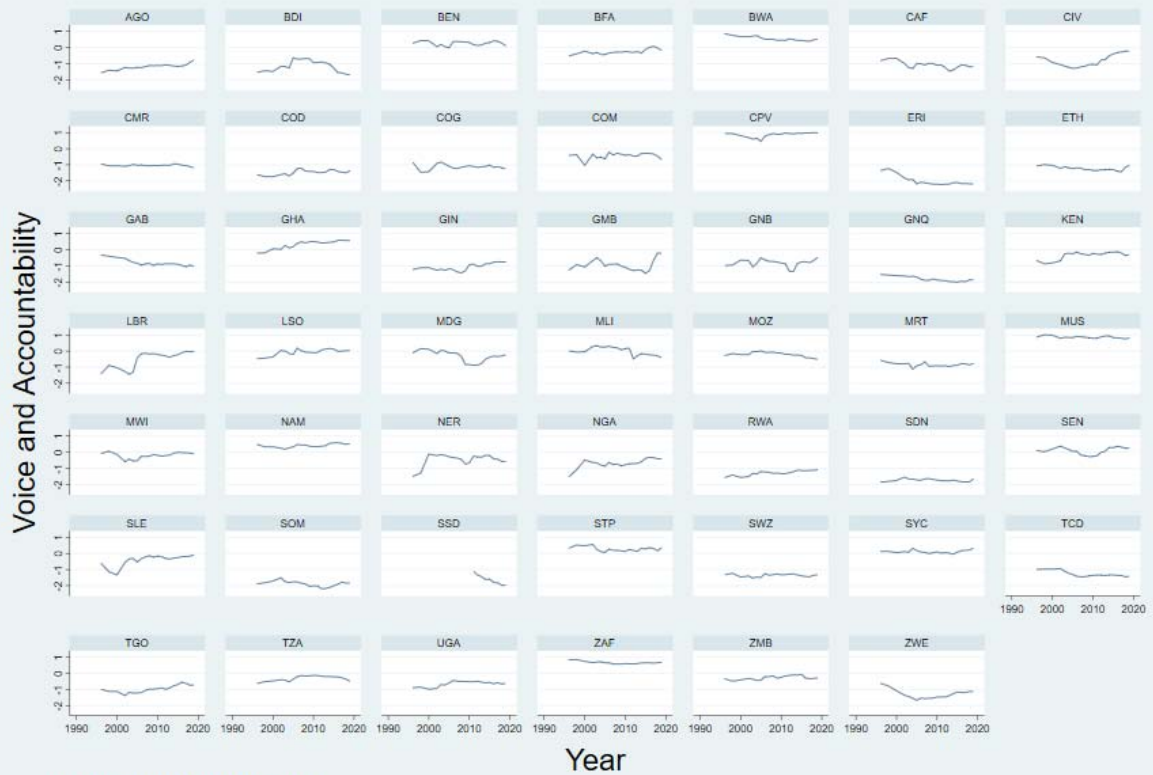
Graphs by Country Code

Graphs by Country Code

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