



# **EXAMINING THE RELATIONSHIP BETWEEN GOVERNANCE AND GROSS FIXED CAPITAL FORMATION IN SUB-SAHARAN AFRICA**

A Research Report submitted in partial fulfilment of the Degree of  
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## **DECLARATION**

I, Dennis Machobani, declare that this research report is my own unaided work. It is submitted in fulfilment of the requirements for the degree of Master of Commerce (M.Com) in Applied Development Economics at the University of the Witwatersrand, Johannesburg. It has not been submitted before for any degree or examination at this or any other university.

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## **ABSTRACT**

*This study delves into the intricate relationship between governance and Gross Fixed Capital Formation (GFCF) in Sub-Saharan Africa (SSA), aiming to address the substantial infrastructure deficit in the region. Employing the System GMM methodology, the primary research question focuses on understanding the correlation between institutions and GFCF in SSA. Subsequent sub-questions delve into the relationships between political stability and GFCF, as well as the composite index of institutions and GFCF. Policy recommendations highlight the pivotal role of good governance, advocating for reforms, institution strengthening, and enhanced transparency. The study's outcomes emphasize the intricate interplay of diverse factors impacting GFCF, prompting policymakers to adopt comprehensive strategies for sustainable development. Persistent effects of past investment choices underscore the necessity for continuous efforts to incentivize investment. Key determinants such as trade policies, current account balances, gross domestic savings, and government expenditure are identified, suggesting targeted interventions to stimulate private sector engagement and cultivate an environment conducive to heightened investment in Sub-Saharan Africa.*

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## Introduction

The Sub-Saharan Africa (SSA) region comprises 48 countries, with 27 classified as low-income countries (Ongundipe, 2014; Kimaro et al., 2017). This vast region grapples with a substantial infrastructure deficit (Edobor, 2022). Addressing this infrastructure gap necessitates significant fixed capital investments. Chileshe et al. (2020) assert that involving the private sector in infrastructure investment is essential due to the shortfall across various sectors. Governance factors play a pivotal role in shaping gross fixed capital formation (GFCF) levels. GFCF's significance in economic growth and poverty reduction in SSA is well-established (Akobeng, 2017). Despite this recognition, the factors influencing GFCF in SSA remain inadequately explored. Analysing the relationship between governance and GFCF is a crucial and valuable endeavour, shedding light on previously uncharted territories of economic development. This research delves into this understudied aspect, offering a unique opportunity to deepen our comprehension of economic development in the region. By investigating the intricate interplay between governance practices and GFCF, the study aims to provide valuable insights into the facilitators and hindrances of capital formation. These insights can inform policymakers and stakeholders in making informed decisions.

Several empirical studies have investigated financial determinants of domestic investment in SSA. Ndikumana (2000) examined the impact of financial development on domestic investment in 30 SSA countries, highlighting the positive correlation between domestic investment and financial development indicators. Akanbi (2016) delved into macro and institutional determinants of investment, emphasizing the significance of addressing institutional impediments. However, weak instruments limited the accuracy of Akanbi's 2SLS estimation method (Huang et al., 2021). The unique challenges and dynamics of SSA necessitate dedicated research. Most previous studies covered shorter time spans, lacked comprehensive data, and focused on a limited number of countries. This study enriches the discourse by analysing a longer time span, employing robust estimation techniques, and including important control variables like savings rate, unemployment rate, and population. Furthermore, it considers political stability, a crucial factor given the recent surge in successful military coups in Africa, impacting investment and economic development (Al Jazeera, 2023).

Governance is a critical driver of economic landscapes. Transparency, accountability, and efficiency foster stability and reduce uncertainty, enhancing the investment environment (Agere, 2000; Fung, 2014; Yang & Meng, 2023). Institutions also play a pivotal role in shaping

investment climate, emphasizing the importance of property rights, contract enforcement, and voluntary exchange (North, 1990; Barro, 1996; Hall and Jones, 1999; Acemoglu et al., 2001). Sub-Saharan Africa grapples with governance challenges like corruption, weak institutions, political instability, and inadequate regulatory frameworks, which hinder investment and economic growth. This study aims to uncover how governance practices affect capital formation, offering insights into economic development drivers in the region. The research's findings can inform policy decisions, particularly for policymakers, government agencies, and international development organizations in SSA. Understanding the nuanced relationship between governance and GFCF can guide targeted interventions, reforms, and strategies. Policies aimed at promoting good governance practices and strengthening institutions can be tailored, ultimately fostering sustainable economic growth and development in Sub-Saharan Africa. By using a dynamic panel data approach, the research contributes to a deeper understanding of the relationship between governance and domestic investment in SSA. Its findings can inform policy decisions, guide investor choices, and bridge the knowledge gap on this critical relationship in the region. Ultimately, by shedding light on these intricate dynamics, this research aids in the pursuit of sustainable economic growth and development in Sub-Saharan Africa. The rest of the paper is organised as follows: Section 1 begins briefly by discussing the problem statement and the research objectives, Section 2 presents the review of literature, Section 3 discusses the data to be used, Section 4 presents the research methodology, Section 5 presents the findings, and Section 6 offers policy implications and conclusion.

## **Section 1**

### **1.1. Problem Statement**

This research delves into the intricate interplay between governance and GFCF in Sub-Saharan Africa (SSA), where a substantial infrastructure deficit poses a significant challenge. SSA faces unique challenges in gross fixed capital formation (GFCF) compared to other regions, and a substantial infrastructure and financing gap exists (Calderon et al., 2018). To address this gap, it's crucial for governments to facilitate private sector involvement in infrastructure investment, as Chileshe et al. (2020) advocates. Though estimates vary, assessments conducted by the African Development Bank (2018) indicate that the infrastructure requirements of the continent stand at \$130–170 billion annually, accompanied by a financial shortfall ranging from \$68 to \$108 billion. Despite the recognised importance of GFCF for economic development in SSA, there is a notable lack (especially over the past five years) of in-depth exploration into the

factors influencing it. The core issue lies in the insufficient examination of the nuanced relationship between governance elements like political stability, control of corruption, and GFCF in the region. Given the prevalent governance challenges such as corruption, weak institutions, political instability<sup>1</sup>, and regulatory gaps, understanding how these aspects affect capital formation becomes crucial. Naidoo et al (2024) showed that widespread corruption significantly contributes to the decline of trust in political establishments, who further argued that there is a substantial link between corrupt behaviours and limited economic advancement in the Sub-Saharan region. This study aims to unveil this intricate relationship, offering crucial insights for policymakers and stakeholders to make well-informed decisions, customise interventions, and promote sustainable economic growth and development in Sub-Saharan Africa.

## **1.2. Research Question**

- a) The research will attempt to answer the following research questions:
- b) The main research question is: What is the relationship between institutions and gross fixed capital formation in SSA? The main research question has two sub-questions:
  - What is the relationship between political stability and gross fixed capital formation in SSA? The reason for the inclusion of this indicator is provided in Section 2.
  - What is the relationship between composite index of institutions and gross fixed capital formation in SSA?

## **Section 2**

### **2.1. Literature Review**

The literature review serves as a crucial guide as we navigate the complex landscape of research concerning the correlation between governance and Gross Fixed Capital Formation in Sub-Saharan Africa. Its central aim is to provide an overview of the fundamental theoretical concepts and analytical frameworks that underpin our study. Through this review, we seek to gain a profound understanding of essential investment theories, such as the Fixed Accelerator Theory, the Flexible Accelerator Model, Tobin's q theory, and the neoclassical theory of investment. We aim to assess their suitability and relevance within the distinctive context of Sub-Saharan Africa. This literature review will also be instrumental in shaping our analytical

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<sup>1</sup> According to Birdsall (2007), a large number of African countries have been classified as being “fragile”, considering that most of these countries have experienced internal conflicts in the recent past.

framework by illuminating potential pathways that link investment, income, and institutional factors, with a particular emphasis on governance quality. This encompasses aspects like political stability, regulatory conditions, and corruption and their impact on investment decisions and capital accumulation. Moreover, the review will create a solid groundwork for empirical research by identifying pertinent studies that either support or challenge these theories. This will anchor our research in the existing body of knowledge and facilitate a deeper understanding of the underlying mechanisms at play in the region.

## **2.2. Theoretical Framework**

The Fixed Accelerator Theory, initially proposed by Clark (1917), suggests a direct and instantaneous link between the capital stock and output. This Keynesian-based theory posits that changes in aggregate demand, represented by output, drive investment decisions. Adjustments occur immediately, and the capital-to-output ratio remains constant, indicating that investment is primarily influenced by changes in aggregate demand. Criticisms of this theory include its assumption of a constant capital-to-output ratio and the omission of various influential factors like the cost of capital and uncertainty, leading to the evolution of the flexible investment accelerator model.

The Flexible Accelerator Model, introduced by Clark (1994), extends the alignment of actual capital stock with the desired level over multiple time periods. It incorporates a variable capital-to-output ratio, allowing for gradual adjustments influenced by various factors, including uncertainty and market deficiencies. Investment depends on the gap between desired and previous period's capital value, with a fractional parameter ( $\lambda$ ) playing a key role in bridging this gap. This model implies a slower response of investment to changes in expected income or output, resulting in lower short-term investment volatility.

The q theory of investment behaviour, rooted in Tobin (1969), deviates from production-oriented models by explaining investment from a financial and portfolio balance perspective. It quantifies the q ratio as the ratio between the market value of existing fixed capital and its replacement cost. When the q ratio exceeds one, it suggests that stock market investors value a firm's machinery and equipment higher than their replacement cost, motivating firms to invest in new equipment when anticipating increased product demand.

The neoclassical theory, based on Jorgensen (1963), makes several fundamental assumptions, including efficient utilization of fixed capital, diminishing returns to capital and labour, absence of adjustment costs, and perfect financial markets. It also posits the existence of a putty-putty

form of firm capital, allowing for instantaneous adaptation to different technologies without additional costs. This theory emphasizes the cost of capital as the primary driver of investment decisions.

The connection between the Flexible Accelerator Model and the research topic lies in the model's focus on how economic conditions and policies influence investment behaviour and, consequently, Gross Fixed Capital Formation. In Sub-Saharan Africa, where governance quality significantly impacts the investment landscape, this theory aligns with the study's aim to empirically investigate how governance factors shape capital formation in the region. The next section reviews some of the empirical and related studies conducted.

### **2.3. Empirical studies**

Nadeem et al. (2020) investigated the connection between voice and accountability and innovation in Pakistan. The study revealed that a robust voice of accountability, reflecting increased transparency, citizen participation, and reduced corruption, has a favourable effect on innovation. It suggests that when individuals have the ability to voice their concerns in governance and hold authorities accountable, it fosters an environment conducive to innovation. This, in turn, can contribute to positive outcomes for Pakistan's economic development and investment formation. The presence of political instability, particularly when characterised by violent disruptions, hampers both the productive and transactional capabilities of the economy. This has detrimental effects on investment and, consequently, future economic development, thereby giving rise to a vulnerable socio-political climate (Dalyop, 2019). Therefore, nurturing political stability and good governance is indispensable for unlocking SSA's substantial investment potential, stimulating economic diversification, and ultimately enhancing the overall socio-economic conditions of SSA nations.

Government effectiveness reflects assessments of the quality of public services, the effectiveness and independence of the civil service from political influences, the calibre of policy creation and execution, and the trustworthiness of the government's dedication to these policies (Kaufmann et al., 2010). Government effectiveness plays a pivotal role in influencing investment through its impact on the business climate, investor trust, and the overall ease of conducting business within a specific nation. Regulatory quality encompasses evaluations of the government's capacity to create and enforce effective policies and regulations that facilitate and encourage private sector growth. Rammal and Zurbruegg (2006) examined the impact of regulatory quality on investment, specifically intra-foreign direct investment (FDI) flows in the

ASEAN markets. The findings highlighted the vital role of regulatory quality in shaping investment patterns within the ASEAN markets and suggests that improvements in this aspect can lead to increased intra-FDI flows, potentially fostering economic growth and development.

The rule of law pertains to how individuals perceive and adhere to societal norms and regulations, with a particular emphasis on the effectiveness of enforcing contracts, property rights, the performance of law enforcement, the judiciary system, and the prevalence of crime and violence. Staats and Biglaiser (2012) explored the interplay between the rule of law and investment, particularly FDI in Latin America. They emphasize the pivotal role played by the rule of law and the strength of the judiciary in impacting investment choices. The research highlights that the perception of a robust and dependable legal system, coupled with adherence to the rule of law, significantly influences FDI. In areas where the rule of law is firmly established, and the judiciary is robust, there is a higher appeal for foreign direct investment. This is due to the elevated investor confidence and reduced perceived risks associated with investing in countries with resilient legal systems. The study underscored the rule of law's vital importance in shaping investment trends and its positive impact on FDI in Latin America.

In recent years, a growing body of empirical research has delved into the financial determinants of domestic investment in Sub-Saharan Africa (SSA). This exploration has unveiled a complex web of factors that influence the investment landscape in the region, shedding light on the key issues that underpin investment behaviour. These studies have provided valuable insights into the dynamics of investment in SSA, offering both challenges and opportunities for economic development.

Oshikoya (1994) and Ndikumana (2000) are two notable researchers who have examined the financial determinants of private investment in selected African countries. Oshikoya found that factors such as real output, credit availability, exchange rates, inflation, and public investment in infrastructure play a pivotal role in shaping private investment. He emphasized the importance of establishing a stable and reliable policy environment as a crucial element in influencing private investment. Meanwhile, Ndikumana's study, which encompassed 30 SSA countries, delved into the impact of financial development on domestic investment. His findings highlighted a positive correlation between domestic investment and various financial development indicators. However, it's essential to recognize that the intricate and non-linear nature of real-world investment behaviour is not adequately captured by models assuming linear relationships between variables, as noted by Leita (2010).

Akanbi (2016) further investigated macro and institutional determinants of investment, affirming the influence of factors such as GDP, financial development, exchange rates, cost of capital, and governance on domestic investment in SSA. He underscored the significance of addressing institutional impediments, with a focus on strengthening government institutions and enhancing coordination within various government structures. However, it's worth noting that Akanbi's methodology using the two-stage least-squares estimation (2SLS) technique may face limitations when dealing with weak instruments, as cautioned by Huang et al. (2021).

A recurring theme in these studies is the interplay between savings and investment. Ndikumana (2000) pointed out that investment rates have sharply fallen in SSA since 1980, and he highlighted the positive correlation between savings and investment. Financial factors, such as external debt, inflation, black market premiums, and government domestic borrowing, were identified as significant influencers of investment in the region. Additionally, the allocation of investment capital to high-return activities is significantly influenced by the role of financial markets (Greenwood and Smith, 1997).

Notably, the role of governance and institutional quality in shaping investment patterns within SSA is gaining increasing attention. Good governance practices, characterised by transparency, accountability, and efficiency, create an enabling environment for investment, as emphasized by Agere (2000), Fung (2014), and Yang and Meng (2023). These practices reduce uncertainty and promote stability, which are crucial for attracting investors and stimulating economic growth.

The institutional perspective, championed by North (1990), Barro (1996), Hall and Jones (1999), and Acemoglu et al. (2001), underscores the pivotal role institutions play in shaping the investment climate. Effective institutions protect property rights, ensure contract enforcement, and maintain stable regulatory frameworks, all of which lower risk and uncertainty for investors. The negative consequences of corruption on the accumulation of private capital, as highlighted by Everhart (2009), further emphasize the critical role of good governance.

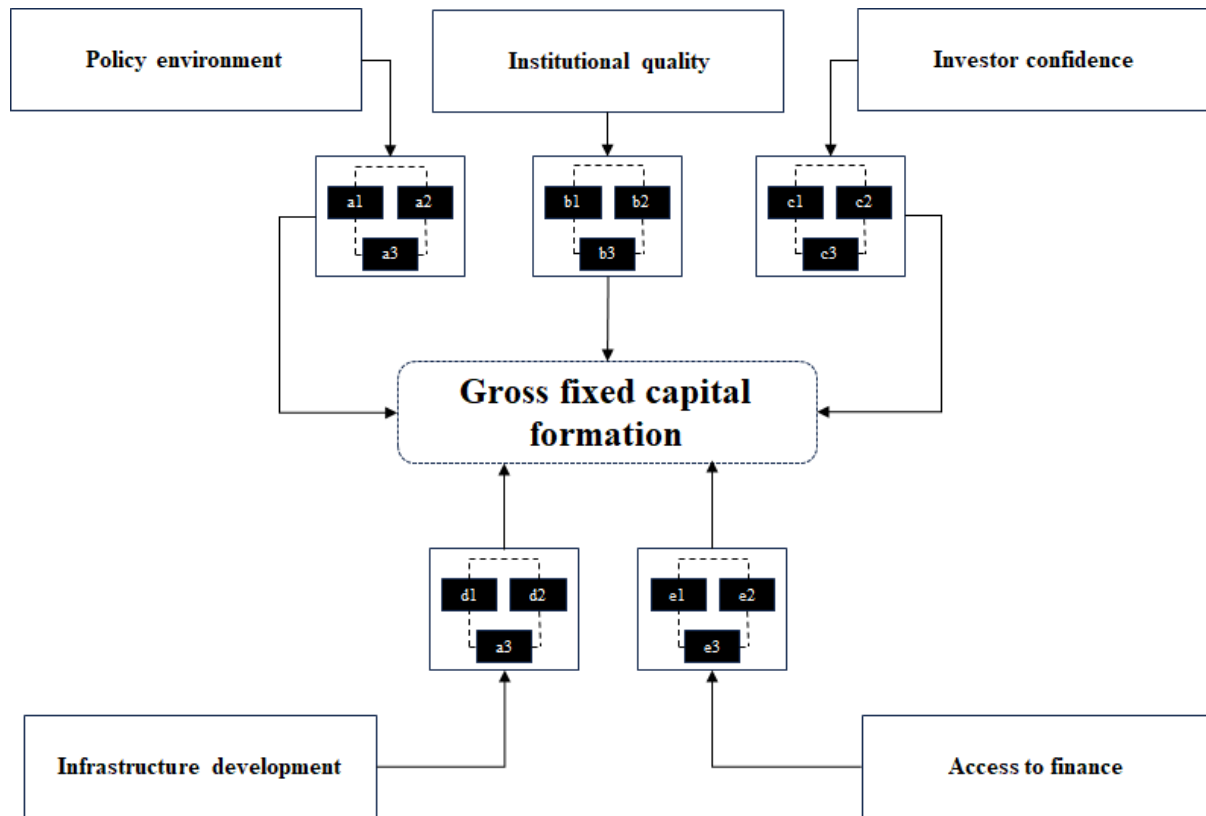
However, governance challenges persist in SSA, including corruption, political instability, and inadequate regulatory frameworks, which can hinder investment and impede economic growth. Political instability, in particular, raises the risk of capital loss and is associated with decreased investment (Fosu, 1992). Nurturing political stability and good governance is crucial for

unlocking SSA's investment potential, promoting economic diversification, and enhancing socio-economic conditions, as Dalyop (2019) has pointed out.

In line with neoclassical investment theory, interest rates have an inverse relationship with investment, with many studies confirming this (Bosco & Emerence, 2016; Liu et al., 2022). SSA faces unique challenges in gross fixed capital formation (GFCF) compared to other regions, and a substantial infrastructure and financing gap exists (Calderon et al., 2018). To address this gap, it's crucial for governments to facilitate private sector involvement in infrastructure investment, as Chileshe et al. (2020) advocates.

The analytical framework depicted in **Figure 1** highlights the primary pathways by which governance indicators can potentially impact GFCF in SSA. Initially, the stability of the policy environment is crucial, where enhanced governance creates an investment-friendly climate through fortifying legal frameworks, augmenting regulatory transparency, and mitigating corruption risks. Subsequently, institutional quality assumes significance as good governance nurtures robust institutions, encompassing effective public entities for economic management and a dependable judiciary. Investor confidence is then bolstered by effective governance, attracting greater capital inflows through heightened transparency, and reduced political instability. Infrastructure development is facilitated by governance improvements, ensuring resource allocation efficiency, timely project execution, and the mitigation of corruption in infrastructure projects. Finally, access to finance for businesses is positively impacted by enhanced governance, achieved through strengthened banking sectors, decreased corruption in financial institutions, and improved credit information systems. This collective framework aims to create an environment conducive to capital formation within the SSA context.

**Figure 1: Analytical framework**



**Legend:** *a1: Strengthening legal frameworks for property rights; a2: Improving regulatory transparency and efficiency; a3: Mitigating corruption risks; b1: Establishing effective public institutions for economic management; b2: Strengthening financial institutions; b3: Promoting an independent judiciary; c1: Enhancing transparency in government actions; c2: Reducing political instability and corruption concerns; c3: Improving the overall business environment; d1: Efficient allocation of public resources for infrastructure projects; d2: Timely project approvals and implementation; d3: Combating corruption in infrastructure initiatives; e1: Strengthening the banking sector through effective regulation; e2: Addressing corruption in financial institutions; e3: Enhancing credit information systems*

Source: Author's own adaptation

The examination of the correlation between governance and gross fixed capital formation (GFCF) in Sub-Saharan Africa (SSA) is underscored by recurrent themes in the literature review above. A central focus is the pivotal role of good governance, characterised by transparency, accountability, and efficiency, in establishing a conducive environment for investment. Various studies, including those conducted by Agere (2000), Fung (2014), and Yang and Meng (2023), consistently emphasize that good governance practices diminish uncertainty, foster stability, and are essential for attracting investors, thereby stimulating economic growth. The institutional perspective, advocated by scholars such as North (1990), Barro (1996), Hall and Jones (1999), and Acemoglu et al. (2001), accentuates the significance of institutions in shaping the investment climate. Effective institutions safeguard property rights, ensure contract enforcement, and maintain stable regulatory frameworks, collectively reducing risk and uncertainty for investors. Moreover, the adverse effects of corruption on

private capital accumulation, as highlighted by Everhart (2009), underscore the crucial role of good governance.

Despite the consensus on the positive impact of good governance and effective institutions on capital formation, persistent challenges in SSA are acknowledged. Issues such as corruption, political instability, and inadequate regulatory frameworks are identified as governance challenges capable of impeding investment and hindering economic growth. Political instability, notably, is linked to reduced investment (Fosu, 1992). Thus, the literature recognises the imperative to address these governance challenges for unlocking SSA's investment potential, fostering economic diversification, and enhancing socio-economic conditions. The literature also explores specific dimensions of governance, such as voice and accountability, government effectiveness, regulatory quality, the rule of law, and control of corruption, to discern their unique roles in shaping investment patterns. These dimensions collectively underscore the intricate nature of governance and its influence on capital formation. While there is a shared agreement on the positive relationship between good governance and capital formation, the literature also acknowledges the inherent complexities. Akanbi (2016) stresses the necessity of addressing institutional obstacles, and the limitations of methodologies, such as the two-stage least-squares estimation (2SLS) technique, are acknowledged (Huang et al., 2021). This recognition implies that while the broad relationship is acknowledged, ongoing exploration is needed to delve into nuances and consider methodological intricacies. While a consensus exists on the positive impact of good governance and effective institutions, the literature also acknowledges challenges and complexities, emphasizing the continuous need for research and endeavours to address governance issues for sustainable capital formation and economic development in the region.

In addition, the existing literature exhibits several limitations, which create opportunities for the present study to make substantial contributions. While Nadeem et al. (2020) emphasises the significance of governance aspects like voice and accountability in driving innovation in Pakistan, their research lacks a specific focus on the unique socio-economic dynamics of Sub-Saharan Africa (SSA). Additionally, it does not comprehensively explore the financial determinants of domestic investment in SSA. Although, Dalyop (2019) underscores the adverse impact of political instability, the study does not offer an extensive analysis of various governance factors, financial determinants, and their collective influence on investment behaviour in the SSA context. The study by Rammal and Zurbruegg (2006) provides insights

into the role of regulatory quality in investment but has a limited scope as it pertains to the ASEAN markets, which may not fully capture the challenges and opportunities specific to SSA.

Furthermore, the literature lacks a comprehensive examination of how financial determinants and governance indicators jointly affect Gross Fixed Capital Formation (GFCF) in SSA. Prior studies often narrow their focus to specific financial factors or governance measures, thereby restricting a holistic exploration of their combined impact on investment formation. Some studies also employ methodologies like Akanbi's (2016) two-stage least-squares estimation (2SLS), which may have methodological limitations, potentially affecting the reliability of their findings.

The prospective contribution of this study lies in addressing these shortcomings. By making use of System GMM (Generalized Method of Moments), the research seeks contribute to the existing body of knowledge. The methodology proves to be a distinctive and innovative approach when investigating the potential relationship between governance and gross fixed capital formation (GFCF) in SSA. In contrast to conventional methods, System GMM allows for dynamic panel data analysis, facilitating the integration of lagged variables and more effectively addressing endogeneity concerns. This temporal dimension becomes pivotal in exploring the influence of governance on capital formation, capturing the evolving nature of institutional factors over time. By utilising both levels and differences of the variables, System GMM enhances the precision of parameter estimation, mitigates biases associated with endogeneity, and delivers more dependable and unbiased estimates of the relationship. Consequently, this methodology contributes significantly to the research by providing a robust analytical framework that considers the dynamic nature of governance variables and their impact on GFCF in SSA. In doing so, it advances the accuracy and depth of insights into the intricate dynamics characterizing this relationship.

In summary, the deficiencies in previous research stem from their restricted scope, limited applicability to the region, and methodological constraints. The potential contribution of the present study is to provide a more comprehensive and region-specific analysis of the interplay between governance, financial determinants, and capital formation, thereby delivering valuable insights for policymakers and investors interested in SSA's investment landscape.

## Section 3

### 3.1. Data

This research cover period from 1996 to 2022 and data on Gross Fixed Capital Formation (% of GDP) was sourced from the World Bank database, while data with all the governance indicators (covering the following dimensions: Voice and Accountability, Political Stability and Absence of Violence/Terrorism, Regulatory Quality, Rule of Law, Government Effectiveness and Control of Corruption) was sourced from the Worldwide Governance Indicators (WGI) project. Other control variables such as GDP, inflation, unemployment rate population and savings rate were used in the study, whose data was obtained from the World Bank World Development Indicators database.

The summary of descriptive statistics provided in **Table 1** highlights significant variation in economic and governance metrics within the dataset. Notably, GFCF demonstrates considerable diversity in investment patterns, as indicated by its mean of 21.54 and a substantial standard deviation of 10.77. GDP per Capita (LogGDPCAP) reflects positive values with a mean of 7.11. Population (LogPOPs) reveals significant variations in population sizes, ranging from -6.08 to 2.81. Trade as a percent of GDP (TRA) indicates a noteworthy information on international trade, with a high mean of 67.71. The Current Account Balance (% of GDP) (CA) shows a negative mean (-5.10), signalling that more countries have deficits in their savings-investment balance. Government debt as percent of GDP (DEBT) underscores substantial variability in debt levels, with a mean of 106.88. Lending Interest rate (LEN) and Government expenditure (GOVE) exhibit moderate means and standard deviations, indicating a degree of stability in lending rates and government spending.

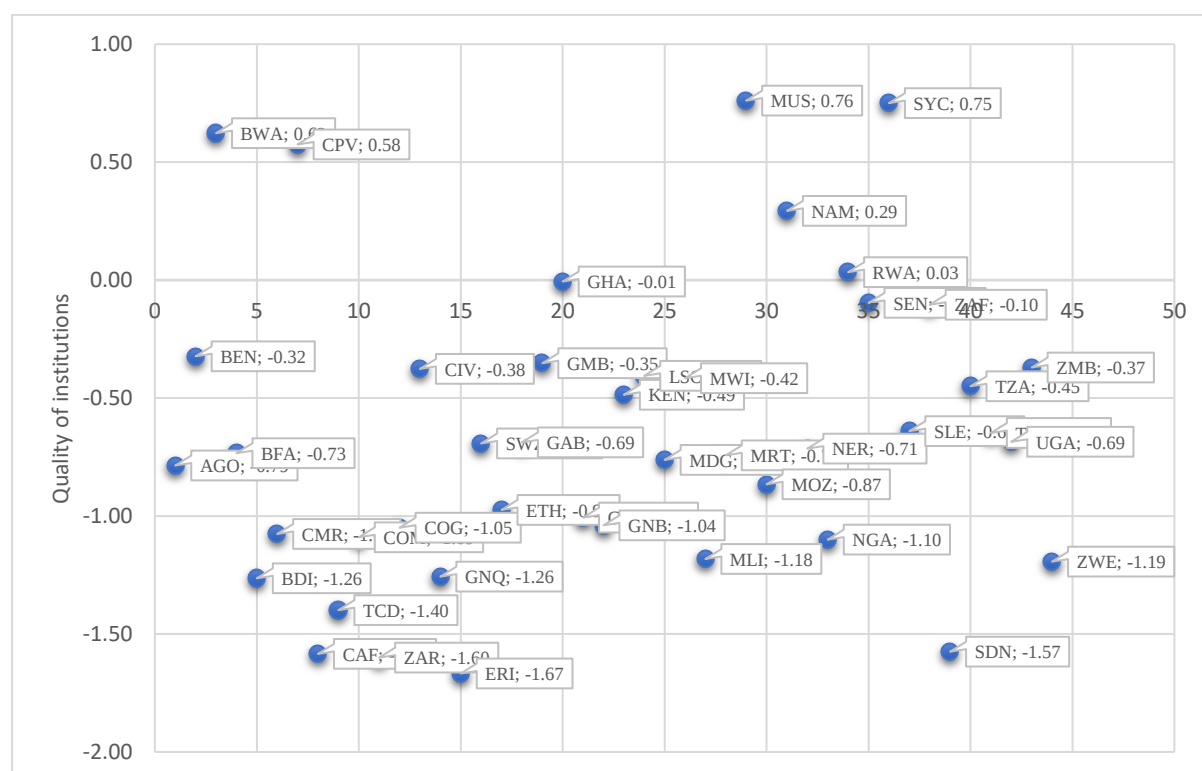
**Table 1: Descriptive statistics**

| Variable                                              | Abbre.    | Mean   | Std. Dev. | Min     | Max    | Expe. sign |
|-------------------------------------------------------|-----------|--------|-----------|---------|--------|------------|
| Gross fixed capital formation (% of GDP)              | GFCF      | 21.54  | 10.77     | -2.42   | 115.10 |            |
| Log GDP per capita                                    | LogGDPCAP | 7.11   | 0.97      | 5.46    | 9.75   | +          |
| Log population, total                                 | LogPOPs   | 0.80   | 0.60      | -6.08   | 2.81   | +/-        |
| Trade (% of GDP)                                      | TRA       | 67.71  | 34.93     | 2.70    | 235.82 | +          |
| Current account balance (% of GDP)                    | CA        | -5.10  | 10.13     | -124.56 | 40.86  | +          |
| Government debt (% of GDP)                            | DEBT      | 106.88 | 150.73    | 0.89    | 761.75 | -          |
| Gross domestic savings (% of GDP)                     | GDS       | 17.07  | 45.52     | 83.29   | 83.29  | +          |
| Lending interest rate (%)                             | LEN       | 15.28  | 4.74      | 217.88  | 217.88 | -          |
| Government expenditure (%GDP)                         | GOVE      | 15.14  | 7.46      | 2.05    | 62.13  | +/-        |
| Voice and Accountability                              | VA        | -0.59  | 0.73      | -2.23   | 1.01   | +          |
| Political Stability and Absence of Violence/Terrorism | PS        | -0.52  | 0.89      | -2.85   | 1.28   | +          |
| Government Effectiveness                              | GE        | -0.74  | 0.61      | -1.88   | 1.15   | +          |
| Regulatory Quality                                    | RQ        | -0.66  | 0.61      | -2.37   | 1.20   | +          |
| Rule of Law                                           | RL        | -0.67  | 0.64      | -1.92   | 1.04   | +          |
| Control of Corruption                                 | CC        | -0.61  | 0.64      | -1.65   | 1.70   | +          |
| Composite Index of governance indicators              | INST      | 0.00   | 1.00      | -2.77   | 3.02   | +          |

Source: Author's own calculation

Additionally, governance indicators such as Voice and Accountability (VA), Political Stability (PS), Government Effectiveness (GE), Regulatory Quality (RQ), Rule of Law (RL), Control of Corruption (CC), and the Composite Index of governance indicators (INST) display varying mean values and standard deviations, reflecting the diverse governance quality across the sampled countries. Thus, this comprehensive overview of descriptive statistics unveils common trends and significant variations in economic and governance metrics. The sampled countries generally portray low values for quality of institutions. For instance, average values for Voice and Accountability, Political Stability and Absence of Violence/Terrorism, and Rule of Law for the sampled countries (combined) during the period under review (1996 – 2022) was 0.61, 0.73 and 0.52, respectively. What is even more striking is that none of the six governance indicators had an average above 0.80. Most of the countries in the sample had unfavourable and negative quality of institutions, based the Composite Index of governance indicators which captures the average of institutions in 2022 (**Figure 2**). Therefore, on average, the region has poor levels of institutions.

**Figure 2: Average composite index of institutions: 1996 - 2022**



**Source: Author's own calculations**

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

The pairwise correlation matrix presented in **Table 2** offers notable insights into the level of association among various economic and governance variables. A positive correlation of 0.084 indicates a connection between Gross Fixed Capital Formation (GFCF) and GDP per Capita, implying that increased capital formation corresponds to higher GDP per capita. The robust positive correlation of Trade with economic indicators like GFCF and GDP per Capita suggests a strong association between trade and overall economic performance. Conversely, the negative correlation between Current Account Balance (% of GDP) and GFCF, as well as GDP per capita, implies that countries with greater capital formation and higher GDP per capita tend to have lower current account balances. While Government debt (% of GDP) exhibits relatively weak correlations with other variables, there is a noteworthy positive correlation with Gross Domestic Savings (% of GDP), indicating a potential connection between higher government debt and increased domestic savings. The data reveals that there is a higher level of association between institutional variables indicators to show web-of-association between economic and political institutions in the sample countries. In summary, the correlation matrix provides valuable insights into the interrelationships among economic and governance variables, shedding light on potential areas of influence and interdependence within the dataset.

**Table 2: pairwise correlations**

|           | GFCF   | logGDPCAP | logPOP  | TRA     | CA     | DEBT    | GDS     | LEN     | GOVE   | VA     | PS     | GE     | RQ     | RL     | CC     | INST |
|-----------|--------|-----------|---------|---------|--------|---------|---------|---------|--------|--------|--------|--------|--------|--------|--------|------|
| GFCF      | 1      |           |         |         |        |         |         |         |        |        |        |        |        |        |        |      |
| logGDPCAP | 0.084* | 1         |         |         |        |         |         |         |        |        |        |        |        |        |        |      |
| logPOP    | 0.025  | -0.208*   | 1       |         |        |         |         |         |        |        |        |        |        |        |        |      |
| TRA       | 0.248* | 0.308*    | -0.182* | 1       |        |         |         |         |        |        |        |        |        |        |        |      |
| CA        | -0.021 | 0.097*    | -0.033  | -0.006  | 1      |         |         |         |        |        |        |        |        |        |        |      |
| DEBT      | 0.08*  | -0.020    | 0.030   | -0.056* | 0.001  | 1       |         |         |        |        |        |        |        |        |        |      |
| GDS       | 0.244* | 0.296*    | 0.073*  | 0.168*  | 0.185* | 0.055*  | 1       |         |        |        |        |        |        |        |        |      |
| LEN       | -0.025 | -0.104*   | 0.093*  | -0.015  | 0.041  | -0.003  | 0.033   | 1       |        |        |        |        |        |        |        |      |
| GOVE      | 0.010  | 0.172*    | -0.148* | 0.24*   | -0.031 | -0.054* | -0.095* | -0.098* | 1      |        |        |        |        |        |        |      |
| VA        | 0.066* | 0.158*    | -0.158* | 0.118*  | -0.007 | 0.010   | 0.019   | -0.123* | 0.122* | 1      |        |        |        |        |        |      |
| PS        | 0.121* | 0.244*    | -0.147* | 0.234*  | 0.007  | 0.008   | 0.101*  | -0.092* | 0.188* | 0.339* | 1      |        |        |        |        |      |
| GE        | 0.129* | 0.285*    | -0.228* | 0.2*    | -0.003 | 0.006   | 0.092*  | -0.098* | 0.194* | 0.388* | 0.347* | 1      |        |        |        |      |
| RQ        | 0.081* | 0.227*    | -0.186* | 0.142*  | 0.021  | 0.008   | 0.089*  | -0.117* | 0.156* | 0.415* | 0.332* | 0.467* | 1      |        |        |      |
| RL        | 0.114* | 0.238*    | -0.204* | 0.179*  | 0.002  | 0.016   | 0.068*  | -0.119* | 0.195* | 0.431* | 0.406* | 0.471* | 0.457* | 1      |        |      |
| CC        | 0.119* | 0.214*    | -0.221* | 0.209*  | -0.007 | 0.009   | -0.008  | -0.127* | 0.274* | 0.369* | 0.35*  | 0.441* | 0.402* | 0.454* | 1      |      |
| INST      | 0.081* | 0.226*    | -0.186* | 0.141*  | 0.021  | 0.008   | 0.089*  | -0.117* | 0.156* | 0.417* | 0.332* | 0.467* | 0.531* | 0.46*  | 0.405* | 1    |

Notes: The variables are denoted as follows: Gross Fixed Capital Formation (% of GDP) – (GFCF), Log GDP per Capita (LogGDPCAP) Log Population, Total (LogPOPs), Trade (% of GDP) (TRA), Current Account Balance (% of GDP) ( CA), Government Debt (% of GDP) (DEBT), Gross Domestic Savings (% of GDP) ( GDS), Lending Interest Rate (%) (LEN), Government Expenditure (% of GDP) (GOVE), Voice and Accountability (VA), Political Stability and Absence of Violence/Terrorism (PS) Government Effectiveness (GE), Regulatory Quality (RQ) Rule of Law (RL) Control of Corruption (CC), Composite Index of Governance Indicators (INST). \* denotes statistically significant at 0.05.

Source: Author's own calculation

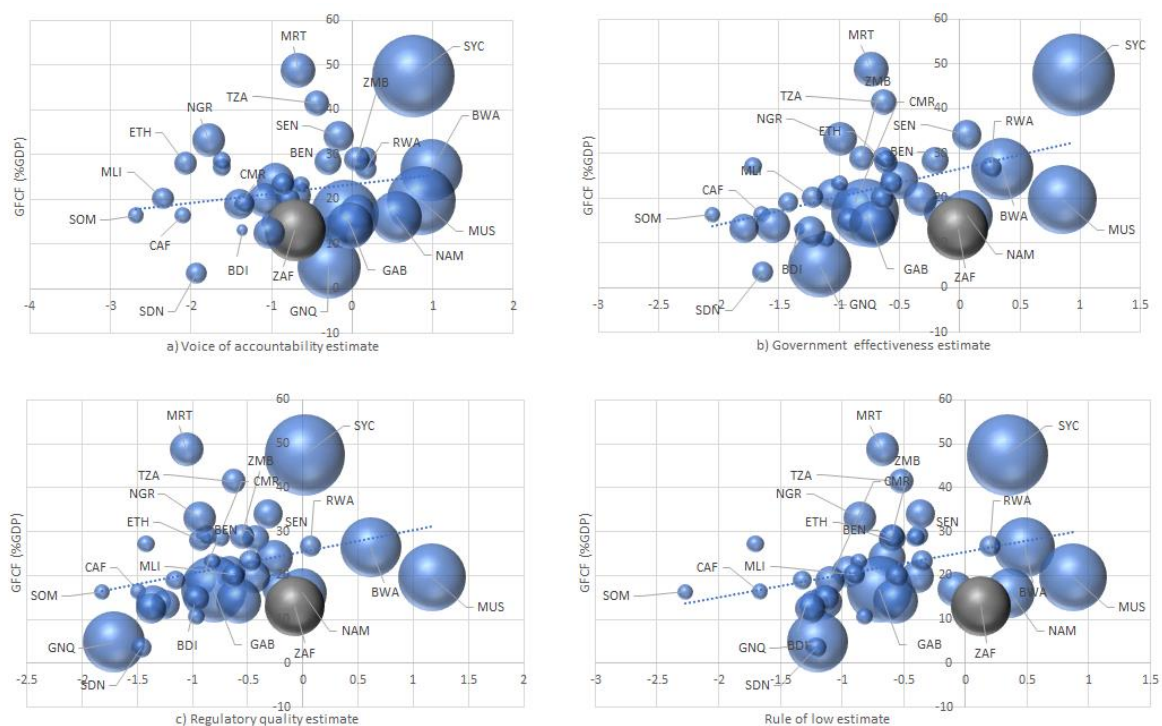
Additional summary statistics with average values of key variables in Sub-Saharan African countries spanning the period 1996-2022 and is provided in Appendix 1. These variables encompass governance indicators like Voice and Accountability, Political Stability, Government Effectiveness, Regulatory Quality, Rule of Law, and Control of Corruption. Economic metrics such as GDP growth, Gross Fixed Capital Formation, inflation, access to electricity, GDP per capita, population growth, trade, general government gross debt, and unemployment rate are also considered. Countries demonstrating above-average performance in capital formation across multiple indicators, such as Seychelles, Mauritius, and South Africa, generally display positive governance and economic outcomes. On the other hand, countries below the group average, including Sudan, Zimbabwe, and Eritrea, face challenges in governance and economic development. While these averages offer a broad perspective, a thorough analysis should consider the unique contexts and specific challenges of individual countries. Other economic variables descriptive statistics is presented in Appendix 2, displaying a sample of 44 countries in SSA, specifically focusing on three variables (GFCF as percentage of GDP, annual growth rate, and GDP per capita). The mean column shows that there is generally a positive relationship between GFCF and annual economic growth across countries.

Research findings suggest that for Africa to make substantial strides in poverty reduction, it must consistently achieve average growth rates exceeding 7% over the medium to long term (Clarke, 2013). In the same study, it was argued that achieving such a growth rate necessitates maintaining investment rates equivalent to 25% of GDP. Appendix 3 outlines the investment gap calculations for different countries in 2022, incorporating GDP, GCF as a percentage of GDP, and the resultant investment gap both as a percentage and in billion US dollars. Noteworthy instances include positive investment gaps in Botswana, Cape Verde, and Tanzania, indicating potential for increased capital formation. Conversely, Benin, Burkina Faso, and Burundi display negative investment gaps, suggesting excess capital formation. South Africa stands out with a significant negative gap of -8.18% (equivalent to \$29.48 billion). The data emphasises the varied economic conditions in Sub-Saharan Africa, offering valuable insights for policymakers aiming to address gaps and stimulate sustainable economic development.

Through numerous surveys and assessments conducted across different countries to evaluate governance, the WGI gather perspectives from a wide range of respondents. These assessments include opinions from a diverse group of stakeholders including businesses, individuals,

government officials, NGOs, and aid donors with significant knowledge and experience of the countries under evaluation. In addition, certain assessments rely on the expertise of commercial risk-rating agencies. The estimate of the governance indicators in the WGI range between “-2.5 to 2.5”, where a move from negative to positive represents improvement and movement from positive to negative reflects a decline in governance. For a thorough and more comprehensive description of all the governance indicators in the WGI, including an explanation of how they were calculated, refer to Kaufmann et al. (2011). **Figure 3** is a scatter representation of selected countries, depicting a relationship between governance indicators (measured on the x-axis), GFCF as % of GDP (Y-axis), as well as GDP per capita which is captured by the size of the bubble. Three other indicators from the Index of Economic Freedom (the Heritage Foundation) are also included in **Figure 4**.

**Figure 3: Scatter representation of relationship between governance, GFCF (%GDP) and GDP per capita: 2021**

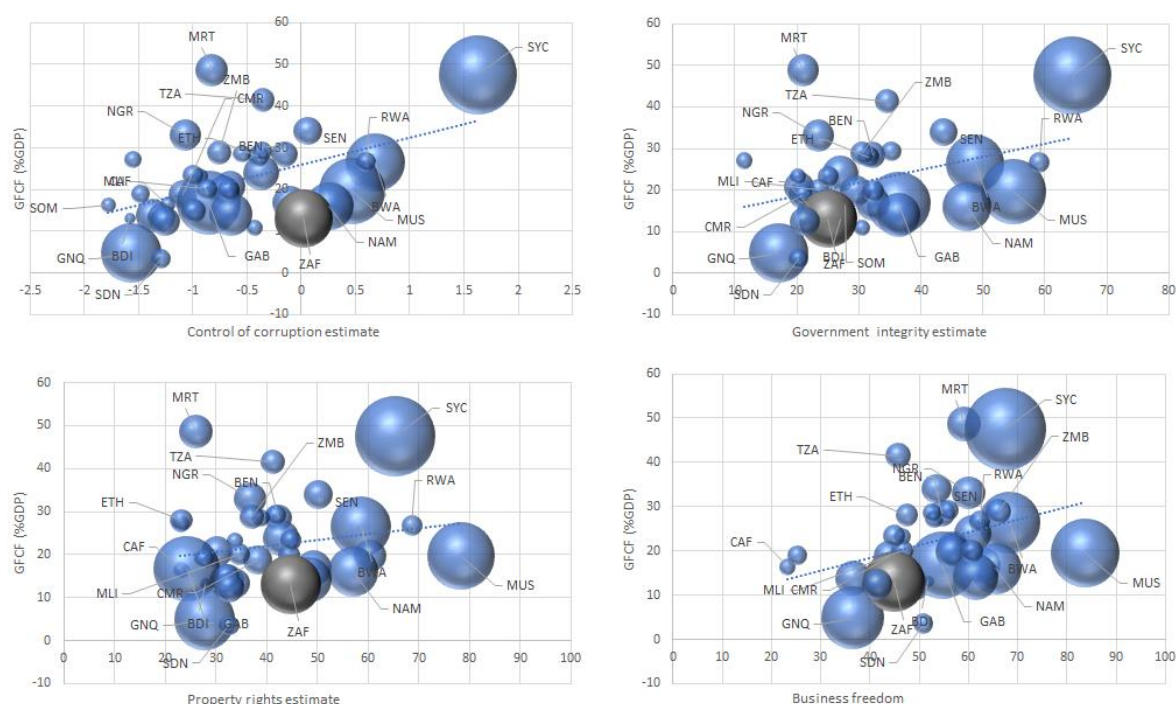


Source: Author’s own calculation, using data from WGI (2022)

**Figure 3** and **Figure 4** show that generally, there is positive relationship between governance (measured on the horizontal X-axis), GFCF as a percent of GDP (measured on the vertical Y axis), and GDP per capita (measured by the size of bubbles in the scatter plots). For instance, countries which had negative Voice of accountability estimate (e.g., Somalia, Central African Republic, Mali, Burundi) generally had relatively lower GFCF as well as lower GDP per capita. Conversely, countries that had positive governance indicators (e.g., Seychelles, Mauritius,

Botswana) generally had higher GFCF and higher per capita income. This the high GDP per capita of Seychelles can be explained by its better governance indicators (including property rights, government integrity and business freedom and large ratio of GFCF (with good governance seen as being associated with higher GFCF). South Africa (represented by the grey bubble) appears to have neutral governance rating as well as below average GFCF. It must be noted though that the general relationship depicted by the two figures is not a straightforward one, as there are a few countries which have very poor governance estimates, yet also having above average GFCF (e.g., Nigeria, Tanzania, Mauritania, Cameroon). Therefore, panel data regression analysis is expected to provide more details regarding the complex relationship between governance and GFCF.

**Figure 4: Scatter representation of relationship between governance, GFCF (%GDP) and GDP per capita: 2022 (Continued)**



Source: Author's own calculation, using data from WGI and Heritage Foundation (2022)

**Figure 3 and Figure 4** reveals Seychelles as a remarkable outlier. Additionally, Mauritius, Botswana, and Rwanda exhibit distinctive characteristics hinting at a robust correlation between institutions and income per capita. The World Bank (2023) mentions Seychelles as the wealthiest nation in SSA, enjoying the highest GDP per capita of \$16 billion in 2022 – the highest in the region. Seychelles' exceptional position can be attributed to a combination of factors such as political stability, effective governance structures, and strategic economic development. This corresponds with Van Nieukerk and Abbink (2018) who noted that

politically and economically, Seychelles maintained overall stability and boasted the highest per capita GDP in Africa. They also cite that the country, positioned at 87th in the World Press Freedom Index, experienced an improvement in respect of political and civil rights by climbing five places from its 2016 ranking of 92nd, indicating that civil and political rights were not genuinely endangered in the country. The country has also augmented investment in ocean-related economic sectors, especially in tourism, shipping, and fisheries, aimed at unlocking greater economic value from its existing resource endowment (Campling & Rosalie, 2006). Thus, the unique feature for the Seychelles among other economies in the SSA region is its strong dependence on tourism and fisheries. The country's focus on sustainable policies and prudent fiscal management likely contributes to its strong correlation between robust institutions and higher income per capita.

Mauritius, Botswana, and Rwanda also warrant closer examination. Mauritius, recognised for its business-friendly environment, transparent legal frameworks, and proactive economic diversification, demonstrates a unique institutional strength supporting economic growth (Koudou, 2019). Kiiza (2006) notes that Mauritius has attained rapid and sustained growth comparable to that seen in Asia, facilitated by the structural shift in the economy. He argues that this transition involved moving away from colonial commodity production, primarily sugar, towards postcolonial industries with higher value-added components, including industrial and informational sectors. Botswana, with its prudent natural resource management and stable political climate, showcases a distinctive blend fostering economic development. Rwanda's post-conflict recovery and development efforts, coupled with a commitment to good governance, may underpin its notable correlation between institutions and income per capita.

North (1990) is a prime example of orthodox institutionalists who offer an explanation for the unique features the standout countries that makes a robust correlation between institutions and income per capita. They contend that some institutions—especially those pertaining to laws governing private property—are essential to the development of Western countries. Although they emphasize other things, Acemoglu et al. (2001) agree with this viewpoint. Their historical perspective focuses on political institutions and the developmentalist ideology of leadership in explaining Botswana's economic prosperity, while acknowledging the importance of "institutions of private property" (Kiiza, 2006). This perspective is strongly linked to the idea that 'excellent' policy decisions played a major role in the success of Mauritius and Botswana. Acemoglu et al. (2002) credit sound policy adoption for Botswana's achievement, and Beaulier (2003) concurs, arguing that Botswana's high investment and economic growth can be ascribed

to the adoption of free-market system, foreign investment inflow, the prudent use of foreign aid. Thus, Beaulier (2003) finds that Botswana's success can be ascribed to its adoption of favourable postcolonial policies, notwithstanding criticism of the 'enabling' institutions approach. In a more recent study, Onyeukwu (2022) finds that the democratic governance system in Botswana has had a considerable influence on the country's development trajectory.

### **3.2. Unit root tests**

Unit root tests were conducted on diverse set of variables to be used in the study, assessing their characteristics at both original levels and after first differences. Notable outcomes which are presented in Appendix 4 are observed for governance-related metrics (Voice and Accountability, Political Stability and Absence of Violence/Terrorism, Government Effectiveness, Regulatory Quality, Rule of Law, and Control of Corruption). Political Stability, Government Effectiveness, and Regulatory Quality exhibit statistical significance at both levels and differences, implying non-stationarity in their original forms but achieving stationarity through differencing. Conversely, Rule of Law and Control of Corruption demonstrate no significant evidence of non-stationarity, indicating stationarity at both levels and differences. In contrast, economic variables such as GDP, inflation rates, and trade percentages consistently reject the null hypothesis of a unit root, suggesting their inherent stationarity. These findings furnish valuable insights into the temporal properties of the scrutinized indicators, laying the groundwork for subsequent modelling and analysis.

### **3.3. Cross-sectional dependence test**

**Table 3** displays results from different cross-sectional dependence tests. The Pesaran test assesses cross-sectional dependence with a test statistic of 0.874 and a p-value of 0.167. The p-value surpasses the conventional significance level of 0.05, implying a lack of substantial evidence to reject the null hypothesis that there is no cross-sectional dependence. This outcome suggests that cross-sectional dependence may not be a significant factor. The Breusch-Pagan LM test, evaluating cross-sectional dependence, yields a test statistic of 18.564 and a p-value of 0.1886. Similarly to the Pesaran test, the p-value exceeds 0.05, indicating insufficient evidence to reject the null hypothesis. Thus, there is little support for the existence of notable cross-sectional dependence. The Friedman test reveals a test statistic of 12.94 and a p-value of 0.0344. In contrast to the prior tests, the p-value is below 0.05, suggesting that there is evidence to reject the null hypothesis of no cross-sectional dependence. Consequently, the Friedman test implies the presence of cross-sectional dependence. The Frees test, gauging cross-sectional dependence, yields a test statistic of 0.0245. Given the notably small test statistic, there is

insufficient evidence to reject the null hypothesis of no cross-sectional dependence. This result is consistent with the preceding tests, suggesting that cross-sectional dependence may not be a significant concern. Considering the critical values associated with the Frees test at different significance levels (0.10, 0.05, 0.01), the test statistic of 0.0245 is substantially smaller, reinforcing the conclusion that there is limited evidence supporting cross-sectional dependence. Thus, the combined results from the Pesaran, Breusch-Pagan, Friedman, and Frees tests indicate that cross-sectional dependence is not prominently evident, and the tests collectively suggest that it may not be a substantial concern in the data.

***Table 3: Cross-sectional dependence test***

|                       | <b>test-statistic</b> | <b>P-value</b> |
|-----------------------|-----------------------|----------------|
| Pesaran               | 0.874                 | 0.167          |
| Breusch-Pagan LM test | 18.564                | 0.189          |
| Friedman              | 12.940                | 0.034          |
| Frees                 | 0.025                 |                |
| alpha = 0.10          |                       | 0.173          |
| alpha = 0.05          |                       | 0.064          |
| alpha = 0.01          |                       | 0.007          |

**Source:** Author's own calculations

## Section 4

### 4. Research methodology

The study employs a system Generalised Method of Moments (GMM), which is an econometric technique that aids in examining the dynamic link between capital formation and institutions, especially in panel data analysis. It efficiently addresses endogeneity concerns by employing lagged values as instruments to control for the simultaneous influence of institutions on capital formation and vice versa. This method is well-suited for dynamic panel data analysis, enabling the study of how institutions and capital formation evolve over time and interact. System GMM uses both first differences and levels of variables, making it effective for utilising available data. It controls for unobserved heterogeneity and serial correlation in the error terms, providing precise parameter estimates while accounting for unobserved country-specific characteristics and addressing data-related issues. Overall, System GMM is a valuable tool for researchers aiming to understand the nuanced dynamics of how institutions influence capital formation over time in panel data settings. To specify the methodology using the system GMM approach for the given model, we can address the potential endogeneity issue and improve the equations to be estimated. System GMM is a dynamic panel data technique that can help address endogeneity concerns. The general dynamic panel data model can be represented as follows:

$$GFCF_{it} = \beta_0 + \beta_1 Y_{i(t-1)} + \beta_2 WGI_{i(t-1)} + \beta_3 X_{i(t-1)} + \gamma Z_t + \delta_t + \mu_i + \varepsilon_{it} \quad \text{Equation (1)}$$

Where:

$GFCF_{it}$ : Dependent variable for country  $i$  at time  $t$ .

$GFCF_{it-1}$ : Lagged dependent variable

$WGI_{i(t-1)}$ : Lagged independent World Governance Indicators

$X_{it-1}$ : Lagged vector of control variables.

$Z_t$ : Individual characteristics.

$\beta_0$ : Country-specific intercept

$\delta_t$ : Time-specific intercept.

$\mu_i$ : Individual-specific error term.

$\varepsilon_{it}$ : Overall error term

System GMM estimation involves two equations to instrument for the endogeneity. These are the first-difference equation and the level equation. The system GMM provides valid

instruments to address endogeneity concerns by using the differenced variables. The estimation process involves creating instruments based on lagged variables and their differences. The Sargan tests and Arellano-Bond tests was used to check the validity of the instruments and the model's overall fit. Eight models was estimated with the governance indicators as the main variables of interest. The eight model involves aggregating the governance indicators through the Principal Component Analysis (PCA) to create a composite index of governance. PCA is a statistical method employed to reduce the dimensionality of a dataset by transforming a set of  $n$  correlated variables into a reduced number of 'dimensions.' Mathematically, PCA generates uncorrelated indices or components from an initial set of  $n$  variables, with each component representing a linear weighted combination of the original variables (Vyas and Kumaranayake, 2006). To analyse how GFCF is impacted by the interaction of institutions and policy variables, equation 2 will be estimated:

$$GFCF_{it} = \beta_0 + \beta_1 Y_{i(t-1)} + \beta_2 X_{i(t-1)} + \beta_3 (WGI_i * POLV_i) + \gamma Z_t + \delta_t + \mu_i + \varepsilon_{it} \quad \text{Equation (2)}$$

Where  $POLV$  captures a set of policy variables,  $(WGI_i * POLV_i)$  represents the interaction between institutions and the rest of the variables are the same as above.

## Section 5

### 5. Research Findings

The 2-step System GMM results from seven distinct models which are presented in **Table 4** offers valuable insights into the intricate relationship between various factors and Gross Fixed Capital Formation (GFCF) in Sub-Saharan Africa. The long description of the variables is provided in **Table 1**. Across the models, lagged GFCF (L1.GFCF) consistently displays a positive and statistically significant impact on current GFCF, suggesting a persistent influence of past capital formation on present investment decisions. This finding corresponds with the theoretical expectations discussed in the literature, as well as a similar finding by Mbengue (2019) emphasising the crucial role of historical capital formation in shaping present investment patterns. However, this finding contradicts Kanu et al. (2014) whose study found that lagged values of GFCF had a negative impact on GFCF. With the exception of Models (2), (4) and (7) which shows that L1.GFCF is positively and statistically related with GFCF at 5% and 10% respectively, all the other models show that (L1.GFCF) is positively and statistically associated with GFCF at 1% significance level. Based on the reported coefficients, a 1% increase in L1.GFCF is associated with an estimated GFCF increase ranging from 0.48 to 0.56. The second lag (L2.GFCF), however, lacks consistent statistical significance, indicating a potentially diminishing impact with additional time lags.

**Table 4: 2-step System GMM on the relationship between governance and gross fixed capital formation**

|                          | Model (1)            | Model (2)            | Model (3)            | Model (4)            | Model (5)            | Model (6)            | Model (7)            |
|--------------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|
| Variables                |                      |                      |                      |                      |                      |                      |                      |
| L1.GFCF                  | 0.480***<br>(0.010)  | 0.569**<br>(0.026)   | 0.485***<br>(0.010)  | 0.0547**<br>(0.037)  | 0.555***<br>(0.012)  | 0.530***<br>(0.006)  | 0.481*<br>(0.076)    |
| L2.GFCF                  | 0.103<br>(0.172)     | 0.031<br>(0.663)     | 0.049<br>(0.423)     | 0.055<br>(0.504)     | 0.053<br>(0.430)     | 0.056<br>(0.366)     | 0.055<br>(0.504)     |
| logGDP                   | 1.464*<br>(0.056)    | 1.592**<br>(0.028)   | 3.535*<br>(0.073)    | 0.239*<br>(0.092)    | 2.751<br>(0.385)     | 0.202*<br>(0.094)    | 0.232*<br>(0.092)    |
| logPop                   | 1.046<br>(0.411)     | 0.717<br>(0.325)     | -0.570<br>(0.520)    | 0.644<br>(0.412)     | -0.237<br>(0.809)    | 0.658<br>(0.592)     | 0.644<br>(0.412)     |
| TRA                      | 0.036<br>(0.224)     | 0.062<br>(0.110)     | 0.067*<br>(0.080)    | 0.057<br>(0.861)     | 0.059<br>(0.733)     | 0.070<br>(0.004)     | 0.057<br>(0.061)     |
| CA                       | -0.318***<br>(0.010) | -0.365**<br>(0.045)  | -0.384**<br>(0.045)  | -0.328*<br>(0.056)   | -0.335*<br>(0.057)   | -0.342**<br>(0.035)  | -0.323<br>(0.022)    |
| DEBT                     | 0.046<br>(0.443)     | 0.026<br>(0.691)     | 0.036<br>(0.423)     | -0.044<br>(0.593)    | -0.023<br>(0.593)    | 0.048<br>(0.456)     | -0.044<br>(0.593)    |
| GDS                      | 0.193**<br>(0.023)   | 0.195***<br>(0.013)  | 0.262*<br>(0.067)    | 0.208*<br>(0.076)    | 0.246<br>(0.123)     | 0.222**<br>(0.048)   | 0.208**<br>(0.031)   |
| GOVE                     | 0.174*<br>(0.026)    | 0.054<br>(0.807)     | 0.006<br>(0.098)     | 0.499<br>(0.152)     | 0.167<br>(0.592)     | 0.516<br>(0.119)     | 0.499<br>(0.152)     |
| LEN                      | -0.044<br>(0.564)    | -0.008<br>(0.903)    | 0.002<br>(0.980)     | -0.014<br>(0.870)    | -0.021<br>(0.873)    | 0.008<br>(0.912)     | -0.014<br>(0.870)    |
| VA                       | 0.339**<br>(0.042)   |                      |                      |                      |                      |                      |                      |
| PS                       |                      | 0.0641**<br>(0.020)  |                      |                      |                      |                      |                      |
| GE                       |                      |                      | 0.017<br>(0.463)     |                      |                      |                      |                      |
| RQ                       |                      |                      |                      | 0.064<br>(0.783)     |                      |                      |                      |
| CC                       |                      |                      |                      |                      | 0.850*<br>(0.052)    |                      |                      |
| RL                       |                      |                      |                      |                      |                      | 0.388<br>(0.130)     |                      |
| INST                     |                      |                      |                      |                      |                      |                      | 0.089***<br>0.003    |
| Constant                 | -18.251<br>(0.587)   | -4.256<br>(0.866)    | 39.280<br>(0.123)    | -2.222<br>(0.930)    | 27.085<br>(0.380)    | -5.591<br>(0.870)    | -4.256<br>(0.866)    |
| Arellano–Bond Test AR(2) | [0.849]              | [0.270]              | [0.232]              | [0.518]              | [0.368]              | [0.366]              | [0.518]              |
| Hansen J-test            | [0.756]              | [0.276]              | [0.475]              | [0.634]              | [0.448]              | [0.574]              | [0.567]              |
| Diff-in-Hansen test      | [0.089]              | [0.034]              | [0.067]              | [0.691]              | [0.512]              | [0.636]              | [0.712]              |
| F-test statistics        | 105.76***<br>(0.000) | 205.88***<br>(0.000) | 127.98***<br>(0.000) | 186.26***<br>(0.000) | 300.44***<br>(0.000) | 200.87***<br>(0.000) | 276.77***<br>(0.000) |
| Number of observations   | 853                  | 853                  | 853                  | 853                  | 853                  | 853                  | 853                  |

Note: \*\*\*, \*\*, and \* implies significant at 1%, 5% and 10% level, respectively. The *p*-values are in parentheses

Source: Author's own calculation

Economic indicators such as logGDP and trade (TRA) also play significant roles. With the exception of Model (5), LogGDP consistently exhibits a positive association with GFCF in the rest of the other models, indicating the importance of economic output in driving capital formation. A one percent increase in GDP is associated with estimated GFCF increases ranging from 0.20% to 3.5% across models. The positive relationship observed between GDP and GFCF holds significant economic and theoretical implications. This connection suggests that as GDP increases, reflecting heightened economic activity and a larger economic scale, there

is typically a corresponding need for increased investments in fixed capital assets. This positive relationship aligns with theoretical expectations, illustrating that a growing economy often necessitates higher levels of capital investment to accommodate expanding production capacities, boost productivity, and facilitate sustained economic progress. Therefore, the positive coefficient associated with GDP in the models implies that, all else being equal, elevated levels of economic output are linked with greater GFCF, capturing the dynamic and mutually reinforcing interplay between economic growth and capital investment. To some extent, this finding is similar to that of Akanbi (2016), who explored the macro and institutional factors influencing investment, highlighting the importance of variables such as GDP, financial development, exchange rates, cost of capital, and governance in shaping domestic investment in SSA. This is further supported by Bonga and Nyoni (2017), who found that GDP was a crucial factor in determining the level of capital formation. However, GFCF has also been recognised as an important driver of economic growth, with causality often running from GFCF to economic growth (Meyer & Sanusi, 2019).

This study provides valuable insights into the complex interplay between economic indicators, particularly logGDP and the process of capital formation (GFCF). The consistent positive relationship between logGDP and total capital formation in fixed assets observed in different models sheds light on the key role of economic production in promoting capital investment. Estimated GDP growth ranging from 0.2% to 3.5% for 1% GDP growth highlights the tangible impact of increased economic activity in promoting fixed capital investment. This finding has important implications from both an economic and a theoretical perspective, as it shows that GDP growth is accompanied by an increased demand for capital investment. This is in perfect harmony with theoretical expectations and emphasises that a prosperous economy requires greater capital investment to accommodate increased production capacity, improve productivity and sustain economic growth. A positive coefficient on GDP implies a dynamic and mutually reinforcing interaction between economic growth and capital investment in the models. Although this study replicates the findings of previous studies by Akanbi (2016) and Bonga and Nyoni (2017), this study provides nuanced insights by examining the specific relationship between institutions and GFCF and provides a deeper understanding of the complex relationship that drives economic development. In addition, the recognition of aggregate capital formation in fixed assets as a catalyst for economic growth, where the potential causality works in both directions, increases the depth of understanding of the complex dynamics of the relationship between economic indicators and capital formation.

Population size (logPop) shows a positive but statistically insignificant relationship with GFCF. Trade shows statistical significance in Model (3), suggesting that a higher percentage of GDP dedicated to trade positively influences GFCF. Conversely, the current account balance (CA) consistently displays a negative impact on GFCF across Models (1) to (6), implying that a higher current account balance as a percentage of GDP corresponds to a reduction in GFCF. The results shows that a 1% increase in CA leads to a decrease in GFCF ranging from -0.318% to -0.365%. The negative coefficient associated with CA in the models implies that, with a worsening current account balance indicative of a higher deficit, there is a corresponding decline in GFCF. However, this finding seems not to align with conventional theory of the expected impact of CA on GFCF. Having a current account that is negative (deficit) entail having a positive financial account and capital account surplus and this should have a positive impact on capital formation. This apparently counterintuitive relationship may be influenced by various factors affecting the dynamics between the current account balance and capital formation. A negative CA could also signal an increased dependence on foreign capital, suggesting that the country is borrowing more than it is saving. In such situations, a reduction in GFCF may result from heightened costs associated with external borrowing or a decrease in domestic savings available for investment.

The negative CA, in this context, signifies a situation where the country's expenditures exceed its income, prompting a need for external financing. Consequently, the reduced GFCF could be a consequence of the amplified financial burden stemming from external borrowing or a limitation in domestic resources allocated for capital investment. This insight underscores the multifaceted nature of the relationship between a negative current account balance and its potential impact on capital formation, encompassing both external borrowing dynamics and the availability of domestic savings for investment purposes. This negative correlation also underscores the potential challenges linked to external imbalances in supporting capital formation, emphasising the significance of attaining a sustainable current account position for promoting domestic investment and ensuring economic stability. However, this finding is contrary to Abdallah (2023) utilised the Granger Causality test to explore the causal connection between the current account balance and GFCF. His findings indicate a lack of evidence supporting the notion that the current account balance has any discernible effect on gross fixed capital formation in Lebanon. On the contrary, it appears that gross fixed capital formation plays a causal role in influencing the current account balance, as indicated by the Granger causality.

Gross domestic savings (GDS) consistently demonstrates a positive and statistically significant impact on GFCF across the 7 models, highlighting the significance of savings in fostering capital formation. A 1% increase in GDS leads to an estimated GFCF increase ranging from 0.193% to 0.262% across models. The results of two policy variables, namely Government expenditure (GOVE) and Lending rate (LEN) are also included. GOVE is positively and significantly associated with GFCF at 5% level of significance (Models 1, 3 and 6) and 10% level of significance (Model 4). Taking Model (3) for instance, a 1% increase in Government expenditure is associated with a 0.328% in GFCF. This suggests that heightened government spending has the potential to stimulate investments in fixed capital assets, such as public infrastructure projects, thereby contributing to overall economic advancement. Specifically, government expenditure, particularly on capital initiatives, can act as a catalyst for private sector investment by creating a favourable environment and fostering investor confidence. As Kanu et al. (2014) argues, to attain sustainable growth in gross fixed capital formation, government should reduce their recurrent expenditure and allocate more resources towards increased capital expenditure. This relationship underscores the potential impact of government fiscal policies in propelling capital formation and bolstering economic growth, highlighting the interconnectedness between public spending and private investment in enhancing a nation's productive capabilities. Lending rates do not consistently show statistical significance, suggesting that the influence of the lending interest rate on GFCF may not be robust across models.

In terms of governance related variables, only Political Stability (PS) and Control of Corruption (CC) were found to be positively and statistically significant at 5% and 10%, with a 1% increase in PS and CC associated with an increase of 0.641% and 0.850% in GFCF, respectively. This finding is particularly crucial in the context of the relatively poor levels of political stability and control of corruption among countries in SSA (see **Figure 5**), showing political stability (left panel) and Control of corruption (right panel) ratings from 1996 - 2022. About 22 of the countries had an average political stability rating of -0.72 – 0.16, 19 countries had a rating which was even poorer. Yahoo Finance (2023) lists countries such as Burkina Faso, Guinea-Bissau, Uganda, Niger, Zimbabwe, and Mali as being amongst the most unstable and fragile countries in the World. Marc et al (2015) elaborates the rise of conflict and wars and instability in West Africa, particularly since 2010. This political instability is reflected in the deterioration in the Net Investment Position among these countries. Appendix 5 shows that compared to Botswana, Mauritius and Seychelles (left panel), countries such as Burkina Faso, Uganda and

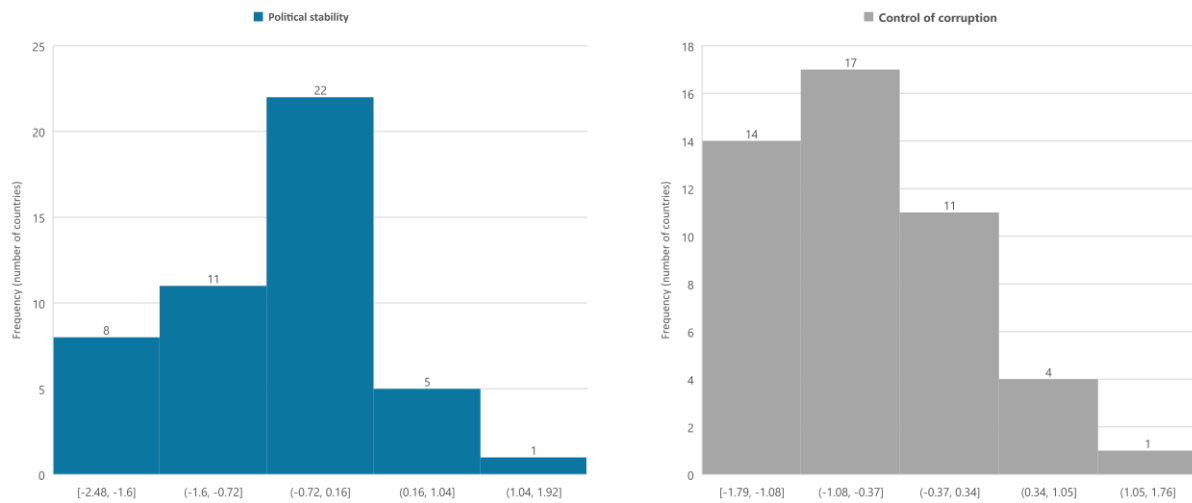
Zimbabwe (right panel) have experienced more capital outflows<sup>2</sup> for the period 1996 – 2022. Kieh (2009) traces this poor political stability or phrased differently - political instability in the African continent as far back as the start of the post-colonial era. On the other hand, only 6 countries had an average rating value for political stability of above 0.16. Control of corruption is even more severely skewed to the negative, with 31 countries having an average rating ranging from -1.79 to 0.37. Only five countries enjoyed an average rating above 0.34. These low rating levels call for drastic improvement in both political stability and control of corruption in SSA. The positive coefficients in respect of both PS and CC in the models imply that an improvement in political stability and a more effective control of corruption correspond to an increase in GFCF. This emphasises that a stable political climate and robust anti-corruption measures create an environment conducive to increased investment. These findings are in agreement with those of North (1990), Barro (1996), Hall and Jones (1999), and Acemoglu et al. (2001), who emphasised the role of quality governance and stable governments in fostering both economic growth and GFCF.

Enhanced political stability reduces uncertainties, fostering investor confidence and commitment to long-term capital projects. Simultaneously, effective control of corruption signals a fair and transparent business environment, enticing both domestic and foreign investors to engage in capital-intensive ventures. This positive correlation underscores the pivotal role of good governance in cultivating an atmosphere that promotes capital formation and overall economic development. These findings are aligned with those of Dalyop (2019) who emphasised the necessity to foster a stable political environment and uphold effective governance in order to unleash investment opportunities in SSA. Everhart (2009) highlighted the significance of implementing measures against corruption to establish a favourable environment for capital formation. While the other governance indicators (Voice and Accountability, Government Effectiveness (GE), Regulatory Quality (RQ), and Control of Corruption (CC), Rule of Law (RL)) also depict a positive relationship with GFCF, they are not statistically significant. However, the average of governance indicators, depicted by the composite index of governance indicators (INST) exhibits is positive and statistically significant at 1%, emphasizing the overarching impact of the overall governance environment on GFCF. A 1% increase in institutions is expected to increase GFCF by 0.09%.

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<sup>2</sup> Measured as Foreign direct investment, net outflows (% of GDP)

**Figure 5: Average score of Political stability and Control of corruption in SSA: 1996 - 2022**



Source: Author's own calculation, based on data from WGI (2022)

**Table 4** also presents important diagnostic tests using the 2-step system GMM. The results of the Allerano-Bond second order autocorrelation AR (2) show that the estimation does not suffer from second order correlation problem. The Hansen J-test evaluates the validity of instrumental variables by checking if they are uncorrelated with the error term in the model. The Difference-in-Hansen Test compares the model fit with and without over-identifying restrictions. The p-values for both tests exceed 0.05, indicating a lack of evidence to dismiss the null hypothesis asserting the validity of instruments at the standard 5% significance threshold. Thus, diagnostic tests, including the Arellano–Bond Tests for serial correlation, the Hansen J-test for instrument validity, and the Diff-in-Hansen test for over-identifying restrictions, collectively support the robustness of the models and the reliability of the results.

Based on the F-statistics, the very low probability values across all the models implies robust evidence for rejecting the null hypothesis that all coefficients of the explanatory variables are collectively zero. Hence, the models are well-suited to the data, and the included variables jointly make a substantial and statistically significant contribution to explaining the variation in the dependent variable. This outcome highlights the confidence in the overall explanatory efficacy of the dynamic panel-data model estimated using the two-step system GMM methodology. These System GMM results underscore the multifaceted nature of factors influencing GFCF in Sub-Saharan Africa. Lagged GFCF, economic indicators, and governance-related variables all play significant roles, with nuanced impacts observed across different models.

**Table 5: 2-step System GMM on the relationship between governance and government expenditure interacted**

|                          | Model (1)          | Model (2)         | Model (3)         | Model (4)         | Model (5)         | Model (6)        | Model (7)         |
|--------------------------|--------------------|-------------------|-------------------|-------------------|-------------------|------------------|-------------------|
| Variables                |                    |                   |                   |                   |                   |                  |                   |
| L1.GFCF                  | 0.292***<br>0.013  | 0.578***<br>0.010 | 0.387*<br>0.087   | 0.873*<br>0.046   | 0.326<br>0.164    | 0.531**<br>0.020 | 0.493***<br>0.010 |
| L2.GFCF                  | 0.226<br>0.414     | 0.096<br>0.604    | 0.123<br>0.518    | 0.936<br>0.390    | 0.144<br>0.365    | 0.186<br>0.109   | 0.043<br>0.837    |
| logGDP                   | 3.705*<br>0.073    | 1.916*<br>0.089   | 8.173<br>0.465    | 3.933**<br>0.036  | 4.284*<br>0.077   | 3.226<br>0.146   | 2.151**<br>0.083  |
| logPop                   | 7.004<br>0.693     | -2.913<br>0.856   | -6.875<br>0.640   | -4.654<br>0.365   | 16.146<br>0.498   | -5.057<br>0.739  | 5.050<br>0.459    |
| TRA                      | 0.064<br>0.254     | 0.072<br>0.298    | 0.076<br>0.440    | 0.0245*<br>0.088  | -0.027<br>0.594   | 0.025<br>0.650   | 0.040*<br>0.056   |
| CA                       | -0.313***<br>0.001 | -0.247*<br>0.074  | -0.337**<br>0.004 | -0.179*<br>0.068  | -0.302**<br>0.038 | -0.204<br>0.151  | -0.231<br>0.087   |
| DEBT                     | -0.001<br>0.564    | 0.034<br>0.565    | 0.073<br>0.788    | 0.006<br>0.207    | -0.001<br>0.504   | -0.019<br>0.898  | -0.022<br>0.109   |
| GDS                      | 0.382***<br>0.012  | 0.159<br>0.195    | 0.32*<br>0.067    | 0.102**<br>0.038  | 0.313***<br>0.012 | 0.083<br>0.463   | 0.107**<br>0.024  |
| GOVE                     | 0.898**<br>0.030   | 0.183<br>0.660    | 0.328**<br>0.037  | 0.012*<br>0.079   | 0.558<br>0.370    | 0.869**<br>0.027 | 0.612*<br>0.067   |
| GOVE                     | -0.074<br>0.155    | -0.017<br>0.873   | 0.007<br>0.911    | 0.009<br>0.209    | 0.083<br>0.304    | 0.112<br>0.003   | 0.013<br>0.083    |
| DUMMY                    | 2.663<br>0.675     | 1.612<br>0.800    | 1.713<br>0.435    | 0.723**<br>0.035  | 2.223**<br>0.031  | 2.179*<br>0.081  | 3.975**<br>0.042  |
| GOVE_VA                  | 0.548<br>0.923     |                   |                   |                   |                   |                  |                   |
| GOVE_PS                  |                    | 0.207**<br>0.045  |                   |                   |                   |                  |                   |
| GOVE_GE                  |                    |                   | 0.067<br>0.827    |                   |                   |                  |                   |
| GOVE_RQ                  |                    |                   |                   | 0.0143**<br>0.023 |                   |                  |                   |
| GOVE_CC                  |                    |                   |                   |                   | 0.134*<br>0.065   |                  |                   |
| GOVE_RL                  |                    |                   |                   |                   |                   | 0.306<br>0.015   |                   |
| GOVE_INST                |                    |                   |                   |                   |                   |                  | 0.115**<br>0.036  |
| Arellano–Bond Test AR(1) | [0.519]            | [0.240]           | [0.325]           | [0.569]           | [0.270]           | [0.151]          | [0.171]           |
| Arellano–Bond Test AR(2) | [0.511]            | [0.206]           | [0.179]           | [0.658]           | [0.857]           | [0.697]          | [0.484]           |
| Hansen J-test            | [0.635]            | [0.778]           | [0.675]           | [0.679]           | [0.247]           | [0.641]          | [0.563]           |
| Diff-in-Hansen test      | [0.143]            | [0.103]           | [0.086]           | [0.068]           | [0.093]           | [0.064]          | [0.005]           |
| Number of countries      | 44                 | 44                | 44                | 44                | 44                | 44               | 44                |
| Number of observations   | 853                | 853               | 853               | 853               | 853               | 853              | 853               |

Note: GOVE\_VA, GOVE\_PS, GOVE\_GE, GOVE\_RQ, GOVE\_CC, GOVE\_CC, GOVE\_RL and GOVE\_INST denote the interaction of government expenditure (GOVE) with Voice and Accountability (VA), Political Stability (PS), Government Effectiveness (GE), Regulatory Quality (RQ), Rule of Law (RL), Control of Corruption (CC), and Composite Index of governance indicators (INST). \*\*\*, \*\*, and \* implies significant at 1%, 5% and 10% level, respectively. The p-values are in parentheses

Source: Author's own calculation

**Table 5** (above), extends the analysis by including a dummy (captured by the variable DUMMY in the table) for income category (lower income country, upper middle income or lower middle income, etc) as per the World Bank ranking. Furthermore, we allow the Government expenditure – a policy variable, to interact with institutions through running of

separate regressions<sup>3</sup>. The results reveal that L1.GFCF consistently demonstrates a significant positive influence on GFCF, with coefficients ranging from 0.292 to 0.578. Conversely, L2.GFCF lacks consistent significance, hinting at a potential diminishing effect of the second lag on current capital formation. The positive impact of logGDP on GFCF is evident, with a 1% increase associated with estimated GFCF increases ranging from 1.916 to 8.173 across models. The significance of trade (TRA) in Model (4) suggests that a 1% rise in the GDP percentage allocated to trade corresponds to a GFCF increase. The current account balance (CA) yields consistently negative and statistically significant results across the various models, except for model 6 which is not statistically significant. Model (4) shows that a 1% increase in the current account balance tends to lead to a 0.179 fall in GFCF.

Government expenditure (GOVE) exhibits varying impacts across models, and its interactions with governance variables reveal nuanced effects. For example, the interaction of GOVE with Voice and Accountability (GOVE\_VA) lacks significance, indicating that this interaction does not consistently influence GFCF. However, the significance of GOVE\_PS (Political Stability) in Model (2) suggests its importance in influencing capital formation. The income category dummy (DUMMY) demonstrates significant effects in Models (4), (5), (6), and (7), indicating that income category significantly influences GFCF. For instance, in Model (4), being in the high-income category is associated with a notable increase in GFCF. Thus, the income category<sup>4</sup> emerges as a significant determinant of capital formation in the region.

Again, the outcomes from the diagnostic tests offer valuable insights into the effectiveness and reliability of the System GMM models utilised in the study. The results of the Arellano–Bond tests for first-order autocorrelation (AR(1)) consistently reveal p-values exceeding the standard significance threshold of 0.05 across all seven models, ranging from 0.151 to 0.569. This signifies a lack of substantial evidence to reject the null hypothesis that there is no first-order serial correlation in the first-differenced errors. Thus, the models proficiently address and control for this type of autocorrelation. Likewise, the Arellano–Bond tests for second-order

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<sup>3</sup> Including interactions between policy variables such as government spending and institutional factors like political stability, corruption control, and government quality can yield valuable insights into economic systems' intricate workings. For instance, while increased government spending might traditionally be seen as boosting economic activity, its impact could vary depending on factors like political stability or the level of corruption. Thus, incorporating these interactions allows us to better understand how these institutional elements shape the outcomes of policy interventions. Political stability, for instance, could amplify or mitigate the effects of government spending, influencing investor and business confidence. Similarly, accounting for corruption can reveal whether increased government expenditure leads to desired results or gets siphoned off through corrupt practices. Additionally, considering the quality of government institutions helps assess the efficiency of policy implementation, affecting the effectiveness of fiscal measures. Hence in this study we opted to use two policy variables, namely government expenditure and the lending rate.

<sup>4</sup> Dummy captured as 0- low-income country, 1- lower middle-income country and 2- upper middle income country

autocorrelation (AR(2)) consistently exhibit p-values surpassing 0.05, ranging from 0.179 to 0.857. This suggests that the models effectively manage second-order serial correlation in the first-differenced errors. The Hansen J-test, which evaluates the validity of instruments used in the GMM estimation, consistently produces p-values above 0.05, ranging from 0.247 to 0.778. This implies that the instruments employed in the estimation process are validated and apt for capturing the dynamics of the underlying data used in the study.

Now we allow for the interaction of another policy variable (lending rate) with institutions and the results are presented in **Table 6** Seven different models (Models 1-7) were employed, each incorporating various independent variables and interactions between lending rates and governance indicators. The results are largely similar with those reported in **Table 5**, as variables such as lagged GFCF, logGDP, TRA, GDS and GOVE are all positively and statistically related to GFCF. On the contrary, variables such as CA and LEN depict a statistically significant negative association with GFCF. Similarly to above, The coefficient for lagged GFCF (L1.GFCF) is consistently positive and highly significant across all models, indicating a robust positive relationship between past and current GFCF. LogGDP per capita exhibits a positive and significant effect on GFCF in models 1, 2, 3,4 and 7. For instance, in model 2, a 1% increase in GDP leads to an increase of 0.91% which is statistically different from zero at 10% level of significance.

**Table 6: 2-step System GMM on the relationship between governance and lending rate interacted**

|                          | Model (1)            | Model (2)           | Model (3)            | Model (4)          | Model (5)           | Model (6)            | Model (7)           |
|--------------------------|----------------------|---------------------|----------------------|--------------------|---------------------|----------------------|---------------------|
| Variables                |                      |                     |                      |                    |                     |                      |                     |
| L1.GFCF                  | 0.743***<br>(0.000)  | 0.367***<br>(0.080) | 0.450***<br>(0.013)  | 0.36***<br>(0.085) | 0.349***<br>(0.037) | 0.740**<br>(0.038)   | 0.356***<br>(0.085) |
| L2.GFCF                  | 0.007<br>(0.921)     | 0.129<br>(0.438)    | 0.202<br>(0.152)     | 0.143<br>(0.369)   | 0.185<br>(0.233)    | 1.044<br>(0.179)     | 0.143<br>(0.369)    |
| logGDP                   | 1.043**<br>(0.017)   | 0.912*<br>(0.088)   | 2.82709**<br>(0.049) | 1.349**<br>(0.048) | 3.435<br>(0.537)    | 1.765<br>(0.805)     | 1.350*<br>(0.075)   |
| logPop                   | -4.897<br>(0.846)    | 5.460<br>(0.777)    | -0.934<br>(0.923)    | -10.820<br>(0.510) | 16.232<br>(0.403)   | -0.054<br>(0.805)    | -10.820<br>(0.510)  |
| TRA                      | (0.023)              | 0.035*<br>(0.086)   | 0.07**<br>(0.020)    | 0.025**<br>(0.061) | (0.008)<br>(0.825)  | (0.023)<br>(0.201)   | (0.025)<br>(0.608)  |
| CA                       | -0.183***<br>(0.010) | -0.281**<br>(0.023) | -0.323**<br>(0.022)  | -0.325<br>(0.112)  | -0.318**<br>(0.016) | -0.184***<br>(0.000) | -0.325**<br>(0.030) |
| DEBT                     | (0.001)              | (0.001)             | (-0.002)             | (0.008)            | (0.007)             | (0.008)              | (0.019)             |
| GDS                      | (0.901)              | (0.575)             | (0.878)              | (0.266)            | (0.650)             | (0.827)              | (0.325)             |
| GDS                      | 0.113**<br>(0.064)   | 0.180**<br>(0.032)  | 0.192*<br>(0.065)    | 0.0248*<br>(0.083) | 0.285**<br>(0.038)  | 0.110**<br>(0.028)   | (0.025)<br>(0.825)  |
| GOVE                     | 0.0034**<br>(0.06)   | 0.661***<br>(0.01)  | 0.826*<br>(0.07)     | 0.867<br>(0.17)    | 0.530<br>(0.32)     | 0.006<br>(0.29)      | 0.867<br>(0.07)     |
| LEN                      | -0.035<br>(0.10)     | -0.050*<br>(0.06)   | -0.109*<br>(0.09)    | -0.340**<br>(0.04) | -0.326**<br>(0.03)  | -0.030<br>(0.120)    | -0.135*<br>(0.08)   |
| DUMMY                    | 3.346*<br>(0.077)    | 1.715*<br>(0.060)   | 3.613<br>(0.689)     | 2.981*<br>(0.082)  | 2.766<br>(0.365)    | 1.751*<br>(0.047)    | 2.981<br>(0.819)    |
| LEN_VA                   | 0.012<br>(0.628)     |                     |                      |                    |                     |                      |                     |
| LEN_PS                   |                      | 0.098**<br>(0.04)   |                      |                    |                     |                      |                     |
| LEN_GE                   |                      |                     | 0.003<br>(0.979)     |                    |                     |                      |                     |
| LEN_RQ                   |                      |                     |                      | 0.308**<br>(0.05)  |                     |                      |                     |
| LEN_CC                   |                      |                     |                      |                    | 0.231<br>(0.118)    |                      |                     |
| LEN_RL                   |                      |                     |                      |                    |                     | 0.017<br>(0.92)      |                     |
| LEN_INST                 |                      |                     |                      |                    |                     |                      | 0.190**<br>(0.048)  |
| Arellano–Bond Test AR(1) | [0.118]              | [0.330]             | [0.125]              | [0.241]            | [0.045]             | [0.160]              | [0.241]             |
| Arellano–Bond Test AR(2) | [0.206]              | [0.861]             | [0.886]              | [0.685]            | [0.956]             | [0.843]              | [0.685]             |
| Hansen J-test            | [0.675]              | [0.405]             | [0.562]              | [0.437]            | [0.766]             | [0.364]              | [0.377]             |
| Diff-in-Hansen test      | [0.036]              | [0.017]             | [0.119]              | [0.097]            | [0.129]             | [0.037]              | [0.086]             |
| Number of countries      | 44                   | 44                  | 44                   | 44                 | 44                  | 44                   | 44                  |
| Number of observations   | 853                  | 853                 | 853                  | 853                | 853                 | 853                  | 853                 |

Note: LEN\_VA, LEN\_PS, LEN\_GE, LEN\_RQ, LEN\_CC, LEN\_CC, LEN\_RL and LEN\_INST denote the interaction of lending rate (LEN) with Voice and Accountability (VA), Political Stability (PS), Government Effectiveness (GE), Regulatory Quality (RQ), Rule of Law (RL), Control of Corruption (CC), and Composite Index of governance indicators (INST). \*\*\*, \*\*, and \* implies significant at 1%, 5% and 10% level, respectively. The p-values are in parentheses

Source: Author's own calculation

The table shows that an increase in lending rate by 1% in model 4 leads to a decrease of 0.34% in GFCF, which is statistically significant at 5%. While there seems to be an inverse relationship between the lending rate and GFCF. The interaction of lending rate with institutions reveals some interesting results. The interaction of lending rate with institutions indicators yields positive coefficients, though only three (LEN\_PS, LEN\_RQ and LEN\_INST) are statistically

significant at 5%. This implies that the lending rate, when interacted with institutions, tends to lead to an increase in GFCF. This could be as a result of effective monetary and lending policies that facilitate funding credit dedicated to expansion of private investment. The table also shows that the relationship between lending rate and GFCF particularly strong and positive, especially when supported by political stability (PS), effective regulatory quality (RQ) and good institutions overall (INST). This is contrary to Nabende and Siater (2003) who found that lending and monetary policy variables exhibit reduced effectiveness when assessed in connection with capital formation.

The SSA consist of various regions which differ both in terms of their political and economic characteristics. For instance, Yahoo Finance (2023) lists countries such as Burkina Faso, Guinea-Bissau, Uganda Niger, Zimbabwe, and Mali as being amongst the most unstable and fragile countries in the World. Marc et al (2015) elaborates the rise of conflict and wars and instability in West Africa, particularly since 2010. Kieh (2009) traces the prevalence of political instability in the African continent as far back as the start of the post-colonial era. **Figure 2** to **Figure 5** demonstrated the extent of variations in terms of GFCF, per capita income, and institutional quality among countries in SSA. In **Table 7**, regional dummies<sup>5</sup> are included to help tease out how capital formation determinants differs across sub-regions in Africa. Specifically, five regional dummies are included (Dummy1 – Dummy5), with the Southern African Development Community (SADC) as the reference region. The signs and coefficients of most of the other variables are largely the same as those in **Table 5**. Therefore, focusing mainly on the regional dummies, the table reveals that GFCF rates in Economic Community of West African States (ECOWAS) are generally lower than those found across SADC, with variation ranging between 1.02% - 3.27% across the 7 models. With the exception of Model 4 which is not statistically significant, the rest of the models are statistically significant at 5% and 10% level. This could be attributed to lower savings rates in in ECOWAS when compared with other regions (Abu et al., 2015). This of course can also be ascribed to the many coups that have been experienced in this sub-region (Huband, 2013).

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<sup>5</sup> Countries belonging to more than one membership in the sub-regions were filtered out to avoid double counting.

**Table 7: 2-step System GMM with regional dummies**

|                          | Model (1)          | Model (2)         | Model (3)          | Model (4)          | Model (5)         | Model (6)          | Model (7)         |
|--------------------------|--------------------|-------------------|--------------------|--------------------|-------------------|--------------------|-------------------|
| Variables                |                    |                   |                    |                    |                   |                    |                   |
| L1.GFCF                  | 0.165***<br>0.003  | 0.336***<br>0.003 | 0.892***<br>0.009  | 0.3429***<br>0.005 | 0.498**<br>0.017  | 0.373***<br>0.002  | 0.493***<br>0.001 |
| L2.GFCF                  | 0.222<br>0.406     | 0.094<br>0.593    | 0.121<br>0.508     | 0.918<br>0.383     | 0.141<br>0.358    | 0.182<br>0.107     | 0.042<br>0.821    |
| logGDP                   | 2.245**<br>0.037   | 08.876**<br>0.045 | 3.245<br>0.236     | 4.467**<br>0.018   | 3.876**<br>0.039  | 2.098*<br>0.074    | 2.423**<br>0.042  |
| logPop                   | 0.860*<br>0.089    | -0.358<br>0.345   | -0.845<br>0.456    | -0.572<br>0.634    | 1.984<br>0.426    | -0.621<br>0.672    | 0.621<br>0.103    |
| TRA                      | 0.027<br>0.254     | 0.024<br>0.298    | 0.082<br>0.440     | 0.0245*<br>0.077   | -0.027<br>0.594   | 0.025<br>0.876     | 0.0404*<br>0.076  |
| CA                       | -0.234***<br>0.003 | -0.654*<br>0.083  | -0.345**<br>0.026  | -0.278*<br>0.074   | -0.262**<br>0.061 | -0.345<br>0.175    | -0.432<br>0.187   |
| DEBT                     | -0.023<br>0.342    | 0.045<br>0.237    | 0.032<br>0.954     | 0.062<br>0.302     | -0.056<br>0.567   | -0.012<br>0.329    | -0.049<br>0.118   |
| GDS                      | 0.423***<br>0.004  | 0.175<br>0.243    | 0.435*<br>0.063    | 0.176**<br>0.042   | 0.542***<br>0.018 | 0.193<br>0.276     | 0.238**<br>0.035  |
| GOVE                     | 0.342**<br>0.046   | 0.235<br>0.453    | 0.268**<br>0.065   | 0.431*<br>0.080    | 0.864<br>0.597    | 0.569**<br>0.032   | 0.356*<br>0.077   |
| LEN                      | -0.084<br>0.155    | -0.064*<br>0.087  | 0.064<br>0.243     | 0.007<br>0.332     | 0.097<br>0.634    | 0.134<br>0.762     | 0.076<br>0.183    |
| Dummy1                   | -2.021*<br>0.083   | -1.012*<br>0.056  | -2.564**<br>0.044  | -1.863<br>0.112    | -2.312**<br>0.033 | -3.656*<br>0.091   | -2.245*<br>0.064  |
| Dummy2                   | 2.623<br>0.675     | 1.973*<br>0.083   | 1.423**<br>0.044   | 1.921**<br>0.035   | 0.976**<br>0.051  | 2.191*<br>0.081    | 1.756**<br>0.042  |
| Dummy3                   | 0.0279<br>0.675    | 0.634<br>0.800    | 0.713<br>0.435     | 0.891<br>0.348     | 0.243<br>0.131    | 0.912<br>0.181     | 0.154<br>0.142    |
| Dummy4                   | -0.135*<br>0.078   | -0.673**<br>0.032 | -0.713***<br>0.011 | -0.623***<br>0.002 | -0.233**<br>0.041 | -0.379***<br>0.012 | -0.275**<br>0.042 |
| Dummy5                   | -1.675**<br>0.047  | -0.612<br>0.234   | -1.845**<br>0.032  | -0.973**<br>0.065  | -1.625**<br>0.031 | -1.673*<br>0.097   | -0.975**<br>0.026 |
| VA                       | 0.435*<br>0.090    |                   |                    |                    |                   |                    |                   |
| PS                       |                    | 0.207***<br>0.013 |                    |                    |                   |                    |                   |
| GE                       |                    |                   | 0.084<br>0.105     |                    |                   |                    |                   |
| RQ                       |                    |                   |                    | 0.165**<br>0.023   |                   |                    |                   |
| CC                       |                    |                   |                    |                    | 0.563***<br>0.003 |                    |                   |
| RL                       |                    |                   |                    |                    |                   | 0.045<br>0.165     |                   |
| INST                     |                    |                   |                    |                    |                   |                    | 0.128**<br>0.034  |
| Arellano–Bond Test AR(1) | [0.457]            | [0.353]           | [0.654]            | [0.645]            | [0.270]           | [0.151]            | [0.171]           |
| Arellano–Bond Test AR(2) | [0.511]            | [0.206]           | [0.179]            | [0.751]            | [0.723]           | [0.543]            | [0.598]           |
| Hansen J-test            | [0.535]            | [0.636]           | [0.545]            | [0.745]            | [0.134]           | [0.543]            | [0.532]           |
| Diff-in-Hansen test      | [0.121]            | [0.103]           | [0.096]            | [0.074]            | [0.046]           | [0.053]            | [0.004]           |

Note: Dummy1 to Dummy5 denote regional dummies as follows: Dummy1:Economic Community of West African States (ECOWAS), Dummy2: East African Community (EAC), Dummy3: Common Market for Eastern and Southern Africa (COMESA), Dummy4: Economic Community of Central African States (ECCAS) and Dummy5: West African Economic and Monetary Union (WAEMU). The reference region is the Southern African Development Community (SADC). \*\*\*, \*\*, and \* implies significant at 1%, 5% and 10% level, respectively. The p-values are in parentheses

Source: Author's own calculation

**Table 7** also shows that that investment rates in the East African Community (EAC) sub-region exceed those in SADC by 0.98% to 2.62%, which is statistically significant mainly at 5% across

the different models. This could be influenced by the relatively higher rate of FDI which the sub-region has recorded especially over the past two decades. This is supported by Penev and Marušić (2014) who noted that between 2001 – 2013, growth in FDI in EAC was higher than that of Africa as a whole. GFCF in the Common Market for Eastern and Southern Africa (COMESA) was higher but not statistically significant when compared with SADC. This could be due to the fact that although this sub-region countries with higher GFCF as a percent of GDP (e.g., Seychelles), there are also countries such as Eritrea and Djibouti which have very low investment rates. Both Economic Community of Central African States (ECCAS) West African Economic and Monetary Union (WAEMU) had lower and statistically significant investment rates than those in SADC.

### **Robustness checks**

**Table 8** incorporates robustness checks with the aim of evaluating the consistency and dependability of empirical findings above by exposing them to changes in model specifications and methodologies. These assessments are aimed at bolstering the trustworthiness of the above results by proving that outcomes are not reliant on particular assumptions or circumstances (Catherine et al., 2022). In column (1), we conduct an estimation using pooled OLS as the base model. The asterisks adjacent to the coefficients signifies the degree of statistical significance, with a greater number of asterisks indicating increased significance. The results presented show that variables such as logGDP, Gross Domestic Savings, Government expenditure, Political Stability, Rule of law and Control of Corruption are positively and statistically related with GFCF. For instance, a 1% increase in GDP is associated with an increase of 1.6% increase in GFCF. Other variables such as Current account balance and the lending rate have a significant and negative impact on GFCF. A 1% increase in lending rate is associated with a decrease of 0.069% in GFCF.

**Table 8: Robustness checks**

|                                  | (1)                              | (2)                      | (3)                       | (4)                    |
|----------------------------------|----------------------------------|--------------------------|---------------------------|------------------------|
|                                  | <b>Pooled OLS<br/>Regression</b> | <b>Fixed<br/>Effects</b> | <b>Random<br/>Effects</b> | <b>2-step<br/>SGMM</b> |
| logGDP                           | 1.609***<br>(0.006)              | 1.734**<br>(0.026)       | 1.609***<br>(0.006)       | 1.158**<br>(0.025)     |
| logPop                           | 0.761*<br>(0.098)                | 0.950<br>(0.467)         | 0.761*<br>(0.098)         | 0.338<br>(0.876)       |
| TRA                              | 0.061<br>(0.335)                 | 0.054<br>(0.234)         | 0.061<br>(0.335)          | 0.086<br>(0.410)       |
| CA                               | -0.389***<br>(0.010)             | -0.384**<br>(0.026)      | -0.389***<br>(0.010)      | -0.491**<br>(0.042)    |
| DEBT                             | -0.016<br>(0.177)                | -0.013<br>(0.235)        | -0.016<br>(0.177)         | -0.018<br>(0.968)      |
| GDS                              | 0.299***<br>(0.003)              | 0.296**<br>(0.026)       | 0.299***<br>(0.003)       | 0.235**<br>(0.028)     |
| GOVE                             | 0.152***<br>(0.014)              | 0.125**<br>(0.059)       | 0.152***<br>(0.014)       | 0.464**<br>(0.031)     |
| LEN                              | -0.069***<br>(0.003)             | -0.081***<br>(0.001)     | -0.069***<br>(0.003)      | -0.031**<br>(0.023)    |
| DUMMY                            | 0.826***<br>(0.002)              | 2.656***<br>(0.010)      | 0.826***<br>(0.002)       | 1.653**<br>(0.031)     |
| VA                               | 2.133**<br>(0.026)               | 2.144**<br>(0.047)       | 2.133**<br>(0.026)        | 1.039<br>(0.417)       |
| PS                               | 0.723**<br>(0.021)               | 0.889***<br>(0.014)      | 0.723**<br>(0.021)        | 1.251**<br>(0.027)     |
| GE                               | 1.087<br>(0.377)                 | 1.585<br>(0.216)         | 1.087<br>(0.377)          | 0.977<br>(0.809)       |
| RQ                               | 0.764**<br>(0.049)               | 0.610<br>(0.598)         | 0.764**<br>(0.049)        | 0.691<br>(0.856)       |
| CC                               | 1.011***<br>(0.004)              | 1.173**<br>(0.023)       | 1.011***<br>(0.004)       | 2.498**<br>(0.041)     |
| RL                               | 2.451***<br>(0.002)              | 2.146***<br>(0.006)      | 2.451***<br>(0.002)       | 2.748**<br>(0.038)     |
| Constant                         | -8.303<br>(0.311)                | -32.154<br>0.04**        | -8.303<br>(0.311)         | -49.439<br>(0.345)     |
| Obs.                             | 557                              | 557                      | 557                       | 557                    |
| R-squared: overall               | 0.598                            | 0.426                    | 0.598                     |                        |
| : within                         | 0.463                            | 0.466                    | 0.463                     |                        |
| : between                        | 0.626                            | 0.426                    | 0.626                     |                        |
| F-statistic (p-value)            |                                  | 31.85 (0.000)            |                           | 19.38 (0.000)          |
| LM test statistic (p-value)      |                                  |                          | 58.96<br>(0.000)          |                        |
| Hausman test statistic (p-value) |                                  |                          | 13.37<br>(0.032)          |                        |
| <b>Diagnostic tests</b>          |                                  |                          |                           |                        |
| Breusch-Pagan test               |                                  | 21.39 (0.000)            |                           | 33.22 (0.434)          |
| Perasan test                     |                                  | 8.23 (0.000)             |                           | 25.02 (0.278)          |
| Durbin-Watson d-statistic        |                                  | 0.017211 (0.05)          |                           | 1.89                   |

Note: \*\*\*, \*\*, and \* implies significant at 1%, 5% and 10% level, respectively. The *p*-values are in parentheses

Source: Author's own calculation

The study also employed the Fixed Effects model and contrasted it with the Pooled OLS model through the utilisation of the F-test, with the corresponding results detailed in column (2) of **Table 8**. The Fixed Effects model incorporates country-specific effects to account for unobserved heterogeneity within each country. Therefore, the estimation of variable coefficients in column (2) reliant on variations observed within each country. The null hypothesis of the F-test is that the model has no fixed effects. The obtained p-value for the F statistic is sufficiently low ( $p\text{-value} < 0.01$ ) to reject the null hypothesis asserting the absence of fixed effects in the model. Consequently, the preference leans towards adopting a Fixed Effects model over a Pooled model. Additionally, a Random Effects model (column 3) was estimated to capture both country-specific and time-specific effects, presuming that these effects are independent of the independent variables. Potential random effects were assessed using the LM test and the results indicate the existence of random effects, as the null hypothesis positing the absence of such effects is rejected at a 1% significance level. Based on this the Random Effects model is preferred to the base Pooled regression model.

The next step involved a comparison between the Random Effects and Fixed Effects models through the Hausman test. The comparison showed that the Fixed Effects model yields more consistent results, as indicated by the rejection of the null hypothesis at a 1% significance level. Consequently, the Fixed Effects model is preferred over the Random Effects model. To delve further, the Fixed Effects model underwent testing for heteroscedasticity, cross-sectional dependence, and autocorrelation. However, as the diagnostic tests in the table show, the analysis revealed that the Fixed Effects model exhibits heteroscedasticity, cross-sectional dependence and autocorrelation. To address these issues, the study employs a 2-step SGMM estimation, and the results are presented in column (4). The Breusch-Pagan test statistic indicates no statistically significant evidence of heteroscedasticity in the residuals for the 2-step SGMM, with a p-value of 0.434. The Durbin-Watson d-statistic of 1.89 indicates no significant autocorrelation in the residuals for the 2-step SGMM model.

## Section 6

### 6.1. Policy implications

The intricate interaction among various factors and Gross Fixed Capital Formation (GFCF) underscores the need for precise and focused policy interventions. The significant and statistically meaningful impact of political stability (PS) and control of corruption (CC) on GFCF underscores the crucial role of good governance. Policymakers should prioritize governance reforms, including strengthening institutions, refining the rule of law, and enhancing transparency. A stable political environment combined with effective anti-corruption measures can instil confidence among investors, attract capital, and contribute to the long-term sustainability of economic development. Results concerning the relationship between lending rates and governance indicators suggest that the combination of monetary policies and sound governance practices can yield positive outcomes for GFCF. However, it is essential to adopt a nuanced perspective that considers the interconnectedness within the broader economic and financial context. Rather than viewing lending rates and governance in isolation, policymakers recognise the multifaceted nature of lending rates, which are influenced not only by monetary policies and governance practices but also by factors such as the depth of the financial system and political risk. It should be acknowledged that consequently, high lending rates may not necessarily indicate weak governance or ineffective monetary policies but could reflect underlying financial conditions and susceptibility to shocks. To accurately analyse this relationship, policymakers need to understand how governance practices interact with broader economic factors to shape lending rates and their implications for capital formation in SSA. This holistic approach enables more accurate interpretation of the data and informs more effective policy recommendations aimed at promoting financial stability and sustainable economic development.

Policymakers should explore potential synergies among various policy instruments, examining how the collaboration of monetary policies with robust governance measures can enhance their impact on investment. The findings highlight the interdependence of diverse factors shaping GFCF. Policymakers should adopt a comprehensive strategy for sustainable development, recognizing the interconnectedness between economic, social, and governance factors. Implementing integrated policies that simultaneously address multiple dimensions can contribute to economic growth that is both robust and inclusive.

The persistent and statistically significant effect of past GFCF (L1.GFCF) in various models underscores the lasting influence of previous investment choices. Policymakers should

consider the prolonged consequences of historical capital formation and adopt strategies that encourage continuous investment. This could involve specific incentives, regulations conducive to investment, and initiatives to ensure the ongoing progress of capital-intensive projects. The positive correlation observed between logGDP and GFCF implies a collaborative link between economic growth and investment. Policymakers need to focus on implementing strategies that actively promote economic growth, including initiatives such as infrastructure development, fostering innovation, and embracing technological advancements. A thriving economy not only attracts increased investments but also demands heightened focus on capital formation to support the continual expansion of production capacities. It is essential for policymakers to explore and adopt a range of measures to stimulate economic growth and ensure sustained investment.

The significant influence of trade (TRA) on GFCF within specific models underscores the crucial role of trade policies in shaping capital formation. Policymakers should target economic diversification and implement strategies prioritising exports to stimulate both trade and GFCF. Introducing measures to minimize trade barriers, optimize logistics, and enhance overall competitiveness can collectively contribute to creating an environment conducive to increased investment. The persistent adverse effect of current account balances (CA) on GFCF highlights the challenges associated with external imbalances. Policymakers need to work towards maintaining sustainable current account positions, addressing concerns linked to excessive dependence on external financing. Implementing strategies to enhance export competitiveness, minimize trade deficits, and attract foreign direct investment can play a pivotal role in fostering a more robust external balance and facilitating domestic capital formation.

The substantial and statistically significant influence of gross domestic savings (GDS) on GFCF underscores the pivotal role that savings play in promoting capital formation. Policymakers should enact measures aimed at mobilizing domestic savings, including initiatives such as financial literacy programs, incentivized savings schemes, and policies that encourage households and businesses to save with the specific purpose of investment. The correlation between government expenditure (GOVE) and GFCF suggests that targeted public spending can serve as a catalyst for stimulating private sector investment. Policymakers should prioritize directing government expenditures toward capital projects, particularly those demonstrating substantial economic returns. This might involve investments in infrastructure, education, and technology, fostering an atmosphere conducive to increased private sector engagement.

## **6.2. Conclusion and recommendations**

The findings obtained from the 2-step System GMM models, particularly in relation to governance indicators, offer valuable insights into the complex dynamics influencing Gross Fixed Capital Formation (GFCF) in Sub-Saharan Africa. These results underscore the crucial influence of governance in shaping investment choices and capital accumulation. Specifically, Political Stability and Control of Corruption emerge as key factors, emphasizing the necessity for comprehensive governance reforms to foster an environment that promotes increased investor confidence and a flourishing investment climate. These findings highlight the importance of prioritizing governance reforms to enhance political stability and counteract corruption. Moreover, adopting a comprehensive governance approach that encompasses various dimensions, including Voice and Accountability, Government Effectiveness, Regulatory Quality, and Rule of Law, is essential. On the whole, the average of institutional performance, as indicated by the Composite Index of governance indicators (INST), is both positive and significant, indicating the positive impact of governance on GFCF in the region. A sustained commitment to upholding the rule of law is identified as crucial for establishing a stable and transparent legal framework.

Looking forward, future research avenues could delve deeper into the effects of specific governance reforms on GFCF and explore the intricate interactions among different governance dimensions. Additionally, investigations into the effectiveness of policy measures addressing external imbalances and promoting domestic savings could offer valuable insights for policymakers. Comparative studies across diverse regions within Sub-Saharan Africa may reveal regional variations, allowing for more targeted and context-specific policy recommendations. Furthermore, understanding the influence of cultural and institutional factors in shaping investment decisions could introduce a layer of complexity to the analysis. Finally, a longitudinal analysis tracking the evolution of governance and economic indicators over time could contribute to evaluating the sustained impact of policy interventions in the region.

## 7. Appendix

### *Appendix 1: Average values of key variables in Sub-Saharan African countries spanning the period 1996-2022*

| Country                  | Voice and Accountability | Political Stability and Absence of Violence/Terrorism | Government Effectiveness | Regulatory Quality | Rule of Law  | Control of Corruption | GDP growth (annual %) | Gross fixed capital formation (% of GDP) | Inflation, consumer prices (annual %) | Access to electricity (% of population) | GDP per capita (constant 2015 US\$) | Population growth (annual %) | Trade (% of GDP) | General government gross debt%GDP | Unemployment rate (%) |
|--------------------------|--------------------------|-------------------------------------------------------|--------------------------|--------------------|--------------|-----------------------|-----------------------|------------------------------------------|---------------------------------------|-----------------------------------------|-------------------------------------|------------------------------|------------------|-----------------------------------|-----------------------|
| Angola                   | -1.17                    | -0.91                                                 | -1.09                    | -1.10              | -1.30        | -1.23                 | 5.04                  | 26.24                                    | 213.07                                | 35.73                                   | 2504.54                             | 3.48                         | 92.77            | 63.26                             | 6.61                  |
| Benin                    | 0.20                     | 0.32                                                  | -0.50                    | -0.43              | -0.46        | -0.56                 | 4.70                  | 19.88                                    | 2.43                                  | 29.69                                   | 990.98                              | 2.93                         | 51.52            | 31.02                             | 1.35                  |
| Botswana                 | 0.56                     | 1.02                                                  | 0.44                     | 0.68               | 0.53         | 0.85                  | 3.85                  | 26.41                                    | 7.03                                  | 46.05                                   | 5587.82                             | 1.97                         | 95.49            | 13.69                             | 19.38                 |
| Burkina Faso             | -0.29                    | -0.48                                                 | -0.73                    | -0.31              | -0.55        | -0.16                 | 5.75                  | 18.87                                    | 2.59                                  | 12.96                                   | 557.76                              | 2.90                         | 45.03            | 34.10                             | 3.70                  |
| Burundi                  | -1.21                    | -1.76                                                 | -1.33                    | -1.13              | -1.29        | -1.13                 | 1.83                  | 11.37                                    | 10.69                                 | 5.77                                    | 296.98                              | 2.87                         | 31.25            | 84.62                             | 2.07                  |
| Cameroon                 | -1.06                    | -0.80                                                 | -0.88                    | -0.88              | -1.14        | -1.18                 | 4.04                  | 18.62                                    | 2.56                                  | 51.40                                   | 1284.32                             | 2.77                         | 45.07            | 37.28                             | 4.88                  |
| Cape Verde               | 0.86                     | 0.88                                                  | 0.00                     | -0.16              | 0.51         | 0.87                  | 5.65                  | 34.60                                    | 2.44                                  | 77.67                                   | 2739.13                             | 1.36                         | 92.08            | 91.67                             | 11.58                 |
| Central African Republic | -1.07                    | -1.77                                                 | -1.53                    | -1.21              | -1.48        | -1.16                 | 1.36                  | 13.00                                    | 3.45                                  | 9.35                                    | 427.57                              | 1.97                         | 42.86            | 61.55                             | 5.56                  |
| Chad                     | -1.27                    | -1.39                                                 | -1.26                    | -1.13              | -1.35        | -1.40                 | 5.33                  | 25.51                                    | 2.92                                  | 6.44                                    | 599.25                              | 3.50                         | 75.24            | 41.74                             | 0.99                  |
| Comoros                  | -0.50                    | -0.21                                                 | -1.57                    | -1.25              | -1.03        | -0.86                 | 2.76                  | 15.79                                    | 5.64                                  | 59.62                                   | 1259.71                             | 2.03                         | 37.91            | 36.25                             | 6.48                  |
| Congo, Dem. Rep.         | -1.46                    | -2.20                                                 | -1.67                    | -1.56              | -1.71        | -1.45                 | 3.69                  | 15.96                                    | 79.10                                 | 13.43                                   | 415.50                              | 3.06                         | 61.59            | 60.14                             | 3.78                  |
| Congo, Rep.              | -1.15                    | -0.74                                                 | -1.20                    | -1.25              | -1.23        | -1.18                 | 1.84                  | 34.24                                    | 3.17                                  | 39.63                                   | 2061.78                             | 2.88                         | 124.03           | 78.20                             | 20.39                 |
| Côte d'Ivoire            | -0.78                    | -1.19                                                 | -0.86                    | -0.60              | -1.02        | -0.75                 | 3.97                  | 18.87                                    | 2.46                                  | 57.44                                   | 1821.83                             | 2.51                         | 55.59            | 50.65                             | 4.55                  |
| Equatorial Guinea        | -1.77                    | -0.05                                                 | -1.17                    | -1.55              | -1.22        | -1.36                 | 16.40                 | 39.96                                    | 4.15                                  | 65.70                                   | 8327.42                             | 4.05                         | 111.54           | 26.67                             | 8.22                  |
| Eritrea                  | -1.94                    | -0.79                                                 | -1.38                    | -1.84              | -1.21        | -0.50                 | 2.15                  | 17.76                                    | 10.42                                 | 38.56                                   | 763.98                              | 1.98                         | 66.48            | 227.67                            | 5.80                  |
| Eswatini                 | -1.35                    | -0.19                                                 | -0.60                    | -0.36              | -0.56        | -0.16                 | 3.07                  | 15.88                                    | 6.54                                  | 50.56                                   | 3100.49                             | 0.86                         | 115.59           | 20.36                             | 24.82                 |
| Ethiopia                 | -1.19                    | -1.43                                                 | -0.79                    | -1.08              | -0.73        | -0.65                 | 7.89                  | 26.75                                    | 11.93                                 | 27.82                                   | 472.70                              | 2.83                         | 34.70            | 66.36                             | 2.97                  |
| Gabon                    | -0.78                    | 0.21                                                  | -0.71                    | -0.39              | -0.53        | -0.84                 | 1.96                  | 25.14                                    | 1.96                                  | 84.53                                   | 7175.60                             | 2.80                         | 84.31            | 53.08                             | 19.21                 |
| Gambia, The              | -0.85                    | 0.19                                                  | -0.67                    | -0.56              | -0.37        | -0.52                 | 3.36                  | 15.38                                    | 5.98                                  | 42.80                                   | 648.57                              | 2.88                         | 49.69            | 70.80                             | 7.68                  |
| Ghana                    | 0.31                     | -0.04                                                 | -0.15                    | -0.15              | -0.04        | -0.17                 | 5.50                  | 20.57                                    | 17.68                                 | 60.21                                   | 1423.23                             | 2.42                         | 77.71            | 70.80                             | 5.71                  |
| Guinea                   | -1.06                    | -1.21                                                 | -1.04                    | -0.97              | -1.33        | -1.03                 | 4.46                  | 21.14                                    | 11.91                                 | 28.52                                   | 733.67                              | 2.29                         | 73.33            | 61.60                             | 4.86                  |
| Guinea-Bissau            | -0.76                    | -0.73                                                 | -1.32                    | -1.14              | -1.41        | -1.26                 | 2.28                  | 12.45                                    | 6.10                                  | 15.75                                   | 589.90                              | 2.35                         | 50.92            | 114.11                            | 3.16                  |
| Kenya                    | -0.38                    | -1.14                                                 | -0.53                    | -0.31              | -0.77        | -0.99                 | 4.02                  | 18.78                                    | 8.58                                  | 33.30                                   | 1372.13                             | 2.59                         | 47.66            | 45.12                             | 3.40                  |
| Lesotho                  | -0.09                    | -0.02                                                 | -0.47                    | -0.51              | -0.17        | -0.04                 | 2.20                  | 29.38                                    | 6.70                                  | 22.37                                   | 917.28                              | 0.65                         | 143.57           | 55.21                             | 17.10                 |
| Madagascar               | -0.28                    | -0.23                                                 | -0.83                    | -0.61              | -0.60        | -0.57                 | 2.89                  | 19.60                                    | 8.79                                  | 19.12                                   | 460.30                              | 2.81                         | 54.46            | 57.90                             | 3.32                  |
| Malawi                   | -0.17                    | -0.10                                                 | -0.63                    | -0.57              | -0.29        | -0.56                 | 4.05                  | 9.64                                     | 17.30                                 | 8.11                                    | 481.40                              | 2.60                         | n/a              | 45.05                             | 5.02                  |
| Mali                     | -0.09                    | -0.69                                                 | -0.95                    | -0.51              | -0.49        | -0.73                 | 4.74                  | 19.09                                    | 2.19                                  | 25.19                                   | 673.22                              | 3.05                         | 58.95            | 38.27                             | 1.53                  |
| Mauritania               | -0.83                    | -0.35                                                 | -0.64                    | -0.59              | -0.70        | -0.64                 | 3.36                  | 36.41                                    | 5.05                                  | 33.52                                   | 1462.70                             | 2.55                         | 81.64            | 50.07                             | 10.15                 |
| Mauritius                | 0.84                     | 0.90                                                  | 0.73                     | 0.68               | 0.89         | 0.28                  | 3.68                  | 21.56                                    | 4.95                                  | 99.33                                   | 7757.89                             | 0.44                         | 114.15           | 63.16                             | 8.02                  |
| Mozambique               | -0.25                    | -0.18                                                 | -0.63                    | -0.54              | -0.80        | -0.61                 | 6.67                  | 19.85                                    | 9.90                                  | 17.00                                   | 455.62                              | 2.77                         | 76.80            | 73.75                             | 3.20                  |
| Namibia                  | 0.42                     | 0.62                                                  | 0.20                     | 0.19               | 0.24         | 0.37                  | 3.31                  | 21.29                                    | 6.48                                  | 43.15                                   | 3955.55                             | 1.74                         | 93.92            | 32.36                             | 21.28                 |
| Niger                    | -0.49                    | -0.76                                                 | -0.82                    | -0.69              | -0.62        | -0.76                 | 4.78                  | 22.30                                    | 2.20                                  | 12.28                                   | 446.16                              | 3.64                         | 39.00            | 41.70                             | 1.35                  |
| Nigeria                  | -0.70                    | -1.73                                                 | -1.04                    | -0.92              | -1.13        | -1.18                 | 4.76                  | 24.39                                    | 12.77                                 | 50.02                                   | 2122.16                             | 2.60                         | 36.72            | 27.31                             | 4.22                  |
| Rwanda                   | -1.27                    | -0.69                                                 | -0.42                    | -0.50              | -0.54        | 0.02                  | 7.79                  | 19.14                                    | 6.56                                  | 17.12                                   | 572.21                              | 3.28                         | 40.12            | 50.98                             | 12.06                 |
| Senegal                  | 0.11                     | -0.29                                                 | -0.28                    | -0.24              | -0.16        | -0.15                 | 4.15                  | 22.27                                    | 1.94                                  | 50.62                                   | 1186.99                             | 2.58                         | 56.57            | 42.42                             | 6.71                  |
| Seychelles               | 0.16                     | 0.83                                                  | 0.61                     | 0.12               | 0.37         | 0.76                  | 3.40                  | 37.86                                    | 5.48                                  | 96.99                                   | 13332.29                            | 1.05                         | 177.78           | 115.67                            | n/a                   |
| Sierra Leone             | -0.42                    | -0.61                                                 | -1.29                    | -1.08              | -1.02        | -0.78                 | 4.49                  | 12.69                                    | 12.14                                 | 16.21                                   | 527.86                              | 2.55                         | 53.99            | 82.23                             | 3.75                  |
| South Africa             | 0.68                     | -0.22                                                 | 0.35                     | 0.40               | 0.04         | 0.18                  | 2.37                  | 16.43                                    | 5.51                                  | 79.82                                   | 5619.15                             | 1.14                         | 52.25            | 41.19                             | 22.08                 |
| Sudan                    | -1.71                    | -2.16                                                 | -1.32                    | -1.41              | -1.38        | -1.30                 | 2.44                  | 15.81                                    | 48.43                                 | 38.18                                   | 2068.34                             | 2.59                         | 23.66            | 129.76                            | 16.29                 |
| Tanzania                 | -0.37                    | -0.40                                                 | -0.60                    | -0.50              | -0.40        | -0.60                 | 5.71                  | 30.06                                    | 7.75                                  | 18.47                                   | 778.35                              | 2.82                         | 38.10            | 27481.50                          | 2.85                  |
| Togo                     | -0.97                    | -0.45                                                 | -1.15                    | -0.79              | -0.81        | -0.85                 | 4.07                  | 15.93                                    | 2.68                                  | 34.80                                   | 714.75                              | 2.69                         | 61.66            | 1709.58                           | 3.48                  |
| Uganda                   | -0.69                    | -1.04                                                 | -0.57                    | -0.22              | -0.47        | -0.97                 | 6.04                  | 22.51                                    | 5.98                                  | 17.39                                   | 717.60                              | 3.06                         | 38.53            | 35.65                             | 3.29                  |
| Zambia                   | -0.29                    | 0.18                                                  | -0.83                    | -0.54              | -0.44        | -0.59                 | 5.11                  | 31.60                                    | 15.85                                 | 27.00                                   | 1085.03                             | 3.09                         | 68.24            | 83.91                             | 10.52                 |
| Zimbabwe                 | -1.25                    | -0.96                                                 | -1.12                    | -1.64              | -1.45        | -1.18                 | 1.09                  | 10.42                                    | 41.79                                 | 38.76                                   | 1359.77                             | 1.46                         | 69.98            | 55.16                             | 5.78                  |
| <b>Average</b>           | <b>-0.59</b>             | <b>-0.52</b>                                          | <b>-0.73</b>             | <b>-0.66</b>       | <b>-0.67</b> | <b>-0.61</b>          | <b>4.27</b>           | <b>21.62</b>                             | <b>14.85</b>                          | <b>37.69</b>                            | <b>2087.49</b>                      | <b>2.46</b>                  | <b>68.43</b>     | <b>721.67</b>                     | <b>7.89</b>           |

Source: author's calculation based on World Bank Data (2022)

**Appendix 2: Other descriptive statistics of selected variables and countries (1996 – 2021)**

| Country              | GDP per capita |          |         |          | GFCF (% of GDP) |          |      |      | Annual growth rate (%) |          |       |      |
|----------------------|----------------|----------|---------|----------|-----------------|----------|------|------|------------------------|----------|-------|------|
|                      | Mean           | Std. Dev | Min     | Max      | Mean            | Std. Dev | Min  | Max  | Mean                   | Std. Dev | Min   | Max  |
| Angola               | 2 809.9        | 1 360.3  | 872.7   | 5 102.0  | 26.3            | 5.7      | 16.2 | 42.8 | 4.9                    | 6.1      | -5.6  | 15.0 |
| Burundi              | 205.7          | 48.2     | 114.4   | 289.4    | 13.0            | 3.7      | 3.9  | 18.4 | 2.6                    | 2.6      | -3.9  | 5.4  |
| Benin                | 1 031.7        | 203.6    | 564.4   | 1 361.1  | 19.6            | 4.1      | 14.2 | 28.4 | 4.5                    | 1.8      | 1.7   | 7.2  |
| Burkina Faso         | 630.2          | 167.8    | 286.8   | 893.1    | 18.7            | 2.8      | 13.4 | 23.5 | 5.7                    | 1.7      | 1.9   | 8.7  |
| Botswana             | 5 826.8        | 1 082.9  | 3 029.8 | 7 238.8  | 26.7            | 2.4      | 20.3 | 31.5 | 3.6                    | 6.4      | -14.1 | 11.9 |
| Central African Rep. | 396.9          | 73.9     | 253.4   | 525.9    | 13.9            | 5.3      | 6.3  | 24.2 | 1.3                    | 9.3      | -36.4 | 8.6  |
| Côte d'Ivoire        | 1 772.0        | 443.4    | 1 021.0 | 2 613.4  | 18.9            | 3.9      | 12.8 | 24.0 | 4.0                    | 4.5      | -5.4  | 10.8 |
| Cameroon             | 1 378.4        | 231.2    | 780.3   | 1 666.9  | 18.8            | 0.5      | 17.9 | 19.9 | 4.0                    | 1.5      | 0.3   | 7.0  |
| Congo, Dem. Rep.     | 375.7          | 137.3    | 168.0   | 577.2    | 18.0            | 6.3      | 7.4  | 28.7 | 5.6                    | 2.0      | 1.7   | 9.5  |
| Congo, Rep.          | 2 366.9        | 827.1    | 910.9   | 3 753.9  | 38.0            | 19.5     | 13.8 | 81.0 | 1.6                    | 6.4      | -10.8 | 11.6 |
| Comoros              | 1 352.8        | 230.0    | 761.9   | 1 608.7  | 15.5            | 2.1      | 11.0 | 18.7 | 2.7                    | 1.2      | -0.2  | 4.5  |
| Djibouti             | 1 744.6        | 852.8    | 749.1   | 3 050.3  | 28.2            | 1.9      | 25.0 | 30.3 | 5.4                    | 2.0      | 1.2   | 7.5  |
| Ethiopia             | 468.7          | 276.8    | 110.5   | 925.0    | 35.1            | 3.7      | 28.0 | 40.7 | 8.8                    | 3.8      | -2.2  | 13.6 |
| Gabon                | 7 528.7        | 1 651.8  | 3 976.6 | 10 273.8 | 25.0            | 4.8      | 16.8 | 35.7 | 2.3                    | 3.1      | -3.3  | 7.1  |
| Ghana                | 1 443.1        | 693.2    | 343.9   | 2 410.9  | 19.8            | 5.3      | 11.8 | 29.0 | 5.8                    | 3.1      | 0.5   | 14.0 |
| Guinea               | 704.0          | 241.6    | 321.3   | 1 189.2  | 22.3            | 7.8      | 14.3 | 52.4 | 4.6                    | 2.8      | -1.1  | 10.8 |
| Gambia, The          | 652.1          | 129.1    | 311.0   | 857.9    | 17.2            | 6.1      | 7.3  | 29.2 | 2.9                    | 4.2      | -8.1  | 7.2  |
| Guinea-Bissau        | 577.2          | 139.8    | 325.0   | 795.1    | 11.4            | 5.1      | 5.9  | 24.3 | 3.0                    | 2.7      | -2.4  | 8.1  |
| Equatorial Guinea    | 11 121.2       | 5 375.4  | 2 395.8 | 19 849.7 | 26.6            | 14.4     | 4.7  | 53.6 | 4.6                    | 12.5     | -9.1  | 38.0 |
| Kenya                | 1 211.9        | 542.7    | 401.1   | 2 069.7  | 19.5            | 1.9      | 15.8 | 23.9 | 4.5                    | 2.3      | -0.3  | 8.1  |
| Lesotho              | 968.8          | 217.7    | 388.4   | 1 265.9  | 27.9            | 3.1      | 23.5 | 35.9 | 2.0                    | 3.1      | -5.6  | 6.3  |
| Madagascar           | 446.7          | 82.1     | 277.5   | 526.7    | 22.0            | 6.4      | 11.0 | 37.8 | 2.5                    | 5.0      | -12.4 | 9.8  |
| Mali                 | 678.6          | 170.0    | 327.0   | 881.5    | 19.2            | 1.7      | 14.8 | 23.0 | 4.2                    | 2.5      | -1.2  | 9.1  |
| Mozambique           | 501.8          | 106.5    | 303.7   | 680.4    | 21.5            | 9.1      | 10.5 | 40.6 | 5.9                    | 2.7      | -1.2  | 9.7  |
| Mauritania           | 1 513.0        | 433.0    | 629.8   | 2 166.0  | 37.1            | 5.7      | 29.0 | 48.7 | 4.1                    | 4.3      | -2.0  | 18.3 |
| Mauritius            | 8 078.3        | 2 738.3  | 431.7   | 11 643.5 | 20.8            | 2.9      | 16.8 | 25.5 | 3.0                    | 4.3      | -14.6 | 5.9  |
| Namibia              | 4 588.8        | 1 111.1  | 1 773.4 | 6 017.2  | 22.2            | 5.7      | 13.7 | 35.1 | 3.3                    | 4.1      | -8.1  | 12.3 |
| Niger                | 455.5          | 113.9    | 223.4   | 590.6    | 25.2            | 6.6      | 13.0 | 32.6 | 5.0                    | 2.6      | 0.4   | 10.5 |
| Nigeria              | 2 023.0        | 677.7    | 733.5   | 3 201.0  | 20.8            | 5.8      | 14.2 | 33.1 | 5.2                    | 3.9      | -1.8  | 15.3 |
| Rwanda               | 586.5          | 202.7    | 234.8   | 821.2    | 20.6            | 4.7      | 12.6 | 27.1 | 7.3                    | 3.6      | -3.4  | 13.2 |
| Sudan                | 1 438.5        | 745.6    | 529.5   | 3 188.8  | 16.9            | 6.3      | 3.5  | 23.6 | 1.1                    | 5.6      | -17.0 | 6.5  |
| Senegal              | 1 263.3        | 242.4    | 688.2   | 1 633.6  | 23.0            | 4.6      | 17.4 | 34.0 | 4.1                    | 2.1      | 0.1   | 7.4  |
| Sierra Leone         | 446.3          | 136.8    | 240.5   | 706.5    | 15.2            | 8.3      | 8.8  | 41.7 | 6.1                    | 9.0      | -20.5 | 26.5 |
| Somalia              | 392.8          | 26.7     | 356.1   | 447.0    | 13.8            | 1.2      | 12.7 | 16.3 | 6.9                    | 4.1      | 2.3   | 15.0 |
| South Sudan          | 1 378.5        | 226.7    | 1 071.8 | 1 659.1  | 9.9             | 2.9      | 5.8  | 13.8 | -4.9                   | 19.7     | -46.1 | 13.1 |
| Eswatini             | 3 416.3        | 770.2    | 1 363.0 | 4 396.6  | 14.8            | 2.8      | 11.8 | 21.4 | 3.2                    | 2.2      | -1.6  | 7.9  |
| Seychelles           | 12 842.6       | 2 414.6  | 8 864.2 | 16 851.1 | 38.4            | 13.9     | 11.0 | 56.5 | 2.7                    | 5.1      | -8.6  | 9.5  |
| Chad                 | 732.5          | 216.2    | 225.9   | 1 017.8  | 27.7            | 10.3     | 19.0 | 59.7 | 5.8                    | 8.9      | -6.3  | 33.6 |
| Togo                 | 725.1          | 143.8    | 439.1   | 964.1    | 17.0            | 4.1      | 11.2 | 23.3 | 4.0                    | 3.1      | -4.7  | 6.7  |
| Tanzania             | 779.8          | 250.7    | 400.4   | 1 146.0  | 32.9            | 6.0      | 19.3 | 42.6 | 6.1                    | 1.3      | 2.0   | 7.7  |
| Uganda               | 652.2          | 246.5    | 241.9   | 897.5    | 23.9            | 2.7      | 19.9 | 31.5 | 6.1                    | 2.2      | 3.0   | 10.8 |
| South Africa         | 6 402.4        | 1 364.2  | 2 708.4 | 8 737.0  | 16.9            | 2.1      | 13.1 | 21.6 | 2.3                    | 2.8      | -6.3  | 5.6  |
| Zambia               | 1 208.5        | 422.2    | 399.1   | 1 840.3  | 31.6            | 5.1      | 24.1 | 38.8 | 5.5                    | 3.0      | -2.8  | 10.3 |
| Zimbabwe             | 1 046.0        | 536.3    | 351.8   | 2 269.2  | 9.4             | 4.0      | 2.0  | 17.0 | 0.6                    | 10.4     | -17.7 | 21.5 |

Source: Author's own calculation, using data from WGI (2022)

*Appendix 3: Investment gap of selected SSA countries*

| Country                  | GDP (constant<br>2015 Billion<br>US\$) | Gross<br>capital<br>formation<br>(% of<br>GDP) | Investment<br>Gap (%) | Investment<br>gap<br>(BillionUS\$<br>) |
|--------------------------|----------------------------------------|------------------------------------------------|-----------------------|----------------------------------------|
| Angola                   | 81.81                                  | 26.90                                          | 1.90                  | 1.55                                   |
| Benin                    | 16.77                                  | 19.07                                          | -5.93                 | -0.99                                  |
| Botswana                 | 17.51                                  | 28.80                                          | 3.80                  | 0.67                                   |
| Burkina Faso             | 16.59                                  | 19.97                                          | -5.03                 | -0.83                                  |
| Burundi                  | 3.38                                   | 11.58                                          | -13.42                | -0.45                                  |
| Cameroon                 | 40.35                                  | 18.52                                          | -6.48                 | -2.61                                  |
| Cape Verde               | 2.16                                   | 34.60                                          | 9.60                  | 0.21                                   |
| Central African Republic | 2.02                                   | 15.25                                          | -9.75                 | -0.20                                  |
| Chad                     | 10.46                                  | 26.49                                          | 1.49                  | 0.16                                   |
| Comoros                  | 1.14                                   | 16.30                                          | -8.70                 | -0.10                                  |
| Congo, Dem. Rep.         | 52.36                                  | 16.11                                          | -8.89                 | -4.66                                  |
| Congo, Rep.              | 8.98                                   | 35.30                                          | 10.30                 | 0.93                                   |
| Côte d'Ivoire            | 68.44                                  | 18.23                                          | -6.77                 | -4.64                                  |
| Equatorial Guinea        | 9.83                                   | 38.79                                          | 13.79                 | 1.36                                   |
| Eritrea                  | 2.25                                   | 17.76                                          | -7.24                 | -0.16                                  |
| Eswatini                 | 4.86                                   | 15.93                                          | -9.07                 | -0.44                                  |
| Ethiopia                 | 105.78                                 | 26.75                                          | 1.75                  | 1.85                                   |
| Gabon                    | 15.87                                  | 25.08                                          | 0.08                  | 0.01                                   |
| Gambia, The              | 1.85                                   | 15.38                                          | -9.62                 | -0.18                                  |
| Ghana                    | 68.29                                  | 21.37                                          | -3.63                 | -2.48                                  |
| Guinea                   | 13.78                                  | 23.53                                          | -1.47                 | -0.20                                  |
| Guinea-Bissau            | 1.31                                   | 12.15                                          | -12.85                | -0.17                                  |
| Kenya                    | 94.80                                  | 19.08                                          | -5.92                 | -5.61                                  |
| Lesotho                  | 2.23                                   | 31.45                                          | 6.45                  | 0.14                                   |
| Madagascar               | 13.44                                  | 18.76                                          | -6.24                 | -0.84                                  |
| Malawi                   | 11.31                                  | 9.13                                           | -15.87                | -1.79                                  |
| Mali                     | 16.92                                  | 20.51                                          | -4.49                 | -0.76                                  |
| Mauritania               | 7.82                                   | 32.49                                          | 7.49                  | 0.59                                   |
| Mauritius                | 13.31                                  | 22.62                                          | -2.38                 | -0.32                                  |
| Mozambique               | 19.15                                  | 35.83                                          | 10.83                 | 2.07                                   |
| Namibia                  | 11.19                                  | 21.59                                          | -3.41                 | -0.38                                  |
| Niger                    | 14.30                                  | 23.04                                          | -1.96                 | -0.28                                  |
| Nigeria                  | 535.34                                 | 24.94                                          | -0.06                 | -0.32                                  |
| Rwanda                   | 12.96                                  | 19.14                                          | -5.86                 | -0.76                                  |
| Senegal                  | 25.37                                  | 25.38                                          | 0.38                  | 0.10                                   |
| Seychelles               | 1.71                                   | 37.86                                          | 12.86                 | 0.22                                   |
| Sierra Leone             | 5.40                                   | 13.12                                          | -11.88                | -0.64                                  |
| South Africa             | 360.47                                 | 16.82                                          | -8.18                 | -29.48                                 |
| Sudan                    | 78.97                                  | 15.81                                          | -9.19                 | -7.26                                  |
| Tanzania                 | 67.10                                  | 29.82                                          | 4.82                  | 3.23                                   |
| Togo                     | 7.90                                   | 16.28                                          | -8.72                 | -0.69                                  |
| Uganda                   | 44.17                                  | 23.14                                          | -1.86                 | -0.82                                  |
| Zambia                   | 25.66                                  | 34.81                                          | 9.81                  | 2.52                                   |
| Zimbabwe                 | 21.32                                  | 11.24                                          | -13.76                | -2.93                                  |
| <b>Average</b>           | <b>44.01</b>                           | <b>22.43</b>                                   | <b>-2.57</b>          | <b>-1.26</b>                           |

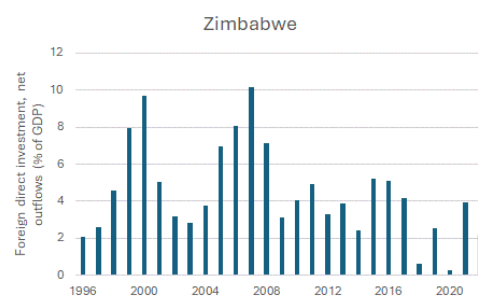
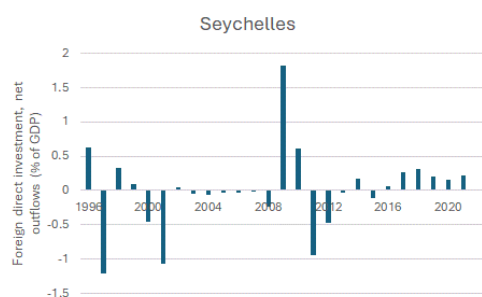
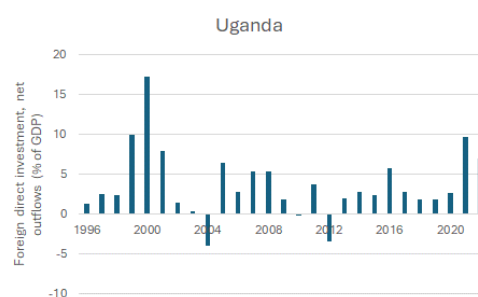
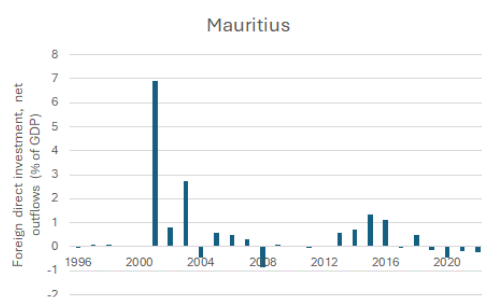
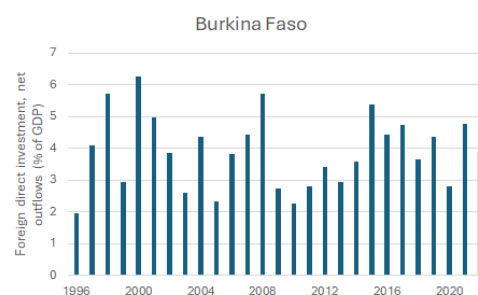
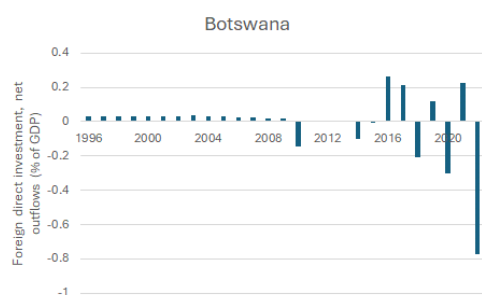
Source: Author's own calculation

## Appendix 4: Unit root test

| Variables                                                              | Level     |             |             |         | 1st difference |             |             |         |
|------------------------------------------------------------------------|-----------|-------------|-------------|---------|----------------|-------------|-------------|---------|
|                                                                        | t-bar     | t-tilde-bar | Z-t-tilde-b | p-value | t-bar          | t-tilde-bar | Z-t-tilde-b | p-value |
|                                                                        | Statistic |             |             |         | Statistic      |             |             |         |
| Voice and Accountability                                               | -1.5765   | -1.4716     | -0.3567     | 0.3607  | -4.2261        | -3.1897     | -14.955     | 0.0000  |
| Political Stability and Absence of Violence/Terrorism                  | -1.9311   | -1.7505     | -2.717      | 0.0033  | -5.3317        | -3.5945     | -18.3887    | 0.0000  |
| Government Effectiveness                                               | -1.9878   | -1.8149     | -3.2674     | 0.0005  | -5.3045        | -3.5477     | -18.0022    | 0.0000  |
| Regulatory Quality                                                     | -1.7955   | -1.6578     | -1.9328     | 0.0266  | -5.2233        | -3.4873     | -17.4788    | 0.0000  |
| Rule of Law                                                            | -1.6351   | -1.5369     | -0.9099     | 0.1814  | 4.9044         | -3.4266     | -16.964     | 0.0000  |
| Control of Corruption                                                  | -1.5484   | -1.4394     | -0.085      | 0.4661  | -4.7201        | -3.3537     | -16.3463    | 0.0000  |
| Gross fixed capital formation (constant 2015 US\$)                     | -0.3401   | -0.3166     | 8.8128      | 1       | -4.3915        | -3.0595     | -13.2908    | 0.0000  |
| GDP (constant 2015 US\$)                                               | 1.144     | 0.8007      | 18.8709     | 1       | -3.6593        | -2.8541     | -12.1345    | 0.0000  |
| GDP growth (annual %)                                                  | -4.1379   | -3.1233     | -14.3579    | 0       | -7.5558        | -4.0824     | -22.56      | 0.0000  |
| Gross fixed capital formation (% of GDP)                               | -1.6768   | -1.5392     | -0.9709     | 0.1658  | -5.3448        | -3.5156     | -17.8124    | 0.0000  |
| Inflation, consumer prices (annual %)                                  | -5.0077   | -3.073      | -13.911     | 0       | -8.0019        | -3.895      | -20.9434    | 0.0000  |
| Inflation, GDP deflator (annual %)                                     | -5.7383   | -3.3901     | -16.6173    | 0       | -8.5522        | -4.1381     | -23.0336    | 0.0000  |
| Lending interest rate (%)                                              | -5.1347   | -1.8808     | -3.8256     | 0       | -7.6516        | -2.9344     | -12.0517    | 0.0000  |
| Access to electricity (% of population)                                | -0.4624   | -0.4462     | 8.2843      | 1       | -6.9664        | -3.8411     | -20.6991    | 0.0000  |
| GDP per capita (constant 2015 US\$)                                    | -0.6985   | -0.6544     | 6.5493      | 1       | -4.192         | -3.1069     | -14.2804    | 0.0000  |
| Gross capital formation (% of GDP)                                     | -1.8433   | -1.6653     | -2.0026     | 0.0226  | -5.6675        | -3.6312     | -18.7168    | 0.0000  |
| Population growth (annual %)                                           | -2.0529   | -1.6467     | -1.8385     | 0.033   | -3.3096        | -2.5535     | -9.56       | 0.0000  |
| Population, total                                                      | 13.3029   | 3.262       | 39.6944     | 1       | -1.8776        | -1.4875     | -0.5197     | 0.3016  |
| Trade (% of GDP)                                                       | -1.7366   | -1.6183     | -1.6632     | 0.0481  | -5.0716        | -3.4138     | -16.8329    | 0.0000  |
| Official exchange rate (LCU per US\$, period average)                  | 3.9885    | -0.2995     | 9.5533      | 1       | 1.4155         | -2.6688     | -10.5796    | 0.0000  |
| Current account balance%GDP                                            | -2.4905   | -2.1879     | -6.4208     | 0       | -5.7388        | -3.6738     | -19.0672    | 0.0000  |
| General government gross debt%GDP                                      | -1.2897   | -1.1977     | 1.879       | 0.9699  | -4.418         | -3.1094     | -14.4776    | 0       |
| Implied PPP conversion rate                                            | 0.4982    | 0.0622      | 12.6202     | 1       | -3.296         | -2.5866     | -9.8484     | 0       |
| Military expenditure (% of GDP)                                        | -1.9478   | -1.7086     | -2.5073     | 1       | -4.9692        | -3.2187     | -15.427     | 0       |
| Domestic credit to private sector by banks (% of GDP)                  | -0.9792   | -0.9186     | 4.2768      | 1       | -4.6782        | -3.2899     | -15.9482    | 0.0000  |
| labor force participation rate, total (% of total population ages 15+) | -1.3732   | -1.22       | 1.7517      | 0.9601  | -3.7178        | -2.7969     | -11.4916    | 0       |
| Manufacturing, value added (% of GDP)                                  | -1.9522   | -1.6416     | -1.8914     | 0.0293  | -5.0102        | -3.3369     | -16.1093    | 0       |
| Real interest rate (%)                                                 | -3.4521   | -2.595      | -9.3329     | 0       | -6.8834        | -3.4733     | -16.2231    | 0       |
| Unemployment, total (% of total labor force) (modeled ILO estimat      | -0.7261   | -0.7008     | 6.094       | 1       | -4.1897        | -3.1017     | -14.0466    | 0       |

Source: author's calculation

## Appendix 5: Comparison of Net Investment Position of selected contries



Source: author's calculation

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