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Financial development, economic freedom, innovative facilities, economic wellbeing and inclusive finance in Sub-Saharan Africa

By

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DEDICATIONS

I dedicate this work to my children, Christlike Nhyiraba Yalley and Miraculous Aseda Yalley.

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I am indebted to everyone who has, in one way or another, contributed to my education.

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ABSTRACT

This thesis presents three empirical papers that seek to improve inclusive finance and economic wellbeing in Sub-Saharan Africa (SSA). Employing a generalized method of moment for 30 SSA countries: The first paper concerned itself with the role of regulation in the relationship between financial development and inclusive finance. It found a significant positive direct effect of financial development on inclusive finance and a significant positive direct influence of regulation on financial inclusion, but found a significant positive role of regulation in the relationship between financial development and inclusive finance up to a threshold of 6.3354, above which regulation negatively modulates. This suggests that when regulation exceeds that threshold of 6.3354 in SSA, it subsequently hinders the financial sector from rendering enough services that can help improve inclusive finance. Hence, policymakers should always check the mean of their economies' regulations against the threshold of 6.3354 before deciding whether to be more restrictive or not. Also, Paper two sheds light on the collaborative role of innovative facilities and economic freedom in inclusive finance. The study recorded that improving economic freedom promotes financial inclusion while expanding innovative facilities in SSA inhibits it. Again, innovative facilities improve the impact of economic freedom on inclusive finance in SSA but subsequently diminish the effect of economic freedom on inclusive finance after certain thresholds. This implies that in SSA, innovative facilities-induced freedom-inclusive finance is relevant only when it has not covered certain thresholds because undesirable results are revealed after the thresholds. Thus, technical and financial knowledge should be enhanced in addition to lowering the cost of using innovative facilities to access financial services to prevent negative influence after the thresholds. Paper three assessed the complementary role of economic freedom on the influence of inclusive finance on economic wellbeing. The findings revealed that financial inclusion enhances the wellbeing of residents, economic freedom improves the wellbeing of the populace and a free environment maximizes the role of inclusive finance on economic wellbeing in SSA. Hence, less restrictions are recommended to be adopted by policymakers in SSA when it comes to enhancing financial inclusion's influence on economic wellbeing.

OPERATIONAL DEFINITIONS

Inclusive finance: It is making financial services and products affordable and accessible to all in an economy.

Financial development: It is conceptualized as the depth, efficiency, stability and concentration of the financial sector in an economy.

Regulation: It reflects the degree to which rules and legal systems in an economy are reliable.

Economic freedom: It is the degree to which the policies and institutions of SSA economies are favourable to freedom.

Innovative facilities: It reflects the use of technology in an economy.

Economic wellbeing: It is the degree to which the policies and institutions of SSA economies are favourable to freedom.

LIST OF ABBREVIATIONS

SSA	Sub-Saharan Africa
INCF	Inclusive Finance
FD	Financial Development
REG	Regulation
LSPR	Legal System and Property Rights
CoREG	Composite of Regulation
EF	Economic Freedom
INNOV	Innovative Facilities
EW	Economic Wellbeing
ATM	Automatic Teller Machine
PCA	Principal Component Analysis
Km2	Kilometer Square
DGMM	Dynamic Generalized Method of Moments
AR2	Arellano and Bond test for second-order serial correlation
NCBB100000	Number of Commercial Bank Branches per 100,000 adults
NCBB1000	Number of Commercial Bank Branches per 1,000 km2
NDAwCB	Number of Deposit Accounts with Commercial Banks per 1,000 adults
NLAwCB	Number of Loan Accounts with Commercial Banks per 1,000 adults
ATM100000	Number of ATMs per 100,000 adults
ATM1000	Number of ATMs per 1,000 km2
FMAI	Financial Market Access
MOB	Mobile Phone Usage
INTER	Internet Usage
FBB	Fixed Broad Band Usage
TEL	Telephone Usage
INFLA	Inflation
UNEMPL	Unemployment
EDU	Education
EG	Economic Growth per Person
POP	Population

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CHAPTER ONE

1.0 Introduction

In light of Sub-Saharan Africa's low level of inclusive finance and evidence of poor economic wellbeing, this thesis presents three empirical papers that investigate how the interrelationships among financial development and regulations, economic freedom, and innovative facilities can be useful for policy toward improving the inclusive finance of residents in Sub-Saharan Africa, as well as how the interaction between inclusive finance and economic freedom can help in alleviating the region's poor economic wellbeing.

1.1 Background of the study

For growth, inclusive finance is essential (Sen & Laha, 2021). Thus, increasing the number of residents involved in the financial system will promote growth, which is a significant goal of the 2063 African Union Goals and the 2030 Sustainable Development Goals. However, the World Bank (2021) has indicated that the economies in Sub-Saharan Africa (SSA) possess low levels of access to financial services. Evidence from the World Bank's Global Financial Index Statistics specifies that fewer than a quarter of African grown-ups have a formal financial institution account, with many saving through informal means. From the discourse, even though enhancing financial inclusion is crucial to accomplishing growth (Sen et al., 2021), financial inclusion in SSA is woefully inadequate in addressing the economic needs of the region. As a result, policy attention has shifted to factors that can improve financial inclusion in SSA and help include more people in the financial system. This thesis, therefore, sought to assess the possible means of improving inclusive finance in SSA. Financial inclusion is captured in this thesis as people in an economy having access to affordable and useful financial services (World Bank, 2022).

The role of financial development in enabling inclusive finance cannot be underrated (India Money, 2020). This is because by offering financial services, the financial sector boosts financial inclusion in SSA (Chatterjee, 2020). Financial intermediary theory suggests that the presence of information asymmetries and high transaction costs in the financial sector can impede financial inclusion by making financial services unattractive to citizens (Demir, Pesqué-Cela, Altunbas and Murinde, 2022). However, the financial sector in SSA is still underdeveloped (Aluko & Ajayi, 2018). For instance, according to World Development Indicated (2022), domestic credit to the private sector as a percentage of GDP has steadily declined from 43.99 percent in 2017 to 40.92 percent in 2018. It then fell to 39.93 percent in 2019 and again to 37.92 percent in 2020. This, therefore, proves that credit facilities were

indeed reduced repeatedly from 2017 to 2020. Thus, the underdeveloped financial sector might be a major reason for low inclusive finance in the region. According to Soumaré, Kanga, Tyson, and Raga (2021), an underdeveloped financial system leads to credit restrictions for individuals and businesses as well as low investment rates. Thus, the financial development of an economy greatly influences financial inclusion. Also, law and finance theory by Porta, Lopez-de-Silanes, Shleifer, and Vishny (1998) highlights that vibrant law in an economy enables the financial sector to operate efficaciously. Thus, the financial sector may not include more individuals in the financial system when there is a poor regulatory system in an economy. An enabling regulatory environment is, therefore, essential to ensure an inclusive financial system in SSA. Hence, the thesis analyses the role of regulations in the association between financial development and inclusive finance in SSA.

In parallel, free-market theory, which encourages less restriction in an economy (Doran & Stratmann, 2021; Smith, 1776), suggests that economic freedom may be a prerequisite for SSA to achieve greater financial inclusion. According to Hussain, Yahya, and Waqas (2021), access to financial services is hampered by severe restrictions in an economy. This implies that excessive restrictions on an economy discourage people from using financial services. Therefore, increasing economic freedom in SSA economies is essential to bringing more people into the financial system. Yet, the importance of economic freedom for inclusive finance is likely to be constrained in the absence of access to innovative facilities like mobile phones, internet services, and information technology. This is because innovative facilities such as information technology, phones, and the internet provide enhanced means for accessing and using financial services (Singh, 2017). This is because innovative facilities such as information technology, phones and internet provide enhanced means to access and use financial services (Singh, 2017). Inferring from technological determinism theory, which postulates that when innovative facilities are made available in an economy, people adopt a culture of using them (Thorstein Veblen, 1857–1929), the study reasons that accessibility of innovative facilities could aid society in developing the culture of using innovative facilities to access financial services. Logically, the study argues that innovative facilities enable people to obtain financial services from the comfort of their homes rather than travelling to a financial institution's or an automatic teller machine's location. This implies that how quickly and easily people can access and use financial services depends on the magnitude of innovative facilities that are offered in an economy. Therefore, innovative facilities could enhance freedom-induced financial inclusion in SSA.

On the other hand, boosting financial inclusion could address the poor economic wellbeing of the people in SSA (Ofori-Abebrese, Baidoo & Essiam, 2020). Supply-leading hypothesis indicates that inclusive finance is necessary for growth and economic wellbeing (Sen et al., 2021; Schumpeter, 1911). Therefore, enhancing financial inclusion can be a pre-condition for spurring the economic wellbeing of people in SSA (Malekano, 2020). Thus, this study diverts to address the role of inclusive finance in the economic wellbeing of SSA. Economies in SSA region possess poor economic conditions to the extent that the World Bank forecasted that by 2030, roughly nine out of ten severely poor individuals would be living in SSA economies. This is particularly striking because SSA economies must integrate people into the financial system to enhance economic wellbeing in the region (N'dri & Kakinaka, 2020). This is because finance dictates who can access and pay for quality education, health and economic opportunities (Malekano, 2020). However, access to the financial system may not offer a better solution unless individuals with access to funding can engage in economic activities that enhance wellbeing with minimal government interference. Acemoglu et al. (2005) contend that strengthening economic institutions that guarantee freedom can promote economic wellbeing. Again, Sen's capability theory (1985) states that freedom to pursue economic wellbeing is only possible when people have the required capabilities (Sen, 1985). Thus, interaction between economic freedom and inclusive finance could result in higher economic wellbeing because financial inclusion builds the capacity of residents in an economy by offering funds to undertake business activities and a secure place to save and invest (Ofori-Abebrese et al., 2020). Extending on the argument, this thesis contends that in an economy where freedom is increased, people are more likely to engage in a variety of activities that can supplement financial inclusion in improving people's economic wellbeing.

In summary, this study examines how the interaction of financial development and regulation and the interaction between economic freedom and innovative facilities can promote financial inclusion in SSA. Also, how the joint effort of financial inclusion and economic freedom can reduce poor economic wellbeing in SSA was examined.

1.2 Research Problem

Statistics from the Financial Access Survey (2019) indicated low financial inclusion in SSA. Supportively, Sub-Saharan Africa has a 43 percent account ownership rate, which is significantly lower than the 63 percent average for developing countries (Jombo, 2021). Meanwhile, financial inclusion is a necessary factor for accomplishing eight of the sustainable development goals. The eight objectives are good health and wellbeing; no

hunger; jobs; gender equality; growth; no poverty; industry; and innovation (Matekenya, Moyo & Jeke, 2021; Tita, 2017; Ofori-Abebrese et al., 2020). Thus, growing inclusive finance in the region has become a major concern for policymakers in SSA. This thesis, therefore, sought to determine how INCF in Sub-Saharan Africa can be enhanced.

First, theoretical suggestions indicate that the lagging nature of the SSA's financial sector could be the main reason for the region's low financial inclusion (World Bank, 2021). This is because the financial market and institutions are the key agents that render accessible and affordable financial services. However, most prior studies in SSA have concerned themselves with the association between financial development and other factors (inclusive growth, education level and economic growth) (Gyamfi, Bokpin & Aboagyeckah, 2022; Thierry & Emmanuel, 2022; Ustarz & Fanta, 2021). Nevertheless, Evan (2015), Kamalu and Ibrahim (2021) and Holphe (2018) considered financial development and financial inclusion. Specifically, Evans (2015) considered the impact of money supply and credit to private sector on inclusive finance in Africa. Kamalu et al. (2021) also studied the influence of total assets of Islamic banks as a percentage of gross domestic product on financial inclusion for member countries of Organisation of Islamic Cooperation. In addition, Hlophe (2018) investigated the impact of credit to the private sector on inclusive finance in Eswatini. However, a paper by the International Monetary Fund indicated that financial development has a complex and multidimensional nature and therefore cannot be measured by one or two indicators (Svirydzenka, 2016), which is the case for the three studies that considered financial development and inclusive financial system.

Thus, this thesis takes a noticeably different perspective from Evans' (2015), Kamalu et al.'s (2021) and Hlophe's (2018) studies by constructing a financial development index that summarizes how advanced financial institutions and markets are based on depth, stability, efficiency and concentration. This thesis contends that representing financial development in a study with only money supply and credit to the private sector or with only total assets is woefully inadequate. Also, the measures of financial development (money supply, credit to private sector and total assets to gross domestic products) used by the three studies are one-sided as they all measure only financial depth, ignoring efficiency, stability and concentration in the financial system (Global Financial Development Database, 2022; Svirydzenka, 2016). Thus, this study differentiates itself from the three existing studies by considering more comprehensive and representative financial development measures, which consist of depth, efficiency, stability and concentration. It would further contribute to literature by moderating

financial development-inclusive finance nexus in SSA with regulation. This is because Sohn et al. (2020) revealed that poor regulations and supervision hinder development in the financial sector and instil distrust in its users. Again, threshold levels at which regulation will strengthen the impact of financial development on inclusive finance were computed. Thresholds would help policymakers become more accurate about the coverage of regulations that would have a desirable outcome.

Secondly, the level of freedom in an economy could have repercussions on the level of inclusive finance in that economy. Hussian et al. (2020) argued that extreme restrictions in an economy hinder financial access and limit people's usage of financial services more frequently. Yet, SSA is deficient in a study on the nexus between economic freedom and inclusive finance in SSA. Earlier studies have rather considered the impact of other factors, including illiteracy, institutions, and income on financial inclusion (Chikalipah, 2017; Eldomiaty, Hammam & El Bakry, 2020; Oyelami, Saibu & Adekunle, 2017, respectively). Therefore, this study will add to the literature investigating the relationship between economic freedom and inclusive finance in SSA. The study further identified that economic freedom in Sub-Saharan Africa might not have a desirable impact on inclusive finance if innovative facilities such as phones, the internet, and computers are not available. Individuals in an economy can use these innovative facilities to easily access financial services, even from the comfort of their own homes (Singh, 2017). Again, in SSA, no study has considered the role of innovative facilities in economic freedom – inclusive finance nexus. As a result, this study fills another gap in SSA's literature by assessing the role of innovative facilities in the nexus of economic freedom and inclusive finance. To be more specific, the threshold levels required for innovative facilities to have a helpful impact on freedom-enhanced inclusive finance in SSA were computed.

In return, enhancing financial inclusion could help reduce poor economic wellbeing in SSA. This is necessary due to the recorded poor economic wellbeing of the people in the region (World Bank, 2018). This thesis argues that accessing financial services enables citizens to undertake business activities, save and invest, which results in enhancing their economic wellbeing (Ofori-Abebrese et al., 2020). Yet, the low inclusive finance in the region might limit financial inclusion-induced economic wellbeing (World Bank, 2021). Economic freedom could assist financial inclusion in improving the economic wellbeing of its citizens. This is because individuals with access to funding and other financial services might not be willing to engage in investment activities in an economy where there are high restrictions

(Hussain et al., 2021). Yet, there is a dearth of empirical facts on the moderating role of economic freedom in the inclusive finance - economic wellbeing nexus in SSA. Therefore, the study contributes to exciting studies in SSA by examining the relevant role of freedom in the association of inclusive finance and economic wellbeing. Also, earlier works on the effect of inclusive finance on economic wellbeing failed to include the financial market aspect in the index they computed for inclusive finance. This thesis computes a novel index for financial inclusion by including financial market.

1.3 Research Objectives

This thesis seeks to achieve the following objectives:

1. To analyse the role of regulations in the relationship between financial development and inclusive finance in SSA.
2. To examine the collaborative role of economic freedom and innovative facilities on inclusive finance in SSA.
3. To assess the complementary role of economic freedom in the inclusive finance-economic wellbeing nexus of SSA.

1.4 Research Hypotheses

Guided by the above three objectives, the following hypotheses were tested:

For the first paper, this thesis hypothesizes:

1. H_{1a}: There is a significant positive effect of financial development on inclusive finance in SSA.
2. H_{1b}: There is a significant positive effect of regulations on inclusive finance in SSA.
3. H_{1c}: Ceteris paribus, the presence of sound regulations enhances the relationship between financial development and inclusive finance in SSA.

For the second paper, this thesis hypothesizes:

1. H_{2a}: Economic freedom affects inclusive finance in SSA, positively.
2. H_{2b}: Innovative facilities affect inclusive finance in SSA, positively.
3. H_{2c}: Ceteris paribus, innovative facilities positively influence the effect of economic freedom on inclusive finance in SSA.

For the third paper, this thesis hypothesizes:

1. H_{3a}: Inclusive finance improves economic wellbeing of the people in SSA.
2. H_{3b}: In a free economy, the economic wellbeing of residents is improved.
3. H_{3c}: Ceteris paribus, economic freedom complements inclusive finance in enhancing the economic wellbeing of SSA.

1.5 Significant of the Study

Recently, the issue of inclusive finance and economic wellbeing has become a topic of concern to policymakers in SSA:

For papers 1 and 2

World Bank and MasterCard Foundation are particularly pushing for financial inclusion in SSA because it is low and enhancing it would be pertinent to major indicators (such as economic growth, economic wellbeing and inequality) in the region. Thus, investigating how financial inclusion can be improved in the region can assist the World Bank and MasterCard Foundation in increasing inclusive finance in the region.

Again, according to Ofori- Abebrese et al. (2020), enhancing inclusive finance can help achieve eight of the seventeen sustainable development goals. The eight objectives are good health and wellbeing; no hunger; jobs; gender equality; growth; no poverty; industry; and innovation. This, therefore, makes growth in inclusive finance a necessary instrument in attaining the sustainable development goals set by the United Nations.

For paper 3

Also, the issue of economic wellbeing in the region is very poor, to the extent that World Bank has predicted that by 2030, 9 out of every 10 residents in SSA will be living in extremely poor economic conditions. Meanwhile, African Union in 2015 included enhancing the economic wellbeing of the people in the economies of SSA by 2063. Thus, this study seeks to achieve enhanced economic wellbeing among Sub-Saharan Africans. The findings of this study are therefore necessary for African Union to introduce policies that can help achieve a better economic condition for the people in Africa by 2063.

For all the three papers

The whole study would be useful to other researchers who would be interested in working around financial inclusion and economic wellbeing. Researchers can base on the information available in this study to do their investigations.

1.6 Delimitation of the Study

This study investigated how to enhance inclusive finance and economic wellbeing in SSA using data that spans from 2008 to 2020 from thirty (30) countries in SSA. The period and countries chosen were determined by data availability. Even though data availability limitations could impact the generalizability and comprehensiveness of the research findings. However, since a quantitative approach was employed and the number of countries employed is more than half of the countries in SSA, the findings of this study can be generalised for SSA. Guided by law and finance theory and collaborative intervention theory of financial inclusion, this work considers the combined efforts of financial development and regulations, as well as a joint effort of economic freedom and innovative facilities, in enhancing inclusive finance in SSA. The variables employed in enhancing financial inclusion in this study do not, however, exhaust all the factors required in an economy to boost financial inclusion in SSA. However, these factors were employed because, to the best of the author's knowledge, there is a dearth of empirical evidence of their effect on financial inclusion in SSA. Again, the study fights the poor economic conditions of residents in the region by employing financial inclusion and economic freedom simultaneously because no study has considered their impact simultaneously on the economic wellbeing in SSA. Other relevant factors that can help reduce poor economic conditions in the region were not considered because they were not the focus. To achieve the purpose of this study, a two-step dynamic generalized method of moments (DGMM) technique was employed in STATA software.

1.7 Limitation of the Study

Like every research, this thesis has limitations:

It cannot be denied that the main platform through which most Sub-Saharan Africans have been involved in the financial system is the mobile money platform. Yet, this study was not able to include mobile money usage in the calculation of the inclusive finance index because the time range for data on mobile money is short and insufficient for the time period considered in this thesis.

Also, even though economic wellbeing has been conceptualized in this study as the income level, education and health of people in the economy, the study recognizes the reality that economic wellbeing is broad and goes beyond these three. Therefore, relevant factors like corruption, poverty and unemployment were not captured in the human development index (Klugman, Rodríguez and Choi, 2011). This thesis measures economic wellbeing with human development index because it is the best proxy for economic wellbeing compared with other measures.

However, despite these constraints, every effort was made to conduct thorough research that would yield the best plausible empirical result that can come out with the best policy recommendation to enhance financial inclusion and economic wellbeing in SSA.

1.8 Outline of the Study

The study was outlined in nine chapters:

Chapter one consists of an introduction, background, research problem, objectives, research questions, contribution, significance, delimitation, outline, and chapter summary. The next chapter of the study presented comprises concepts and stylized facts about the issues under discussion as well as conceptual framework. The subsequent chapter was dedicated to theories. Chapter four was concerned with an empirical review. Afterwards, the methodology was explained, and it is made up of the research paradigm, research design, research approach and tools for analysis and chapter summary in chapter five. Furthermore, paper one is detailed in chapter six, paper two is presented in chapter seven, and Chapter eight gives details about the third paper. In all three papers, the abstract, introduction, literature review, methods, results, and discussion, conclusion and policy recommendation, as well as limitations and suggestions for further studies, were captured. Finally, in chapter nine, the summary, findings, policies and practices are highlighted.

1.9 Chapter Summary

Chapter one provides information on the nature and issues of inclusive finance and economic wellbeing in SSA. It then discusses how interaction among financial development, economic freedom, regulations, and innovative facilities can promote inclusive finance in SSA and how inclusive finance and economic freedom can reduce poor economic wellbeing in SSA. It also enumerates the contribution to the body of knowledge and the significance of the study to policymakers in the region. Finally, it discussed the delimitation and limitations of the entire study as well as how the entire study would be organized.

CHAPTER TWO
CONCEPTUAL REVIEW AND STYLIZED FACTS

2.0 Introduction

The chapter provides brief details on key concepts, trends and the evolution of inclusive finance, economic wellbeing, financial development, regulation, economic freedom, and innovative facilities. It further presents the conceptual framework of the study.

2.1 Concept of Inclusive Finance

World Bank (2022) indicated that inclusive finance is offering affordable and useful financial services that fit the needs of the people. Also, financial inclusion was explained by Corporate Financial Institute (2021) as giving everyone, regardless of their economic level, access to financial services that are equally available and less expensive. Moreso, Triki and Faye (2013) describe financial inclusion as going beyond credit access to savings access and risk-reduction financial products. Financial inclusion could also be defined as a functional financial system that enables more active participation in the financial system (Demirgüç-Kunt & Klapper, 2013).Also, Khan (2012) indicated that inclusive finance has three components: penetration of the financial system, accessibility to financial services, and financial system use.

Evans (2015) defined inclusive finance as the proportion of adults who have deposits in commercial banks per 1,000. However, Ofori-Abebrese et al. (2020) pointed out that inclusive finance is more comprehensive and comprises adult deposit accounts with commercial banks, the amount of outstanding commercial bank debt and adult access points to automated teller machines. Financial inclusion, according to Lee, Wang, and Ho (2022), also includes loan availability, overdraft privileges, and working capital financing. Financial inclusion was again explained by Eldomiaty et al. (2020) as having access to credit cards, debit cards, and saving and borrowing from financial institutions. Based on the various explanations given for financial inclusion, the study infers that all programs that make financial services user-friendly are financial inclusion. Among the definitions given for financial inclusion, this study adopted the World Bank's definition. Therefore, inclusive finance is conceptualized in this thesis as having access to useful and affordable financial services.

2.1.1 Financial inclusion and its need worldwide

It should be highlighted that financial inclusion is crucial for everyone, not only those living in underdeveloped nations. Estimates from Universal Financial Access, one-fourth of the population in a developed nation like the United Kingdom are low-income people with little access to financial services (World Bank, 2020). Additionally, a 2016 White House Council of Economic Advisers assessment stated that many Americans do not have their fundamental financial requirements covered by financial service providers. As a result, the World Bank continues to promote global financial inclusion growth (World Bank, 2020). The effort intends to give at least one billion individuals access to financial services, including maintaining financial accounts from anywhere in the world from which they can send, receive and store their money. The United Nations Development Programme also listed increased financial inclusion as one of its goals (Smith, 2022). Similarly, the private sector strives for greater financial inclusion, which would provide an economic boost to countries. Hence, even though this study is limited to Sub-Saharan Africa, it is, without a doubt, a contribution to the global goal of increasing inclusive finance.

Inclusive finance originated in the 1990s when the United Nations Capital Development Funds worked with microcredit institutions to assist the vulnerable segment of the population (Münkner, 1994). These microcredit organizations were established to provide low-income individuals with loans in order for them to engage in trade and investments to improve their own financial stability (Thacker, 2016). Financial inclusion has evolved from microcredit to encouraging a range of financial services for millions worldwide. Microfinance became the preferred phrase in the late 2000s, replacing microcredit (Thacker, 2016). This demonstrated that society had evolved to recognize that low-income individuals required more than just loans; they also desired to save, buy insurance policies, invest, and do other things. Additionally, credit-only non-governmental organizations started to become regulated institutions authorized to accept deposits, and commercial banks began interacting with the market's low-income groups (Meagher, 2002). Van et al. (2021)— In 2005, the United Nations Development Capital Development Funds changed their strategic direction to focus on a broader range of issues, resulting in more inclusive financial services aimed at attracting low-income individuals while increasing the use of the high-income sector.

Early in 2010, the world recognized that focusing solely on low-income people would not meet the financial needs of the 2 billion people who were not having basic bank accounts (World Bank, 2011). This is because, despite the successes in financial inclusion, just 200

million people, or 10% of the world's population, were served by the microfinance sector. Thus, utilizing already-established financial players like banks, insurers, and government pension plans and connecting them to non-financial players like mobile network providers and internet markets could scale up financial inclusion outreach bigger and faster (World Bank, 2011). In 2018, the World Bank specified that approximately 1.7 billion grown-ups lacked a bank account. Women and poor rural residents make up a sizable proportion of the unbanked population; these groups face frequent discrimination and are often excluded from financial institutions (World Bank, 2020). Due to the lack of financial infrastructure, many under-served and low-income communities suffer (Qamruzzaman & Wei, 2019). Today, finance literature such as Milana and Ashta (2020) and Léon and Zins (2020) supports microfinance institutions, banks, cooperatives, money transfer companies, and mobile network operators to extend the reach of financial markets where they may not go without our demonstration value..

In all, the World Bank (2022) indicated that there has been some level of increase in inclusive finance based on data from global findex database indicating global adult account ownership increased from 51 percent to 76 percent between 2011 and 2021.

2.1.2 Financial inclusion in SSA

According to data from the World Bank in 2011, 24% of adults in SSA nations had bank accounts. Many attempts have been made by stakeholders to improve inclusive finance in the region because it is a crucial factor in the development of the region. SSA has seen a substantial improvement in financial inclusion (International Finance Corporation, 2022). According to Perlstein (2018), the following have helped Sub-Saharan Africa's inclusive finance: First, extending financial services to all facets of SSA nations has been greatly aided by mobile-based financial services. Also, with the strategies of financial institutions, majority of the population has made appreciable progress toward financial inclusion. Regrettably, SSA states still lag behind other developing nations (Asuming, Osei-Agyei & Mohammed, 2019). In a study on the situation of financial inclusion in SSA, GeoPoll (2019) discovered that rates of financial exclusion are greater than anticipated, even among middle-and upper-class communities in the region. This suggests the need for more research with the aim of enhancing inclusive finance in the area. According to Shegog (2018), there are numerous obstacles that SSA must overcome in order to catch up to the developed world when it comes to financial inclusion.

Thus, this thesis investigates various ways to overcome challenges that hinder the growth of inclusive finance in SSA. Specifically, this thesis argued that the level of financial development, nature of regulation, level of freedom and innovative facilities could matter in improving financial inclusion in SSA.

2.2 The Concept Economic Wellbeing

Policymakers have aimed to improve the wellbeing of people all around the world throughout history (Mikdashi, 2018). However, it appears that more needs to be done to ensure economic prosperity. Veenhoven (2013) said that despite centuries of philosophical debate, there has never been a consensus on what economic wellbeing means. Numerous assessments and critiques have been made on the concept of economic wellbeing and this has led to continual changes in the concept of economic wellbeing (Llena-Nozal, Martin & Murtin, 2019). Economic wellbeing was initially limited to income level, and therefore, income and gross domestic product were used to measure how well people in an economy were doing economically (Osberg &Sharpe, 2002). This might be based on the logic, that if an economy is growing in their income then it would reflect in the economic wellbeing of an average person. However, worries about the fact that gross domestic production does not adequately reflect the wellbeing of the average person have emerged in recent years. For instance, according to Kapoor and Debroy (2019), the gross domestic product is merely an indicator of domestic output and revenue and does not accurately represent the wellbeing of the populace. The financial and economic crisis has made these worries worse, even though they were already there throughout the years of robust growth and solid economic performance that marked the early part of the decade. Thus, various recognized agencies diagnose these perceptions as essential to introducing the right policies to improve people's economic wellbeing.

As early as 1969, Seers asserted that economic wellbeing consists of poverty, unemployment and inequality of the people in the economy. Additionally, OECD (2014) reaffirmed that gross domestic per capita does not reflect important aspects of an individual's economic wellbeing, such as education, political institutions, health, environmental quality, inequality, income and gender inequality. Oman (2021) stipulated that the health and wealth of nations indicate the wellness of its residents. Llena-Nozal et al. (2019) also indicated that economy wellbeing is a virtuous circle where people wellbeing and economic growth are jointly strengthened. Economic wellbeing consists of gross domestic product per capita and inflation and employment trends (United States government, 2022). In addition, Bank of England

(2020) stipulated that economic wellbeing is determined by four factors: economic growth, unemployment, inflation and inequality. However, following Ofori-Abebrese et al. (2020), this thesis conceptualizes economic wellbeing as the income level, education level and health of the people in an economy. Hence, the discussions under economic wellbeing in this thesis are narrowed to income, education and health.

2.2.1 Economic wellbeing worldwide

Less than 20% of people in the world were literate in 1820, and those who were were disproportionately Western European (Van Zanden, Baten, Mira d'Ercole, Rijpma, Smith & Timmer, 2014). After 1945, many parts of the world saw a sharp rise in literacy rates and educational attainment, reaching almost 80% of the global population by 2000 (Van Zanden et al., 2014). Global secondary school enrollment rose from 75.69 percent in 2016 to 76.75 percent in 2020 (World Bank, 2022). This suggests that worldwide education expansion has been sluggish. Similarly, in Western Europe in 1830, the average life expectancy at birth was around 33 years, increased to 40 years in 1880, and then nearly doubled in the years that followed, with the most significant gains seen in the first half of the 20th century (Van Zanden et al., 2014). Life expectancies began to rise in the rest of the globe from considerably lower levels, especially after 1945 (Van Zanden et al., 2014). Again, globally, the average lifespan increased from under 30 years in 1880 to about 70 years in 2000 (World Bank, 2022). World Bank reports that life expectancy improved slightly from 72.19 years to 72.76 years from 2016 to 2020.

Furthermore, the global economy has seen extraordinary income growth since 1820 (Bolt et al., 2014). Between 1820 and 2010, the global average gross per capita increased by a factor of 10 as per gross national income per capita (Bolt et al., 2014). According to World Bank's current assessment: in 2016, income per capita increased by 2.14 percent; in 2017, it increased by 1.48 percent; and in 2018, it increased by another 2.35 percent. In 2019, the global income growth rate climbed at a decreasing rate of 1.88 percent. It then increased by 1.60 percent in 2019 before decreasing by 4.22 percent in 2020. The reduction of income in 2020 could be attributed to COVID-19, which rubbed the globe and distrusted economic activities. Yet, this growth was spread very unevenly, resulting in a considerable increase in average income disparities between countries.

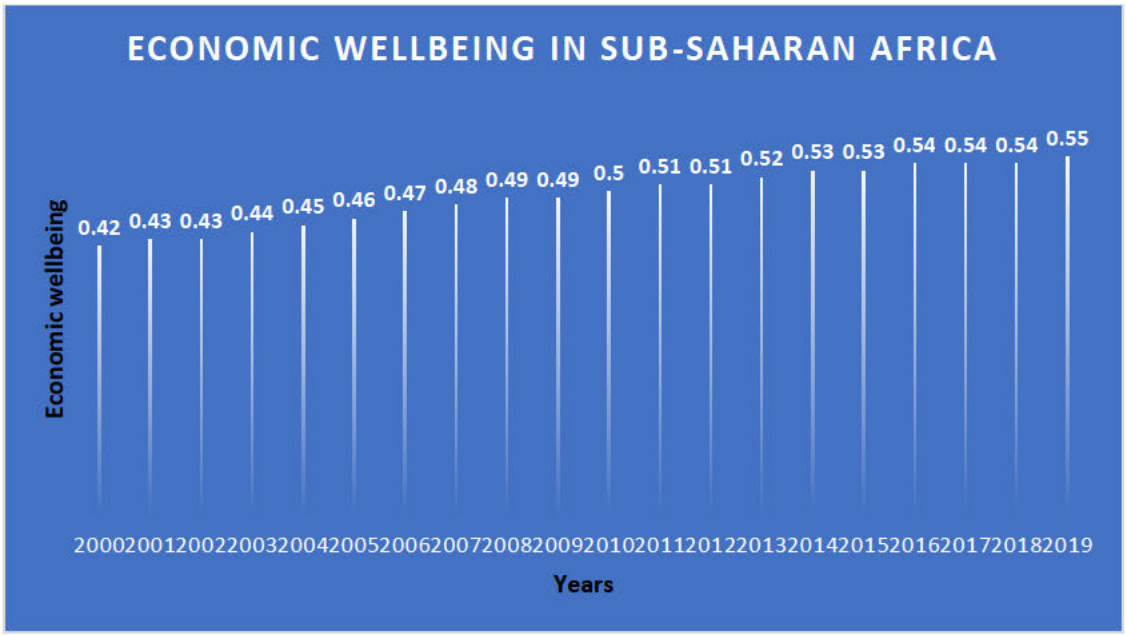
Therefore, education, health status and income have strengthened in many world economies, which implies that general economic wellbeing in the world has progressed.

2.2.2 Economic Wellbeing in SSA

This section provides an assessment of economic wellbeing in SSA from 2000 to 2019. From figure one, this thesis presents the trend movement of economic wellbeing as measured by Human Development Index in SSA.

Figure 1

Economic wellbeing in SSA



Note. Figure 1 was adopted from Human Development Reports (2021)

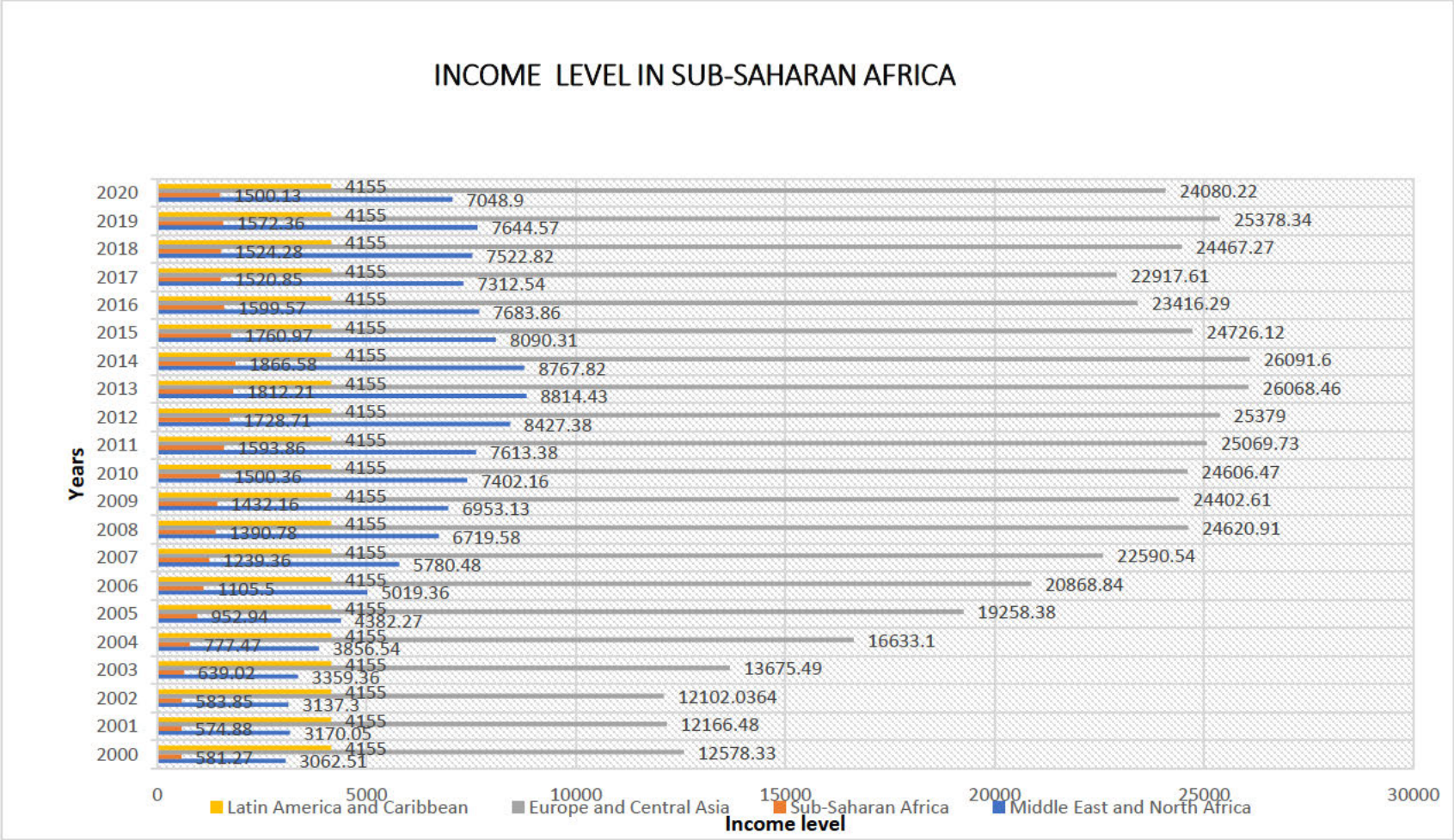
Figure 1 showed a consistent rise in Sub-Saharan Africa's economic wellbeing, from 0.42 in 2000 to 0.55 in 2019. However, there were marginal changes, and even in certain years, the value for economic wellbeing remained the same (*see* 2001 and 2002, 2008 and 2009, 2011 and 2012, and 2016 and 2017). The difference in percentage between 2000 and 2019 is 30.95%. According to the UNDP, there is low human development when the human development index is less than 0.55. This study contends that the economic wellbeing of people in Sub-Saharan Africa is low because most of the economic wellbeing scores between 2000 and 2019 were below 0.55. Hence, this study sought to examine how economic wellbeing in SSA can be enhanced by employing financial inclusion and economic freedom. Since economic wellbeing in this thesis is explained as the income level, education level and health, the nature of income, education and health of people in SSA is discussed below to give a picture of how they are performing individually.

2.2. 3 Income levels in SSA

This thesis cannot discuss economic wellbeing in without discussing the income level. Income level is a relevant and the earliest measure of economic wellbeing worldwide. Therefore, this study employing Gross National Income per capita, Atlas method in US currency from World Development Indicators, Figure 2 gives information on the average income level of SSA from 2000 to 2020.

Figure 2

Income level in SSA



Note. Data for Figure 2 was sourced from World Development Indicators.

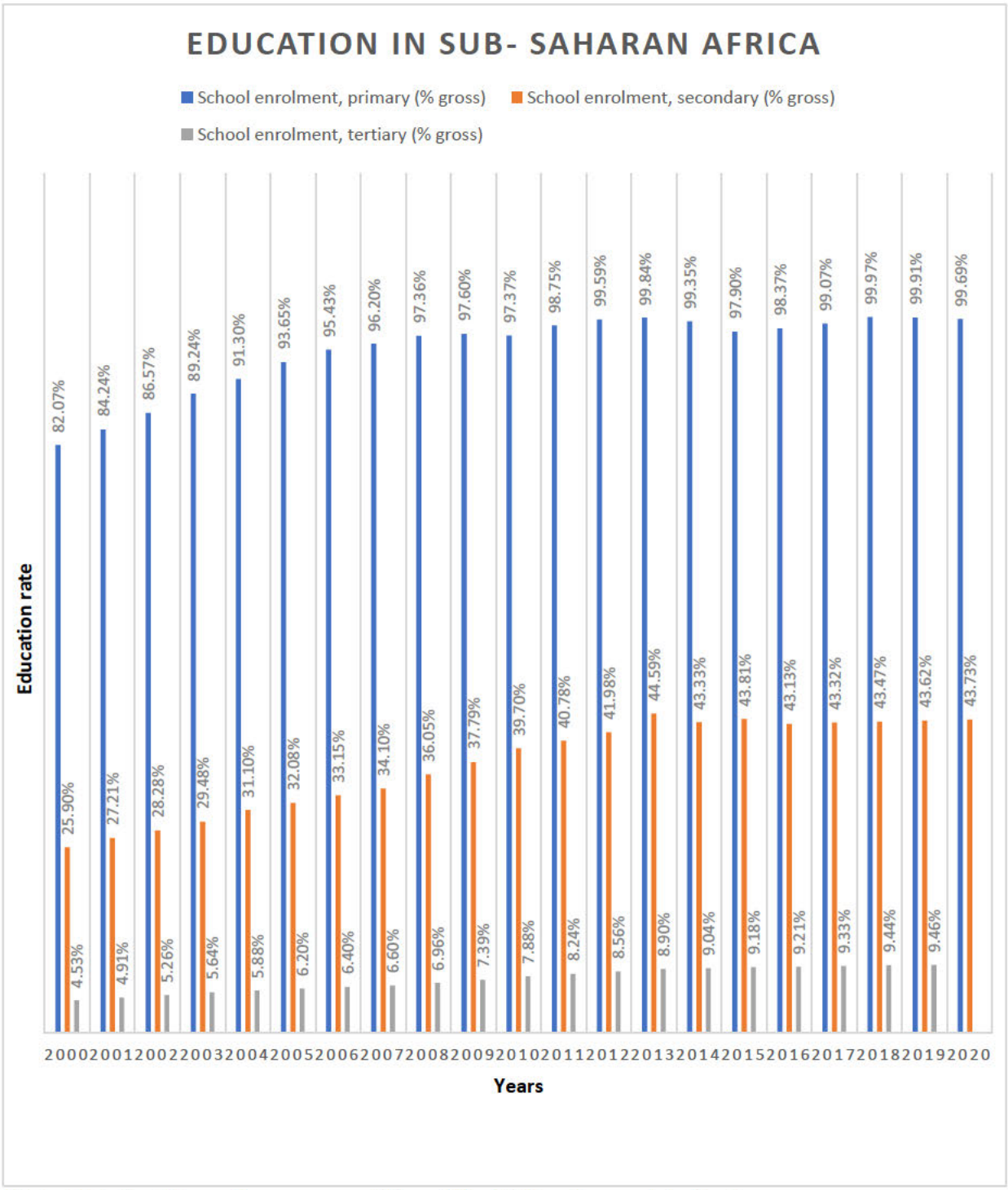
From Figure 2, the average income per person in Sub-Saharan Africa increased continuously from US$ 581.27 in 2000 to US$ 1866.58 in 2014 and started dropping in 2015. In 2015, the average income in Sub-Saharan Africa was $1609.97 USD, and it is expected to fall further to $150.13 USD by 2020. This implies that the income level of SSA is retrogressing and it is likely to reduce further in 2021 and 2022 amidst external shocks like COVID-19 and the Russian-Ukraine War (World Bank, 2022). Also, figure 2 compares the income level of Sub-Saharan Africa to other regions like the Middle East and North Africa, Latin America and Caribbean and Europe and Central Asia. In 2000, Sub-Saharan Africa, Middle East and North Africa, Latin America and Caribbean and Europe and Central Asia had an average income of US$ 581.27, US$ 3062.51, US$ 4155 and US$ 12578.33, respectively. In 2010 also, the average income was US$ 1500.36 in Sub-Saharan Africa, US$ 7402.16 in Middle East and North Africa, US$ 4155 in Latin America and Caribbean, US$ 24606.47 in Europe and Central Asia. Finally, in 2020 the average income in Sub- Saharan Africa was US$ 1500.13, Middle East and North Africa was US$ 7048.90, Latin America and Caribbean was US$ 4155 and Europe and Central Asia was US$ 24080.22. From the comparative trend among the regions, Sub-Saharan Africa is generating the lowest income.

2.2.4 Education in SSA

Education is yet another important component of economic prosperity. People's literacy levels are measured by education, and it is widely acknowledged that when people are educated, their economic wellbeing improves (Germinal & Taleb Da Costa, 2021). According to the OECD (2019), higher education boosts employment rates and reduces job stress. Therefore, educating the local populace should be a top concern if individuals in the economy are to achieve greater economic wellbeing successfully. This section evaluates the quality of education in SSA using data on school enrollment from World Development Indicators. According to World Development Indicators, gross enrollment ratio is the proportion of the overall enrollment, irrespective of age, to the populace that corresponds to the level of education shown. Figure 3 gives details of education in Sub-Saharan Africa below.

Figure 3

Education in SSA



Note. Data for Figure 3 was sourced from World Development Indicators.

Figure 3 depicts a study on school enrollment in Sub-Saharan Africa at the primary, secondary, and tertiary levels. At the primary level, the percentage of the population age group who qualified and enrolled for primary education were between 82.07 percent and

99.97 percent (*see* 2018). In particular, 82.07% of children enrolled in primary school in 2000; in 2005, primary enrollment increased to 93.65%; in 2010, primary enrollment increased to 97.37%; in 2015, primary enrollment increased to 97.90%; and in 2020, decreased to 99.69%. Thus, generally, most of the age groups who qualify for primary in Sub-Saharan Africa do enroll in primary education. However, comparing the yearly enrolment of primary education to secondary and, subsequently, tertiary education is not encouraging. The yearly gross enrolment in primary education seems not to be reflected in secondary education and secondary enrolment also seems not to be reflected in tertiary enrollment. For instance, enrolment for primary, secondary and tertiary was 82.07%, 25.90% and 4.53%, respectively in 2000. In 2010, enrolment was 97.37% for primary, 39.70% for secondary and 7.88% for tertiary. Again, 2019 enrolment was 99.91% in primary, 42.62% in secondary and 9.46% in tertiary. From the comparison, there is a relevant reduction in the number of people moving from primary education to secondary and, subsequently, to tertiary.

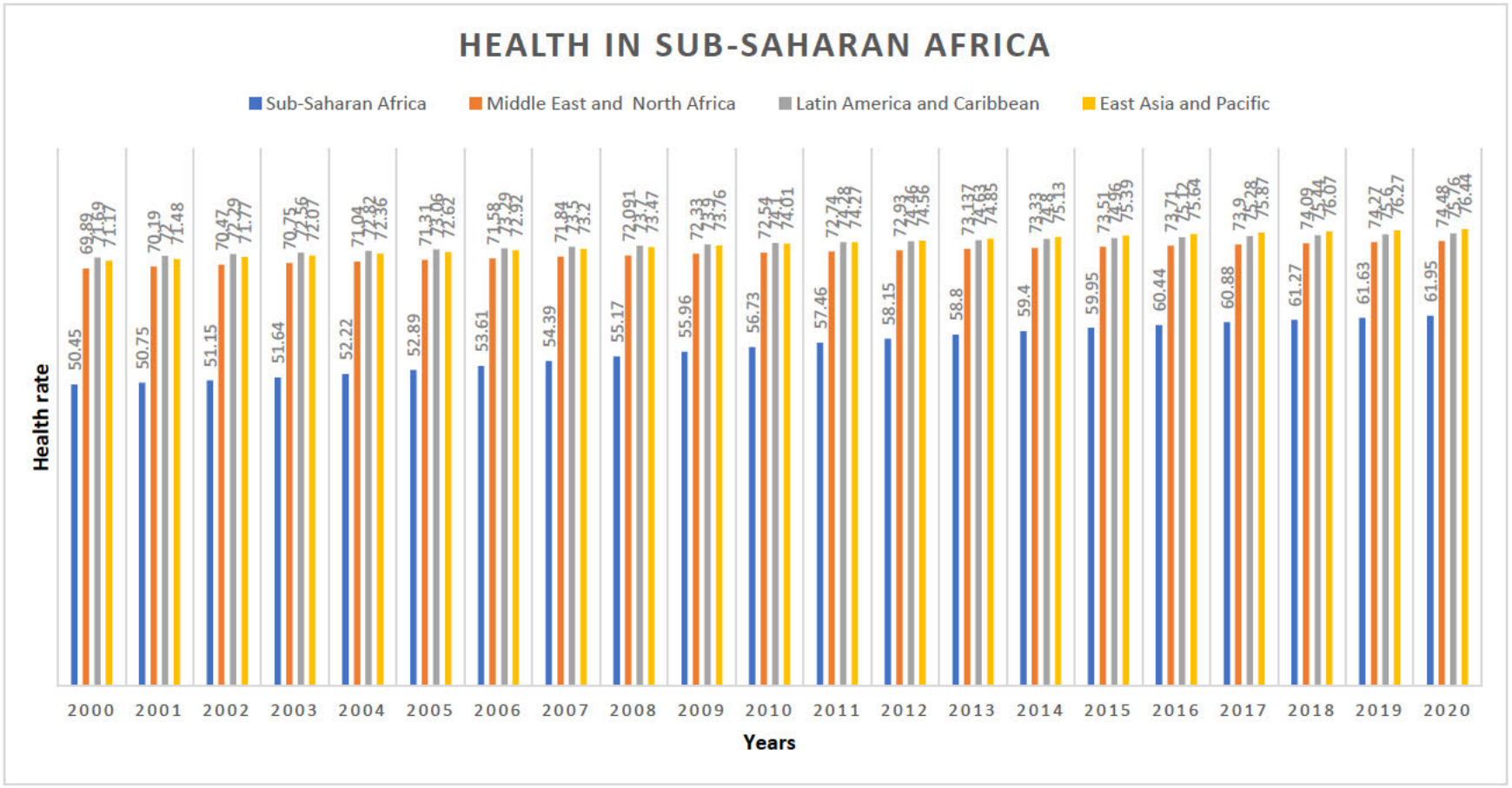
Additionally, this thesis recognized a significant increase in secondary education from 25.90% in 2000 to 43.73% in 2020. According to Word Development Indicator, secondary schools lay the foundation for human development. Thus, to build a very strong foundation for the economic wellbeing of people in SSA, leaders should make an effort to increase enrollment in secondary education. The worst performing education level in Sub-Saharan Africa would be tertiary. Figure 3 reveals a marginal increase in tertiary education from 4.53% in 2000 to 9.46% in 2019.

2.2.5 Health in SSA

The third important factor that is incorporated in economic wellbeing is health. Examining an economy's health data is one way to evaluate economic wellbeing. The section gives data on health from 2000 to 2020, using life expectancy at birth as a metric of health. According to the World Development Indicator, a newborn infant's life expectancy at birth is the period in years they would live if the mortality trends that were in place at the time of their birth persisted throughout their lives.

Figure 4

Health in SSA



Note. Data for Figure 2 was sourced from World Development Indicators.

Figure 4 reveals an increase in the health of people in SSA from 2000 to 2020. Figure 4 started at 50.45 in 2000 and improved to 52.89 in 2005. In 2010, there was an upward movement to 56.73. In 2015, it was further enhanced to 59.95 and finally, went up again to 61.95 in 2020. This implies that there has been a consistent increase in the health of SSA. According to statistics, the percentage change in health in Sub-Saharan Africa over the last twenty-one (21) years, from 2000 to 2020, is 22.67%.

Unfortunately, SSA has a lower level of health compared to other regions. SSA has lagged behind in terms of health issues from 2000 to 2020. Life expectancy was recorded as 50.45 in SSA, 69.89 in the Middle East and North Africa, 71.69 in Latin America and the Caribbean, and 71.17 in East Asia and the Pacific in 2000. Similarly, in 2011, Sub-Saharan Africa had 57.46, Middle East and North Africa had 72.54, Latin America and Caribbean had 74.28 and East Asia and Pacific recorded 74.29. Again, Sub-Saharan Africa had the lowest level of health wellbeing in 2020, with 61.95; the Middle East and North Africa had 74.48; Latin America and the Caribbean had 75.76; East Asia and the Pacific had 76.44.

All indications from the statistics discussed under economic wellbeing in SSA reaffirm that economic wellbeing in the region is comparably poor and the need to enhance is of immediate importance. The study engages inclusive finance and economic freedom in fighting the poor economic wellbeing in SSA.

2.3 The Concept of Financial Development

Financial development is undoubtedly the progression of the financial sector within an economy. The World Bank describes the financial sector as the collection of organizations, products, and markets as well as regulatory environment that enables financial dealings to be carried out (World Bank, 2016). According to the 2016 Global Financial Growth Report, the goal of financial sector development is to lower system costs, which includes minimizing information asymmetry and upholding financial agreements. Moreso, Zarrouk, El Ghak, and Al Haija (2017) assert that financial sectors of the economy flourish when knowledge of investments and capital allocation is made public; they are able to mobilize funds for savings and they are able to offer clients professional financial advice. This study conceptualized financial development as financial efficiency, financial dept, financial stability and financial concentration of an economy.

2.3.1 Financial development in SSA

In SSA, financial sector is largely underdeveloped, with banking systems accounting for the majority of financial sector assets and operations (Ibrahim and Alagidede, 2018). Helped by reform efforts Kasekende (2010) indicated the depth and coverage of financial systems as measured by the ratios of broad money and private sector credit to gross domestic product has been gradually increasing over the past decade. But the scale of financial intermediation in the region remains significantly lower than in other developing regions of the world, while access to financial services is also relatively low, reflecting a combination of low-income levels, small absolute size, and infrastructure weaknesses (Mlachila, Dykes, Zajc, Aithnard, Beck, Ncube & Nelvin, 2013). This affirms the observations, by World Bank that Sub-Saharan Africa typically scores lowest among the world's developing sub-regions on various dimensions of financial development.

A report by International Monetary Funds on SSA's financial system from 1980 to 2014 was published in 2016 (Mlachila, Jidoud, Newiak, Radzewicz-Bak & Takebe, 2016). In their analysis, they noted that since 1995, the region's median private sector loan to GDP ratio has grown by about 10 percentage points, to about 21 percent in 2014. But it is still only half as big as the regions of the Middle East and North Africa, East Asia, and Latin America and the Caribbean combined. In a similar vein, the banking industry's asset depth in 2014 averaged 57 percent of GDP, which is significantly lower than that of comparable areas. Additionally, using the financial development index to evaluate the financial development in SSA revealed a similar finding: the region's financial development has remained uninspired for the past three decades, although there has been some modest acceleration over the past 15 years. Also, according to data from the financial development index, financial growth has been accelerating in several Sub-Saharan African nations during the 1980s, but progress has been slower in other countries in the region. Surprisingly, financial development now is worse than it was in the 1980s in economies like the Central African Republic, Cameroon, Chad, and Sierra Leone. This could partly be a result of civil wars and conflicts or the changing importance of state-owned enterprises.

Although many Sub-Saharan African nations still lack developed financial markets, some encouraging trends should be commended (Soumaré, Kanga, Tyson & Raga, 2021). For instance, government securities like treasury bills and treasury Bonds dominate the local debt markets in Sub-Saharan Africa (Soumaré et al., 2021; Mu, Phelps & Stotsky, 2013). This implies that project bonds that finance infrastructure investment are gradually growing.

Another positive trend is the increase in the proportion of marketable instruments relative to non-marketable debt, which enables nations to set more liquid standards for upcoming corporate issuances (Mlachila et al, 2016). Again, the average maturity of instruments has increased significantly, and in certain low-income economies, particularly in Benin, Burkina Faso, Kenya, Mali, Tanzania, and Zambia. Finally, debt instruments with maturities greater than 10 years have recently become more prevalent in SSA.

To conclude in most SSA countries, financial development has progressed over the past four decades. However, despite all the progress, financial markets and financial institutions are less developed than in other developing regions. This might be a good explanation for low INCF in SSA because the main player (financial sector) in boosting financial inclusion is underdeveloped.

2.4 The Concept of Regulation

Regulating economic activity is largely acknowledged worldwide. This is due to the fact that regulations are required in any economy to curb market failures, address information asymmetry, and uphold contracts (Qian, 2017; Kessler, 2010). According to Shleifer (2010) and Hart (2009) regulatory reactions to economic crises and market results are desirable. As a result, regulation appears to be widely accepted in almost every country, yet it has many connotations that cannot be distilled into a single idea. Katsamunska (2016) indicated that regulation is considered a mechanism that restricts, directs, or otherwise controls social behaviour. In addition, Koop and Lodge (2017) noted that regulation explains how norms are frequently supported by some type of authoritative system for ensuring compliance. Yet again, Keping (2018) considers regulation as a set of laws that an economy accepts. However, this thesis describes regulation as the efficacy of an economy's legal system. The study views regulation from two perspectives: Legal system and property rights (It is the extent to which a country's laws defend private property rights and the degree to which its government enforces those laws); and regulation (which evaluates how well the government can make and administer healthy rules and policies that encourage the growth of the private sector).

2.4.1 Regulations in Sub- Saharan Africa

Even though Sub-Saharan African leaders have been prompt in signing documents stating they are prepared to commit to the rule of law and regulation, there is a noticeable deterioration in the region's adherence to these standards (Fombad & Kibet, 2018). In 2016,

for instance, the Ibrahim Index of African Reports expressed great worry about a decline in the legal framework in Sub-Saharan Africa. Again, findings from Afrobarometer 2016 on access to justice show that in most African nations, significant obstacles continue to prevent residents from accessing equity legal systems.

SSA nations have enacted an increasing number of changes in recent years in an effort to change the legal and regulatory landscape to enable businesses to flourish. According to a 2014 World Bank Group analysis, Sub-Saharan Africa experienced the highest global rate of business regulatory reforms in 2013 and 2014, with 74 percent of the region's economies strengthening their business regulatory environments. According to Doing Business 2015, among the 189 economies studied, Benin, Côte d'Ivoire, the Democratic Republic of the Congo, Togo, and Senegal are among the top 10 global improvers in terms of business regulation. In the past five years (since 2011), 11 different Sub-Saharan African nations have been listed among the top 10 worldwide regulatory improvers, according to the report series. Some countries, like Burundi, Cabo Verde, Côte d'Ivoire, and Rwanda, have done so repeatedly. As a result, Sub-Saharan African economies have made significant strides toward better regulation, which is advantageous for firms (financial sector). The average score for doing business in Sub-Saharan African economies rose by 0.9 points in 2020 compared to 2019. However, despite extensive regulatory reform plans, issues still exist in the region due to lax judicial and enforcement systems (Nketiah-Amponsah & Sarpong, 2020). As a result, Sub-Saharan Africa needs to keep strengthening rules while concentrating on a suitable policy framework for clear legal, regulatory, and implementation requirements. To attain the necessary level of financial inclusion, financial institutions and markets, like every other business, need sound regulation.

2.5 The Concept of Economic Freedom

The first thing that comes to mind when the concept of economic freedom is mentioned is the elimination of constraints or government meddling in the economy (Muhammed, Okafor and Itodo, 2022). According to Zhu and Zhu (2017), it is the capacity of individuals in an economy to engage in economic activity with minimal government interference. Economic freedom is described by the Heritage Foundation as every person's inherent right to manage their property and labour. It further emphasizes that when people have the freedom to produce, invest, work, and purchase whatever they see fit in a market then economic freedom is upheld in that economy. According to the Fraser Institute, economic freedom also includes the right to free market access and competition, as well as the protection of individuals and

their property. Again, Cumbers, McMaster, Cabaço, and White (2020) and Elkhouly and Amer (2015) regard economic freedom as equity chances for everyone in an economy. According to Alpsahin Cullen (2019), economic freedom occurs when governments allow the free flow of labour, goods, and capital and refrain from restricting individual freedoms in excess of what is required to uphold and safeguard that freedom.

Based on the current index created for economic freedom by The Heritage Foundation and Fraser Institute, the study argues that the concept of economic freedom can be classified into two broad components, which are market freedom and institutions. That is, as the policy of freedom is being implemented, sound institutions are put in place to reduce the adverse effects of freedom. According to the discourse, having the ability to function with the fewest possible limitations and having the right institutions in place to safeguard your freedom is what is meant by economic freedom. However, this thesis conceives economic freedom as the basic right of every man to control his own property and labour legal system and to engage in competitive and open markets.

2.5.1 Economic freedom in SSA

In 2015, the Sub-Saharan Africa region's Index of Freedom study from the Heritage Foundation showed a minor improvement, with 39 of the region's economies still having lower levels of economic freedom. Using Freedom House's annual Freedom Report, it can also be said that, regionally, political and civil liberties have deteriorated. Nine of the 26 repressed nations in the world are found in SSA. Mauritius received the highest rating in the Freedom House reports for increasing economic freedom in Sub-Saharan Africa. Angola, Comoros, Guinea-Bissau, Seychelles, Liberia, and Sierra Leone all experienced continuous increases in the Index of Economic Freedom between 2011 and 2015.

After six years, Sub-Saharan Africa received a score of 55.70, which was once again below the global average of 61.60 for economic freedom (Index of Economic Freedom, 2021). According to the Freedom House 2021 report, there has been a loss in freedom in 21 Sub-Saharan African nations. This resulted from elected officials circumventing term limits; an increase in online repression; and the implementation of COVID-19-related restrictions by authoritarians. On the other hand, Sudan has continued to increase its freedom while Malawi has made a remarkable recovery. This thesis indicates that the level of inclusive finance and economic wellbeing may be influenced by Sub-Saharan Africa's low level of economic freedom. Therefore, economic freedom needs to be improved in SSA.

2.6 The Concept of Innovative Facilities

Innovative facilities are termed information technology in other studies, and, according to Castagna (2021), it is the use of computers, networking, and other physical devices, infrastructure, and processes to create, store, process, and exchange all forms of electronic data or transactions. Abeka, Andoh, Gatsi and Kawor (2021) also describe it as the use of cellular telephones and fixed telephones. Charness and Boot (2009) indicated that it includes any device or setup that has a microprocessor chip. In this thesis, innovative facilities are conceptualized as access to a mobile phone, internet services, and the use of information technology. The study considers internet services, mobile phones, and information technology because they help residents access financial services easily.

2.6.1 Innovative facilities in SSA

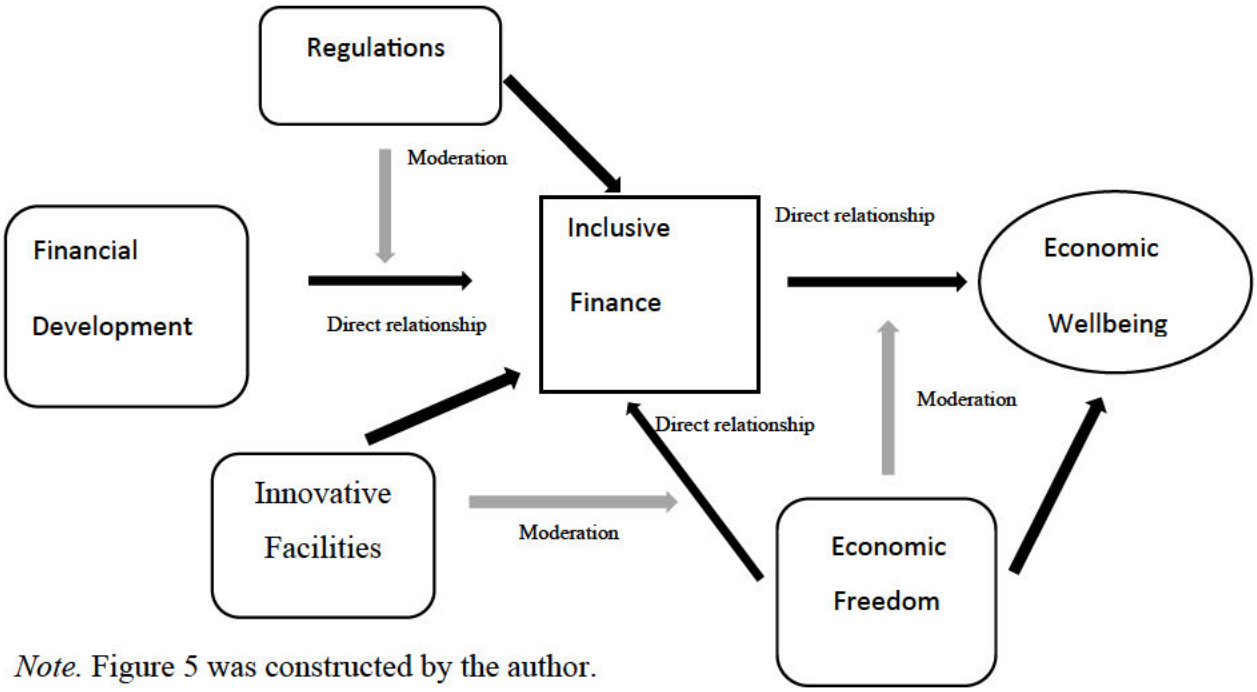
SSA has advanced in innovative facilities more than in previous years (Agyapong et al., 2017). According to World Development Indicator data, mobile cellular subscriptions per 100 people amplified from 3.58 percent in 2002 to 83.09 percent in 2020. Additionally, the proportion of people who use the internet in the population went up from 0.83 percent in 2002 to 30.04 percent. Once more, the quantity of fixed broadband subscriptions per 100 people increased from 0.04 in 2004 to 0.60 in 2020. The discussion revealed that although the use of mobile phones has skyrocketed, increase in internet usage and speed has been incredibly low. As a result, Sub-Saharan Africa has some of the lowest internet access rates and speeds worldwide. According to statistics, Sub-Saharan Africa generally has few innovative facilities. According to World Bank (2020) statistics, Sub-Saharan Africa is trailing behind other regions in innovative facilities. Only 20% of people in SSA had access to the Internet in 2017, compared to 48% of people globally and 41% of people in emerging nations. This thesis indicates that growth in innovative facilities in the region can help grow financial inclusion.

2.7 Conceptual Framework

A conceptual framework indicates expected relationships between variables employed in a study (Błazejowski, Kwiatkowski & Gazda, 2019). This section presents a pictorial view of the interaction among the variables in this thesis based on the three objectives of this thesis. The black arrow shows a direct relationship, while the ash arrow demonstration a moderating effect.

Figure 5

Conceptual framework



Note. Figure 5 was constructed by the author.

In this framework, economic wellbeing is the regressand. Financial inclusion plays a dual role as a regressor to economic wellbeing and a regressand to the rest of the variables. Financial development and economic freedom are regressors to financial inclusion. Regulations, innovative facilities and economic freedom are moderating variables. In all, figure 5 presents the relationship between financial development and inclusive finance being moderated by regulations, the link between freedom and inclusive finance being moderated by innovative facilities, and economic freedom moderating the nexus between inclusive finance and economic wellbeing.

2.8 Chapter Summary

Chapter two provides an understanding of inclusive finance, economic wellbeing, financial development regulation, economic freedom and innovative facilities as explained by earlier studies and narrows it down to how it was conceived in this study. Also, this chapter presents brief information on how each issue has evolved in the world but provides more information on the changes that have taken place in SSA. From the details given above, financial inclusion and economic wellbeing have improved slowly over the years in SSA, but it is comparably poor. Finally, it presents the conceptual framework of the entire study, highlighting the interaction among the variables of interest in this study.

CHAPTER THREE
LITERATURE REVIEW

3.0 Introduction

Chapter three presents the theories and empirics that support papers one, two and three. It discusses how the theories and studies related to these papers the gaps filled by each objective.

3.1 Theoretical Review

3.1.1 Theoretical review for paper one

To analyze the role of regulations in the relationship between financial development and inclusive finance in SSA

This sub-section presents theories for paper one of this thesis.

3.1.1.1 Financial development and inclusive finance

3.1.1.1.1 Modern financial intermediary theory

According to Andrieş (2009), Gurley and Shaw's work in the 1960s served as the foundation for the theory of financial intermediation (1960). Gurley and Shaw (1956) typically describe financial intermediation as the process of taking money from depositors or investors, sometimes known as the surplus spender, and lending a sizeable portion of it to borrowers. According to Gurley et al. (1956), financial institutions collect money at a reduced cost from those who have extra money and credit it out at a higher cost. In finance, surplus spenders are those who have extra money to put away or invest, and deficit units are those who obtain credit, according to Singh and Nainwal (2017). Financial intermediaries essentially operate as mediators in financial transactions between two parties (Affum, 2020). And by doing this, financial institutions are able to promote loan access, investment, and saving. According to Ruiz (2018), financial intermediaries include banks, investment banks, mutual funds, pension funds, and insurance companies in an economy.

The foundation of contemporary financial intermediation theory is the notion that intermediation lower transaction costs and asymmetries in the financial information of a country. Thus, financial intermediaries, in theory, help to lower transaction costs and increase the ability to obtain accurate information on time in an economy. Residents of an economy avoid using financial services when information asymmetry and transaction costs are high (Demir, Pesqué-Cela, Altunbas, and Murinde, 2022). Cai (2018) highlighted that information asymmetry causes moral hazard and adverse selection which in turn causes individuals to

lose interest in using financial services like investments, insurance, and savings accounts. Additionally, high financial transaction costs in an economy, which may result from high-interest rates on credit and other fees to access financial services, may cause a decline in the usage of financial facilities in that economy (Ozili, 2018). Thus, financial intermediary theory suggests that the presence of information asymmetries and high transactional costs in the financial sector may hinder financial inclusion.

Thus, modern financial intermediary theory is essential to objective one because it acknowledges that the financial sector's activities might impede financial inclusion. Paper one admonishes that financial development is the cornerstone of inclusive finance since the financial industry is the primary driver of financial services' accessibility and affordability.

3.1.1.2 Financial development and inclusive finance: the role of regulations

3.1.1.2.1 Economic regulation theories

People have sought an effective legal system in their economy for a very long time (Qian, 2017). Sound rules and regulations tend to reduce market failures, increase company efficiency, and protect citizens' interests in an economy (Qian, 2017). Government assures businesses and society that all of their rights are safeguarded through a robust regulatory structure (Chen & Divanbeigi, 2019). According to Posner (1974), there are typically two theories of regulation in an economy: private-interest theory and public-interest theory.

As per Arthur Cecil Pigou's public-interest theory of regulation, which was created in 1938, regulation is provided in response to the public's need to reduce economic inefficiencies. So, according to the public-interest theory of regulation, laws should protect and benefit the entire public (where the general public is both residents and firms). According to Harnay and Scialom (2016), the public-interest theory of regulation is upheld when government rules enhance markets, make up for weak competition, and minimize unfavourable market outcomes, which in general meet public needs.

Financial inclusion in an economy is an important public interest due to its numerous benefits to individuals and the economy at large (Ozili, 2020). However, citizens expect the laws of their country to protect their financial dealings and agreements with financial firms (Chen et al., 2019). In other words, people want their money, investments, and credit agreements with financial institutions and markets in their country to be protected in a way that prevents them from becoming victims to financial institutions. Issues including investment fraud, rapid financial institution failure, information asymmetry, and adverse selection are rare in an

economy with active regulation (Haini, 2020). Thus, improving financial inclusion would be guaranteed in an economy where a dependable legal system is put in place.

As a result, the public-interest theory of regulation relates to objective one because objective one indicates that financial inclusion, which is in the public interest, would be improved if laws were effective and protects people's financial interactions with financial institutions. In contrast, residents would not be encouraged to obtain financial services if regulation signals private interests as promoted by the private-interest theory of regulation. This is because Horwitz (1991) indicated that regulation from a private-interest perspective is where regulators consistently disregard the public interest due to undue influence from their targets, beneficiaries, and political ambition. From paper one which argues that effective regulations in SSA would increase financial inclusion, it is more likely that financial exclusion would rather be encouraged in a country with lax or private-centred laws that do not protect the public's financial activities.

3.1.1.2.2 New institutional theory

The institutional theory, which Meyer and Rowan established in the late 1970s as a way to investigate how organizations fit with, are related to and are affected by their societal, state, national, and global settings, served as the foundation for new institutional theory. However, new institutional theory approach things differently. New institutionalism accentuates that formal and informal regulations influence people's and businesses' behaviour (DiMaggio, 1998). Again, North (1991) clarified that new institutions are humanly constructed restrictions that determine human and organizational interaction. Knight (1992) subsequently claimed that institutions are the networks of laws that are formed and put into practice to structure social and commercial relations.

Since new institutions theory advocates that regulations shape the operations of firms such as financial institutions and markets in an economy, new institutions theory supports objective one. Paper one of this thesis indicates that regulations influence the effect of financial development on inclusive finance. As a result, the institutional framework within which economies function can be crucial for identifying the benefits of regulation in improving the functioning of the financial sector. Thus, in light of financial accessibility and affordability being evidenced by the effective operations of the financial industry, it is intuitive to assess the role of regulations in the association of financial development and financial inclusion in SSA.

3.1.1.2.3 Law and finance theory

The relevance of law in the growth of the financial industry is highlighted by law and finance theory (La Porta, Lopez-deSilanes, Shleifer & Vishny, 1997, 1998). And this argument is based on two major economic defences of rule of law. First, according to Levine (1998), Levine (1999), and Levine et al. (2000), the financial sector responds to the law more effectively in an economy where rules are well-organized, fair, and enforced. Logically, the operations of financial institutions and markets are carefully supervised in a nation where the laws are upheld. Abdurakhmanova (2020) stipulated that financial institutions would be confident in operating and growing in an economy where justice is served. Aluko and Ajayi (2018) too reasoned that economies with regulations that uphold contracts and defend creditor rights led to the development of a robust financial industry. The relevance of law in the growth of the financial industry is highlighted by law and finance theory (La Porta, Lopez-deSilanes, Shleifer & Vishny, 1997, 1998). La Porta et al. (1997, 1998) justified their argument by indicating that compared to civil law, common law provides more robust investors' legal protection than civil law economies which are characterized by high corruption and government dishonesty.

From both arguments, the role of conducive regulations in the developing financial sector of an economy is emphasized. Huang (2010a) stated that the supply side of financial development is seriously influenced by law. This presages that for an economy to achieve an enhanced financial sector is subject to the nature of law in the economy. Thus, law and financial theory is the foundation of objective one as objective one further contends that the presence of a vibrant legal system could enable the financial sector to enhance financial inclusion better. This would be accomplished in two ways: foremost, the financial sector would be influenced by the law to render more efficient financial services accessibility which would result in enhancing accessibility (Abaidoo and Agyapong, 2022); and Also, According to Eldomiaty et al. (2020) residents of an economy would be motivated to access financial services because their interests and dealings with the financial sector are protected by law.

Nevertheless, like every theory, law and finance theory have received some level of criticism. Fowowe (2014) clarified that contrary to the argument by law and finance theory that common law-based legal systems have more developed financial sectors than countries with civil law-based legal systems, empirically, legal origin does not explain why financial sector development varies across African countries.

3.1.1.2.4 Systems theory of financial inclusion

It was introduced by Ozili (2020). The theory states that inclusive finance outcomes are achieved through sub-systems such as financial and legal systems in an economy. In other words, the nature of financial and legal systems in an economy would determine the level of INCF of that economy. The theory again emphasized that any change in these sub-systems in an economy would reflect its financial inclusion (Ozili, 2020). Thus, changes in regulations (whether good or bad) would affect financial accessibility and affordable in society (Tang, Irfan, Razzaq & Dagar, 2022). Also, changes in the financial sector of an economy would reflect in its financial inclusion (Evans, 2015). Hence, efficiency in an economy's legal system and enhancement in financial sector performance are complementary needs to improve financial inclusion in an economy. Intuitively, residents would be motivated to patronize financial services in an economy where both financial and legal sectors are efficient.

Thus, following the systems theory of financial inclusion, the nature of inclusive finance in SSA is affected by the interrelationship among these sub-systems (in this case, financial and legal systems). However, the theory debunks the possibility that changes in the full system (such as substituting the existing financial inclusion strategy with a new one) would have a meaningful impact on inclusive finance in the economy. Hence, this theory relates to objective one because it argues that interdependence among sub-systems such as legal and financial systems would provide more robust inclusive finance in SSA. Thus, the complementary effects of finance and regulation on financial inclusion are emphasized.

According to Ozili (2020), there are a few drawbacks to his theory. First, he pointed out that in some economies, these current sub-systems might not function well, which would mean that the projected influence on financial inclusion might not be fully achieved. Second, the idea places more emphasis on sub-systems than the possibility that a comprehensive system reform could have an impact on inclusive finance. Thirdly, systems theory of financial inclusion makes the underlying assumption that there is a link between the outcomes of inclusive finance and the supporting subsystems. This might not be the case since there may be more complex issues in the link between these subsystems and financial inclusion than presumed.

Table 1a

A summary of theories that backs paper one is presented below:

Propounder(s)	Theories	Key Argument made
Financial development and inclusive finance		
Gurley and Shaw (1956)	Modern financial intermediary theory	It indicates that financial intermediary lower transaction costs and reduces asymmetries in information and as a result increases financial inclusion.
Regulations and inclusive finance		
Pigou (1938) and Horwitz (1991)	Economic regulation theory: Public-interest theory of regulation and private-interest theory of regulation	Regulations that serve the public interest could increase financial inclusion while regulations that serve private interest would hinder inclusive finance.
Financial development and inclusive finance: the role of regulations		
DiMaggio (1998)	New institutional theory	Rules shape the activities of firms such as financial institutions and markets and make them more efficient in their operations. And by enhancing the operations of the financial sector, financial services are made more accessible and affordable.
La Porta, Lopez-deSilanes, Shleifer & Vishny (1997, 1998)	Law and finance theory	Improvement in legal system enhances financial development which is a foundation for inclusive finance.
Ozili (2020))	Systems theory of financial inclusion	Inclusive finance enhancement required the complementary effort of financial and regulatory system of an economy.

3.1.2 Theoretical review for paper two

To examine the collaborative role of economic freedom and innovative facilities on inclusive finance in SSA.

Theories that support paper two (2) are discussed in this sub-section.

3.1.2.1 Economic freedom and inclusive finance

3.1.2.1.1 Financial liberalization theory

The McKinnon-Shaw hypothesis is another name for the financial liberalization theory, which originated from the separate publications of McKinnon (1973) and Shaw (1973).

According to this theory, financial services are improved in a free market. According to Aluko et al. (2018), the financial sector will be liberalized to give various financial services and thereby boost financial accessibility in an economy when governmental limitations on financial activity are loosened or repealed. The financial industry is rationally incentivized to offer various cutting-edge services (like internet banking and mobile money services) that increase financial accessibility in the economy in a society where government restrictions are minimal. Additionally, the competition that results from a free economy might influence financial institutions to lower transaction costs to attract customers (Mavrakana & Psillaki, 2019). Thus, if free economic activity is maintained in an economy, the two major prerequisites for financial inclusion—accessibility and affordability—would be met. On the other hand, in a repressed economy, the government imposes regulations to limit and obstruct the financial sector's services, which makes it harder for citizens to obtain financial resources (Aluko et al., 2018). Extending from this argument, by making financial services more accessible and lowering their costs, freedom in an economy can promote financial inclusion. According to paper two's view of financial liberalization theory, expanding Sub-Saharan Africa's open economic policies might serve as a solid base for improving an inclusive financial system.

However, contrary to what the financial liberalization theory claims, financial liberalization does not always result in healthy financial inclusion. According to Ghosh (2005), financial deregulation has increased financial crises in developing nations, including investment crime and the abrupt demise of financial institutions. Too little regulation and compliance go hand in hand with too much freedom, creating a fragile and unpredictable financial system. In other words, the financial sector tends to be prone to crises when financial liberalization is high.

3.1.2.1 Economic freedom – inclusive finance nexus: the role of innovative facilities

3.1.2.1.1 Technological determinism theory

Technological determinism theory argues that a society's technological advancements or innovative facilities determine its cultural values, social order, and history (Thorstein Veblen, 1857–1929). According to this notion, technological innovation propels social progress in an unavoidable direction. Two key ideas underlie technological determinism: first, the development of innovative facilities themselves follows a predictable, traceable path independent of cultural or political influences; and second, innovative facilities organize society in a way that allows them to further develop themselves. As we transition from one

technological age to the next, McLuhan (1969) recognized that innovative facilities influence how people in an economy think, feel, and act, as well as how our society functions. Thus, technological determinism means that technology is the key originator of the transformation of people in an economy. Thorstein Veblen (1857–1929), established that technology positively impacts societal transformation. Therefore, the development of innovation facilities, new technology, and the availability of innovative facilities cause a change in the culture of the individuals. According to Hauer (2017), the causes of changes in a nation are the internet, computers, and phones. Hauer (2017) went on to claim that the development of computers, networks, and the internet has fundamentally altered many facets of human activity and economic participation.

The rising popularity of innovative facilities such as phones, the internet, and computers has changed the way people access financial services in an economy (Singh, 2017). Traditionally, people would travel to the premises of financial institutions to transact their financial transactions, but now the availability of the phone, internet and computer has made people access financial services from the comfort of their homes. Today, people can deposit, redraw, invest and even access credit facilities through the use of innovative facilities (Singh, 2017). Inferring from the argument of technological determinism theory, objective two argues that innovative facilities such as phones, the internet, and computers could help residents in SSA cultivate the culture of accessing financial services through innovative facilities, leading to the improvement of inclusive finance in the region.

3.1.2.1.2 Technology acceptance model

It is a framework for information technology that helps to understand how consumers embrace and make use of new technologies or facilities, particularly in the context of an economy (Kamble, Gunasekaran and Arha, 2019). Technology adoption model was developed by Davis (1989), and the theory contends that a person's use or acceptance of technology (advanced tools like computers, phones, and the internet) is dependent on its utility and simplicity. Meaning, users are more likely to adopt innovative facilities when they are easy to use and useful. In other words, while the inventor of an innovative facility may believe the product is useful and user-friendly, their beliefs will not necessarily be shared by the facility's potential users.

Extending from what the technology acceptance model stands for, the adoption of innovative facilities such as phones, the internet, and computers in accessing financial services is

predicated on the ease of using these innovative facilities in accessing financial services as well as their usefulness in accessing financial services. According to Wellalage, Hunjra, Manita and Locke (2021) for financial services to be available across the length and breadth of an economy, innovative facilities could be the facilitator in terms of speed, convenience, and costs. Since deposit, redraw, investment and credit are currently made easy through the use of innovative facilities (Bansal, 2014), paper two identifies that innovative facilities have made a significant contribution to financial inclusion in SSA by being useful and making access to financial services easy. Thus, people are very likely to adopt the use of innovative facilities in accessing financial services.

3.1.2.1.3 Collaborative intervention theory of financial inclusion

From the theory, joint effort from various stakeholders is needed to offer formal financial services in an economy (Ozili, 2020). This suggests that improving inclusive financial services in an economy requires the coordinated efforts of multiple stakeholders.

This point put forth by collaborative intervention theory of financial inclusion is line with paper two, which argues that less government involvement in an economy alone will not optimize inclusive finance if the distance to financial services is fairly far. According to Singh (2017), developing a growth-inclusive financial system has been difficult because of rural areas, reachability, speed, and ease of financial access in an economy. In other words, innovative facilities are still required to achieve financial inclusion more quickly, even if individuals have free access to financial services. Thus, the collaborative effort of government (which can enact laws that promote freedom in an economy), internet service providers, telecommunications providers, and computer suppliers can all work together to ensure greater inclusive finance growth in SSA by guaranteeing freedom and the availability of innovative facilities.

The benefits and drawbacks of the collaborative intervention theory were listed by Ozili (2020).

Merits consist of:

1. The supply of formal financial services is encouraged to take a multistakeholder approach.
2. The participating stakeholders are happy to have made a significant contribution to the financial inclusion initiative.

Demerit comprises:

1. It is challenging to estimate the number of partners needed to offer the excluded population formal financial services.
2. It is possible for some collaborators to stop participating, leaving the burden to the few active collaborators.
3. Giving formal financial services to the excluded group does not necessarily have a higher success rate with more collaborators.

Table 2a

A summary of theories that backs paper two is presented below:

Propounder(s)	**Theories**	**Key Argument made**
Economic freedom and inclusive finance		
McKinnon (1973) and Shaw (1973)	Financial liberalization theory	It indicates that financial services are improved in a free market.
Innovative facilities and inclusive finance		
Thorstein Veblen (1857–1929)	Technological determinism theory	The availability of innovative facilities could help residents in Sub-Saharan Africa cultivate the culture of accessing financial services through innovative facilities than covering a distance to a financial institution. Hence, financial inclusion is enhanced.
Davis (1989)	Technology adoption model	Innovative facilities improving financial inclusion is predicated on the ease of use and usefulness of innovative facilities in accessing financial services.
Economic freedom and inclusive finance: the role of innovative facilities		
Ozili (2020)	Collaborative intervention theory of financial inclusion.	Less government involvement in an economy alone will not optimize inclusive finance if the distance to financial services is fairly far, thus, innovative facilities could join the effort of economic freedom to improve financial inclusion by reducing the barrier of distance to financial services.

3.1.3 Theoretical review for paper three

To assess the complementary role of economic freedom in inclusive finance-economic wellbeing nexus of SSA.

Theories that are in line with paper three are discussed.

3.1.3.1 Inclusive finance and economic wellbeing

3.1.3.1.1 Finance-inequality narrowing hypothesis

The finance-inequality narrowing theory was advanced by Banerjee and Newman (1993) and Galor and Zeira (1993). The theory is built on the idea that people who are struggling financially are barred from using financial services like borrowing money to invest in physical and human capital. It further indicates that people who are predicted to have more income invest in their businesses and education. Hence, there is no choice for individuals with less wealth but to borrow from financial institutions to invest in their education and economic activities to improve their wellbeing (Ofori- Abebrese et al., 2020). This further implies that less wealthy inheritors will likely continue to experience poor economic wellbeing if they do not access financial services.

According to the financial-inequality narrowing hypothesis, inclusive finance and income inequality are inversely correlated; as inclusive finance advances, inequality declines and economic wellbeing is enhanced**.** Therefore, this hypothesis claims that an increase in inclusive finance offers enhanced economic wellbeing. From finance-inequality narrowing hypothesis, paper three indicates that financial inclusion is a relevant tool for boosting Sub-Saharan Africa's economic wellbeing.

Contrarily to finance—inequality narrowing hypothesis, the finance - inequality widening hypothesis proposed by Clarke, Xu, and Zou (2006) suggests that high-income groups gain from financial services, whereas lower-income groups find it strenuous to receive financial services because of their limited access to credit and collateral. Due to this, poor people only receive a primary education, which leads to their entering the unskilled labour market where they will be paid less and have a poorer standard of living.

3.1.3.1.2 Supply-leading hypothesis

Supply-leading hypothesis originally indicated that financial services result in economic growth (Schumpeter, 1911). The theory is supported by the presumption that a well-functioning financial sector has the power to increase capital accumulation, move funds from non-growth sectors to more growth-inducing sectors of the economy, mobilize savings,

expand liquidity, and drive total economic efficiency (Ozigbu, 2018). In other words, economic growth is influenced by changes in the effectiveness of capital accumulation, or by a rise in both the rate of savings and the rate of investment. This suggests that inclusive finance is crucial for growth.

However, from a different perspective, Sen et al. (2021) argued that supply-leading hypothesis proposes that financial inclusion facilitates achieving higher economic wellbeing for the people in an economy. This is theoretically justified because people are incentivized to save and invest when financial services are made available and affordable in an economy. One of the most significant effects of the supply-leading hypothesis is that entrepreneurs have access to funds which raises their expectations and create opportunities for new economic activities that can improve their economic wellbeing.

Through engaging in entrepreneurial activities and having access to education and healthcare facilities, financial inclusion—which includes having access to credit and a safe location to save and invest—can assist improve living conditions. Therefore, paper three, which contends that inclusive finance is a prerequisite for the economic wellbeing of everyone in an economy, is strongly justified by the supply-leading hypothesis. A low level of inclusive finance in an economy raises the likelihood of poor access to capital, low savings, and low investment, all of which would have an adverse effect on the economic wellbeing of the populace.

3.1.3.2 Inclusive finance and economic wellbeing: the role of economic freedom

3.1.3.2.1 Amartya Sen's capability theory

It is a normative approach to a person's economic wellbeing that Sen, Amartya, introduced in the 1980s. The theory is concerned with people's actual ability to live the lives they want rather than just having the right or freedom to do so (Sen, 1985). Amartya Sen's capacity theory incorporates several concepts that were previously excluded from traditional wellbeing economics theories, with the main emphasis on improving access to the resources people require to live fulfilling lives (Sen, 2001). In more detail, the theory is built on two presumptions: that freedom to achieve wellbeing is of prime moral importance, and also, freedom to pursue economic wellbeing is only possible when people have the required capabilities. According to Kimmitt et al. (2017), Sen's capability theory generally argues that freedom-induced economic wellbeing only makes sense if freedom is interconnected and complementary.

Drawing from the theory, paper three suggests that the interconnection of economic freedom and inclusive finance could result in higher economic wellbeing. This is because financial inclusion builds the capacity of residents in an economy by offering them credits, insurance and providing a secure place for residents to save and invest (Ofori-Abebrese et al., 2020). Thus, making financial services accessible and affordable is one way the capacity of individuals could be built for their economic wellbeing to improve in an economy where restrictions are minimal.

3.1.3.2.2 Free market theory

Free market theory was first propounded by Smith (1776), and it derives from the "invisible hand of the market" notion that underpins both classical and neoclassical economic theories. According to the theory, in a less constrained market, supply and demand will naturally approach an equilibrium where the highest possible financial and economic good for the individuals in the economy will be realized (Smith, 1937; Fix, 2021). Thus, Smith considers a free market to exist when government control is minimal, with the interaction of supply and demand being the main forces of the market. In a free market, agents are not restricted in any way. CFI (2022) indicated that free market theory is characterized by private property, consumer sovereignty, competition, profit, voluntary exchange and limited government involvement.

Drawing from this, the study indicates that fewer restrictions or interferences from the government in an economy's market can solve the poor economic issues in Sub-Saharan Africa (Le Goff & Singh, 2014) and add more individuals to the financial system. Less restricted markets give people the right to involve themselves in economic activities as well as financial services. Thus, in a free market, people can access funds from financial institutions and invest them in various businesses that can enhance their economic wellbeing. This insinuates that while freedom could boost economic wellbeing directly, it also makes access to financial services easy, which further strengthens economic wellbeing in an economy. This theory relates to paper three because it seeks the relevance of economic freedom in financial inclusion – economic wellbeing nexus of people in SSA.

Table 3a

A summary of theories that backs paper three is presented below:

Propounder(s)	Theories	Key Argument made
Inclusive finance and economic wellbeing		
Galor and Zeira (1993) and Banerjee and Newman (1993)	Finance-inequality narrowing hypothesis	It indicates that as inclusive finance advances, financial access increases, giving the poor the opportunity to borrow money, invest in their human capital and raise their earning potential, both of which contribute to their economic wellbeing.
Schumpeter (1911)	Supply-leading hypothesis	People are incentivized to save and invest when financial services are made available and affordable, which results in improved economic wellbeing.
Inclusive finance and economic wellbeing: the role of economic freedom		
Sen (1985)	Amartya Sen's capability theory	The interconnection between economic freedom and inclusive finance could result in higher economic wellbeing than just economic freedom. This is because a free economy with financial access provides residents with resources to engage in economic enhancement activities.
Smith (1776)	Free market theory	While freedom could boost economic wellbeing directly, it also makes access to financial services easy, which further strengthens economic wellbeing in an economy.

3.2 Empirical Review

3.2.1 Empirical review for paper one

To analyze the role of regulations in the relationship between financial development and inclusive finance in SSA.

Here, the study would review existing studies that favour paper one and highlight how paper one differentiates from them.

The financial sector of every economy is the main agent for providing affordable and accessible financial services to the people in an economy. Thus, logically, the financial sector advancement of an economy should be a major determinant of financial inclusion. Yet, prior studies mostly concentrated on the influence of financial development on other factors and not inclusive finance. As a result, most of the reviews in this section dealt with financial development in relation to other factors before narrowing it down to the few works on financial development and inclusive finance. Subsequently, empirical evidence that suggests the role of regulation in the association between financial development and inclusive financial systems was highlighted.

3.2.1.1 Financial development and other factors

At the international level:

One of the areas international literature has considered relevant to financial development is energy. Bayar, Ozkaya, Herta and Gavriletea (2021) studied the effects of various elements of financial development on the primary energy of European Union transition. This was achieved through panel cointegration and causality tests. Bayar et al. (2021) discovered that financial development influences primary energy use. In a similar vein, Ulucak (2021), using bootstrap auto-regressive distributive lag techniques, stated that an improved financial sector will result in increased energy consumption in Pakistan. Also, Anton and Nucu (2020) found the banking sector, bond market, and capital markets have a substantial influence on renewable energy consumption in the European Union. Again, Shobande and Ogbeifun (2022) argued that financial development should be given high consideration in energy efficiency for OECD countries. Moreso, Shah, Hao, Yan, Yasmeen, Padda and Ullah (2022) who conducted a study for G7 economies found the enhancing role of financial development in energy efficiency when they engaged the Driscoll and Kraay method. Furthermore, Lee and Wang (2022) indicated that China's energy security is heightened through financial sector advancements. Similarly, using bootstrap autoregressive distributed lag techniques, Samour,

Baskaya and Tursoy (2022) affirmed that enhancing the financial sector is necessary for renewable energy consumption in the United Arab Emirates. Likewise, Lei, Liu, Hafeez and Sohail (2022) indicated a symmetric influence of financial sector on renewable energy consumption in China employing a non-linear ARDL approach. Again, Mohsin, Taghizadeh-Hesary and Shahbaz (2022) pointed out that upsurges in energy poverty are caused by low financial development in Latin America. However, Saadaoui and Chtourou's (2022) results indicated that progress in the financial sector diminishes renewable energy consumption.

Another area that recent literature has stressed is the relevance of financial development to sustainable development. For instance, Abbasi, Hussain, Haddad, Salman, and Ozturk (2022) employed dynamic autoregressive-distributed lag to assess the role of financial sector on Pakistan's sustainable development and designated financial development as a precondition for Pakistan's sustainable development. Also, Ahmed, Kousar, Pervaiz and Shabbir (2022) examined the relationship between financial development and green growth and concluded that financial advancement encourages green economic growth in South Asia. Again, Zameer, Yasmeen, Wang, Tao and Malik (2020) using the entropy weight method and coupling coordination degree evaluation method indicated that financial development is relevant to ecological competency (it is one means of sustainable development) in China. Furthermore, Zahoor, Khan and Hou (2022) also concluded in their studies that financial development is relevant to boosting ecological footprint, CO_2 emissions, and growth in China after employing various dynamic techniques. Moreso, Shobande and Ogbeifun (2022) asserted that financial sector improvement is important to promoting sustainable development in the OECD countries. Li, X., Yu, Salman, Ali, Hafeez and Aslam (2021) argued that progress in the financial sector indicators will help to attain sustainable development. Bao (2020) found that in the long run, financial development positively affects sustainable growth.

Despite the fact that the importance of financial section of an economy on growth can be traced way back, there have been a significant number of recent studies on the subject. Shahbaz, Nasir and Lahiani (2022) indicated that financial development plays a meaningful role in economic growth in Asian countries. Also, Usman, Jahanger, Makhdum, Balsalobre-Lorente and Bashir (2022) poise that progress in the financial section is needed for economic progress in the Arctic countries. Again, Cao, Kannaiah, Ye, Khan, Shabbir, Bilal and Tabash (2022), employing autoregressive distributive lag, discovered a beneficial impact of financial development on South Asian's growth. Likewise, Bibi (2022) concluded that sound financial

operations are required for economic enhancement in South Asia. In the study by Mammadov and Ahmadov(2021), they discovered that financial growth is relevant to the economic progress of Azerbaijani. Likewise, employing auto-regressive distributed lag model, Fathima Rinosha, and Mohamed Mustafa (2021), indicated financial development is crucial to economic development in Sri Lanka. Furthermore, using Bayesian analysis, Hoang (2021) reveals that financial activity improvements improve economic growth in Asean countries. Moreso, Lenka and Sharma (2020), using the ARDL as well as an error correction model, established that a surge in financial development causes the economic growth of India in both long and short periods. In addition, Bibi and Li (2022) disclose that financial progress causes economic progress in Pakistan. Yet, Tariq, Khan and Rahman (2020) recorded that economic growth reacts differently to financial development in Pakistan by employing quantile regression. Matei (2020) supported the finding of Tariq et al. (2020) using a pooled mean group estimator, indicating that in emerging European economies, financial enhancement has a positive influence on economic activity till a certain threshold and then its relationship with growth becomes negative. In a more contrary vein, Verma and Giri (2022) found that financial progress had a negative influence on the growth of SAARC countries.

Financial development-driven environmental quality is another area that has been considered by researchers. Usman, Kousar, Makhdum, Yaseen, and Nadeem (2022) indicated that in the long-run financial development quickens environmental quality in Pakistan. Also, Zoaka, Ekwueme, Güngör and Alola (2022) specified that financial development rejuvenates the environmental quality in all the BRICS economies. Zoaka et al. (2022) result was achieved using the pooled mean group autoregressive distributive lag model and the panel dynamic ordinary least square estimation techniques. Again, employing a generalised method of moment, Dagar, Khan, Alvarado, Rehman, Irfan, Adekoya and Fahad (2022) contended that financial improvement causes environmental degradation in OECD economies. Usman et al. (2022) reported that improving the financial sector reduces environmental degradation in Arctic countries. On the other hand, Khan, Babar, Oryani, Dagar, Rehman, Zakari and Khan (2022) examined using dynamic ARDL and found that in Canada, financial development causes environmental degradation. Yousaf et al. (2022) also concluded that improving the financial sector reduces CO2 emissions in China. Also, Umar, Ji, Kirikkaleli and Xu (2020), using the wavelet power spectrum, reveal that the financial sector induces CO_2 emissions at various time frames and frequencies in China. According to Amin, Ameer, Yousaf and Akbar (2022), carbon dioxide emissions have been the key source of extreme environmental

degradation. Employing quantile regression, Ohajionu, Gyamfi, Haseki and Bekun (2022) explained that credit to private sector causes CO_2 emissions. On the other hand, Awosusi et al. (2022), engaging autoregressive distributed lag technique, discovered financial development does not have any substantial impact on environmental deterioration in Uruguay.

Since researchers are still interested in direct foreign investment induced by the nature of the financial sector in the economy, this thesis reviews the existing studies on financial development-direct foreign investment nexus. Lutfi, Ashraf, Watto and Alrawad (2022) found financial development leads to increased foreign direct investment inflow for Pakistan for both long and short periods, after employing ARDL estimations. Also, using ARDL bound testing and VECM procedures, Khan and Khan (2019) establish that the financial sector plays a vital role in improving foreign direct investment in China. Again, Ayouni and Bardi (2018) admonished the policymaker in Tunisian to make every effort to enhance financial operations in their country to attract more foreign direct investment. Moreso, Dellis (2018), an efficient and deep financial system should be a driving reason for foreign direct investment inflows in advanced countries. Furthermore, using a technique known as the pooled mean group cointegration test, Behera, Tripathy and Mishra (2020) confirmed that financial development empowers developing countries in Asia to increase their foreign direct investment outflow. Likewise, Bilir, Chor and Manova (2019) indicated in their studies that a host economy's financial situation determines the level of multinational operation, using the US as a case study. Contrary to most of the findings on the association between financial development and direct foreign investment, Shahbaz, Mateev, Abosedra, Nasir and Jiao (2021) applying the bootstrapping ARDL cointegration test indicated that financial development reduces the inflow of direct foreign investment. Tsaurai and Makina (2017) examined financial development threshold levels that affect FDI inflows using 11 upper-middle-income emerging economies and gave mixed results. They found that advanced share market and banking sector development above the threshold levels have a favourable and important impact on FDI inflows. They also found that private and public bond markets that are equivalent to or more than the threshold have an adverse and negligible impact on FDI inflows, whilst levels that are lower than the threshold have a positive but negligible effect.

Again, studies on financial development and income-inequality have received recent attention in research. Mbona (2022) employed generalized method of moment and indicated that financial sector improvement can help reduce inequality in income. Similarly, Suhaimee,

Zaidi, Sulaiman and Zulkepli (2021) discovered that both the banking sector and the stock market of Malasysia have a strong influence on reducing income inequality. Likewise, Cetin, Demir and Saygin (2021), employing multiple techniques, recommend that policymakers in Turkey reduce income inequality. Again, Jung (2021) showed that financial development is relevant to reducing income inequality. On the other hand, Ullah, Kui, Ullah, Pinglu and Khan's (2021) financial development causes a surge in income inequality in the One Belt One Road economies. According to Jung and Cha (2021), financial debt actually worsens income inequality in China, contrary to popular belief. Guided by cointegration test and quantile regression, Shi, Paul and Paramati (2022) also asserted that financial deepening increases income inequality in Australia. Again, Klachkova and Solonina (2022) recorded diverse results in their studies. They note that when loans increase, inequality in Russian will increase, while increases in deposits and bank infrastructure cause a reduction in income inequality.

Other recent studies on financial development include: Liu, Saleem, Al-Faryan, Khan, and Zafar (2022) argue that financial development reduces natural resource price volatility in the Middle East and North Africa. Also, Fonseca and Van Doornik (2022) explain that financial development in Brazil leads to a high labour market. Also, Chandio, Jiang, Abbas, Amin and Mohsin's (2022) ARDL estimation results disclose that financial development enhances agricultural production in China. Again, Haschka, Herwartz, Struthmann, Tran and Walle (2022) employ a novel copula-based estimator and recommend that Vietnam should build favourable financial conditions in their economy to promote firm growth.

In SSA:

Like the international level, most SSA studies have considered the influence of financial development on other factors other than financial inclusion. Hence, the review was done on financial development and other factors. Since Sub-Saharan African countries are significantly more than North African countries, studies done in the whole of Africa were included in the review done under this section. Again, to ensure consistency, the review of financial development on other factors under this section would be guided by factors considered under the international review above.

The thesis reviews the relevance of financial development in the energy of SSA. Thebuho, Opperman and Steenkamp (2022) reveal that intensifying financial development would in turn improve energy consumption in SSA. Also, Murshed, Khan and Rahman (2022)

indicated that financial development is a necessary ingredient for energy sustainability. Again, Mamadou Asngar (2022) indicated that access to credit in Africa hastened access to electricity. Likewise, from ARDL estimation, Lefatsa, Sibanda and Garidzirai (2021) indicated that the benefit of financial development to energy consumption would be enjoyed in South Africa. In the same vein, Chireshe (2021) asserted that the financial happenings in SSA should be improved to boost the renewable energy production capacity in the region. Moreso, by commissioning a generalized method of moments and quantile regressions, Asongu and Odhiambo (2021) confirmed that financial advancement totally encourages renewable energy consumption in SSA. Additionally, Adom (2021) employed a generalized method of moments which adjusted for the Aiken and West slope difference test and found the full effect of financial development on electricity consumption to be negative. Likewise, employing a unit root test in conjunction with a pooled mean group, Nyeadi (2022) established that financial advancement has a substantial positive influence on clean energy consumption in SSA. Furthermore, Nkalu, Ugwu, Asogwa, Kuma and Onyeke (2020) reported a conflicting result by indicating that in the long run, good financial condition will improve energy consumption, but in the short run, improved financial development would hinder energy consumption in SSA.

Another area where recent SSA literature has stressed the effect of financial sector improvement on sustainable development. Odugbesan, Ike, Olowu and Adeleye (2022) suggested to SSA policymakers to heighten financial development in the region to guarantee higher sustainable development. Also, Hussain, Oad, Ahmad, Irfan and Saqib (2021), employing Autoregressive Distributed Lag cointegration tests, suggested that policies boosting financial development are prioritized in emerging countries that are on the path of achieving sustainable economic development. Again, Bao(2020) specified that financial advancement is relevant to sustainable growth in developing countries. Moreso, Mlachila, Jidoud, Newiak, Radzewicz-Bak and Takebe (2016) argued that financial development promotes sustainable growth in SSA.

Existing current studies on financial development and economic growth in SSA include: Ustarz et al. (2021) examined the relationship between financial advancement and growth in SSA using the generalised method of moments and indicated that the financial sector positively enhances growth. Also, Ncanywa and Mabusela (2019) asked, can financial development influence growth in SSA? They employed an autoregressive and distributive lag model in answering the question and specified that financial development improves economic

growth. Again, Olayungbo and Quadri (2019) used pooled mean group and ARDL estimations designated that financial development boost economic growth. Moreso, Nguyen, Le, Ho, Nguyen and Vo (2022) specified a linear positive link between financial sector and growth in emerging economies after employing an advanced dynamic common correlated estimator. In addition, Taiwo(2021) indicated that financial development boosts growth in SSA. Additionally, Ibrahim and Alagidede (2018) highlighted that a high level of finance is a necessary condition for growth. More so, Tajudeen, Olusola and Ademola (2017) asserted that financial sector enhancement is required to stimulate growth. Furthermore, An, Zou and Kargbo (2021) confirmed that financial development causes growth in SSA.

Works in SSA have again highlighted the relevance of financial development to environmental quality: Xuezhou Manu and Akowuah (2022) investigated how financial development optimized environmental quality in SSA. Furthermore, Emenekwe, Onyeneke and Nwajiuba (2022) analysed the association between financial development and carbon emissions in SSA. Musah, Owusu-Akomeah, Nyeadi, Alfred, and Mensah (2022) assessed the role of financial services in West African environmental sustainability. They found that financial development hinders environmental sustainability. Again, Musah, Owusu-Akomeah, Nyeadi, Alfred and Mensah (2022) disagree that financial development would hamper the pursuit of a sustainable environment.

Financial development-driven foreign investment inflow has also received the attention of Sub-Saharan Africa's researchers recently: Boateng et al. (2017) studied the complementarity effort of financial development on investment in SSA. Also, Odhiambo (2021) indicated that financial development causes an increase in direct foreign investment in SSA. Again, Shuaibu (2021) engaged the log-linear regressions and ARDL bound tests in testing the association between financial development and direct foreign investment, indicating that improving the financial sector in Nigeria will help draw more foreign investors.

Income inequality reduction driven by financial development in SSA: Kapingura (2017) stipulated that financial development reduces the magnitude of inequality in South Africa. However, Adeleye, Osabuohien and Adam (2022) stipulated that domestic credit aggravates inequality in Nigeria and South Africa because financial development optimizes inequality in African countries. In support, Zungu and Grelying (2021) also reveal that financial development optimizes inequality in African economies. Others recorded mixed results. For instance, Séraphin and Cyrille (2022) employing estimation of the ARDL and NARDL

models gave mixed results based on time period. Séraphin et al. (2022) indicated that financial development tend to promote inequality in high-income nations and reduce it in middle and low-income nations. Similar, Bolarinwa and Akinlo (2021) found mixed results where financial development increases inequality in high-income economies but reduces it in low and middle-income countries.

These studies reviewed above considered the effect of financial development on energy, sustainable development, growth, foreign direct investment and income inequality, respectively. Paper one, on the other hand, considered the effect of financial development on inclusive finance.

3.2.1.2 Financial development and inclusive finance

This section present summary of studies that relate to paper one in Table 1b.

Table 1b

A summary of some of the empirical studies that support paper one.

Author (s)	Topic	Gap Filled
Financial development and financial inclusion		
Kamalu & Ibrahim (2021).	"Islamic banking development and financial inclusion in OIC member countries."	Total assets of Islamic banks as a percentage of gross domestic product as a measure of financial development. However, paper one differentiates itself by computing a more comprehensive financial development index that consists of financial efficiency, dept, stability and concentration. Paper one further differentiates itself by moderating the relationship between financial development and inclusive finance with regulation.
Hlophe (2018)	"Does financial development mean financial inclusion? A causal analysis for Eswatini."	Credit to private sector was employed as a measure of financial development. Nevertheless, Paper one distinguishes itself by computing a more comprehensive that consists of financial efficiency, dept, stability and concentration. Paper one would further novel relationship between

		financial development and inclusive finance by moderating it with regulation.
Evan (2015)	"The effects of economic and financial development on financial inclusion in Africa."	Credit to private sector and money supply was employed as a measure for financial development. Nonetheless, Paper one differentiates itself by computing a more comprehensive that consists of financial efficiency, dept, stability and concentration. Again, paper one would originate the role of regulation in relationship between financial development and inclusive finance.

3.2.1.3 Financial development and inclusive finance: the role of regulations

From the review presented in Table 1c, regulations influence both financial development and financial inclusion. Thus, sound regulation would not only improve financial inclusion on its own but would additionally enhance the role of financial development in improving inclusive finance.

Table 1c

A summary of empirical justification for introducing regulations for paper one:

Authors	**Findings**	**Empirical justification for introducing regulations**
Financial development and financial inclusion: the role of regulation		
Regulation and Financial development		
Bousnina and Gabsi (2022)	They discovered that the financial sector must be entrenched within a reliable legal framework in order to enhance operations.	Thus, sound regulation is needed for the financial sector to deliver its best.
Abaidoo and Agyapong (2022)	They indicated that improvement in regulations and rule of law enhances the efficiency of financial institutions.	
Ikpesu, Akinola and Ikpesu (2022)	They confirm that rule of law and regulations affect banking sector development positively.	
Atanga Ondoa and Seabrook (2022)	They affirmed that implementing sound regulation quality enables financial sector development.	
Savari, Rostami, Fallah Shams and Jamali (2022)	They indicated that among the factors that affect stock market returns, rule of law and the regulatory quality of countries cannot be underrated.	
Atellu, Muriu, and Sule (2021)	They suggest that prudential regulations are important drivers of financial stability.	
Aluko and Ibrahim (2021)	They specified that market regulations induce financial sector development.	
Feng and Yu (2021)	They indicated that improvements in regulatory quality and rule of law make financial operations more efficient.	
Sarhangi, Mohaghegh Niya and Amiri (2021)	They confirmed a significant positive impact of regulation on financial development.	
Azmeh (2018)	They disclosed that financial sector improvement in an economy is more intense when sound regulation is upheld.	
Muye and Muye (2017)	They concluded that regulation is a needed factor to boost the financial sector.	
Xiao, Tian and Yuan (2018)	They indicated that regulation is a needed strategy for every economy that wants to improve its financial system.	

Regulation and financial inclusion		
Besong, Okanda and Ndip (2022)	They indicated that bank regulation sustains financial inclusion.	Hence, regulations would result in an increase in financial access and affordability.
Yakubi, Basuki, Purwono and Usman (2022)	Found that regulations drive financial inclusion.	
Gichuru and Namada (2022)	Established that regulations are requirements for financial inclusion.	
Nguyen and Ha (2021)	They stipulated that legal and judicial effectiveness are required for an inclusive financial system.	
Eldomiaty, Hammam and El Bakry (2020)	They indicated that financial inclusion in a weak regulatory lead to financial exclusion.	
Chen and Divanbeigi (2019)	They found that in countries where regulatory quality is heightened, people are more likely to have a financial account.	
Kodongo (2018)	He indicated that agency banking regulations improve formal financial access.	
Barua, Kathuria and Malik (2016)	They stated that regulatory changes are necessary to make the new architecture for financial inclusion viable.	

3.2.2 Empirical review for paper two

To examine the collaborative role of economic freedom and innovative facilities on inclusive finance in SSA

Once more, the study would analyze earlier research that supports paper two and highlight how paper two contributes to literature.

According to Hussain (2012), draconian restrictions on business operations impair financial access and distort the commercial operating environment. Therefore, economic freedom stimulates an inclusive financial environment because it fosters competition, which encourages financial institutions to create more effective inclusive finance policies. In general, there is scant proof of how economic freedom affects financial inclusion across the globe. There is no empirical data on the effect of economic freedom on inclusive finance in SSA, rather researchers have examined the impact of other factors on inclusive finance. As a result, majority and initial reviews would focus on the effect of other factors on inclusive

finance. Inclusive finance and economic freedom were then discussed. The discussion was followed by studies that suggested the innovative facilities' complementing function in the association between economic freedom and inclusive finance.

3.2.2.1 Other factors and inclusive finance

At the international level:

Institutions – inclusive finance nexus has received much attention. For instance, Ben Khelifa (2021), using the OLS regression model, identified that institutional quality is suggestively connected to inclusive finance. Also, Tran and Dinh (2021) demonstrated that residences in provinces with enhanced institutions are more likely to have a variety of financial services such as loans, bank accounts, ATM cards and insurance. Again, AbdulKareem, Mohamed, Soliman, Albadaly, Ababtain and Al Sabti (2021) gave various impacts of governance indicators on financial inclusion, which include: fighting corruption reduces borrowing and enhances savings; a decrease in corruption is linked to the improvement of the savings rate in the Kingdom of Saudi Arabia; and political stability improves four measures of inclusive finance. In support, Eldomiaty et al. (2020) specified that improved institutions can boost inclusive finance in the world. Okello Candiya Bongomin, Ntayi, Munene and Malinga (2018) also indicate that institutions are a vital ingredient for inclusive finance in Uganda.

The impact of financial literacy on inclusive finance has also been highlighted, globally. Asyik, Wahidahwati and Laily (2022) employed a partial least square structural equation model and affirmed that financial literacy has a meaningful role in the inclusive finance of Indonesia. Also, Dharni (2022) asserted that financial literacy is a central factor in encouraging financial inclusion in India. Moreso, Khan, Siddiqui and Imtiaz (2022) argued that financial literacy is a way to confront financial exclusion issues in India. Again, Goenadi, Murhadi and Ernawati (2022) indicated the higher an individual's literacy in finance, the more advanced the people's financial inclusion would be in Indonesia. Agreeably, via multiple linear regression Soejono and Mendari (2022) reaffirm that financial literacy would advance the financial inclusion of university lecturers in Palembang. Again, Bianco, Marconi, Romagnoli and Stacchini (2022), conducting a study in Italy, explained that higher financial knowledge and education strategies diminish the possibility of an economy being classified as part of those with low financial inclusion. Moreso, Mandal, Saxena and Mittal (2022) indicated that poor financial literacy has hindered the vulnerable population from being part of inclusive finance after engages structural equation modelling. Additionally, Noor, Batool

and Rehman (2022) revealed that financial literacy has a substantial impact on inclusive finance in Pakistan. Furthermore, Wewengkang, Mangantar and Wangke (2021) assessed the effect of financial literacy on inclusive finance in Manado and established that financial literacy is an essential tool for boosting inclusive finance. Hasan and Hoque (2021) inquire about how financial literacy can help achieve inclusive finance. Using logistic, probit and complementary log-log regression to assess the role of financial literacy in eliminating the obstructions that prevent people from partaking in financial services and indicated that knowledge concerning services provided by financial institutions speeds up financial access. Again, Hecht (2021) advocated that financial inclusion requires financial knowledge and understanding. Also, applying a systematic literature review of 75 studies Roy and Patro (2022) specified that financial literacy is needed for enhancing the financial inclusion of women.

The effect of income on inclusive finance is also reviewed because it is rampant in literature. Kaur and Kapuria (2020), via an econometric assessment of panel data for 28 states of India over four years, indicated that income influences inclusive finance. Also, Dar and Ahmed (2020) ascertain that India income has a meaningful influence on financial exclusion. Again, Altarawneh, Al-Nuaimi and Al-Nimri (2020) examined the level and elements that influence inclusive finance in Latin America and Europe with special emphasis on Brazil and Romania, where they found income to be a great contributor to financial inclusion. Moreso, Motta and Gonzalez Farias (2022) examined the determining factors of inclusive finance in Latin America and the Caribbean region, and their result revealed that more income is connected to higher financial inclusion. Ahmad and Rooh (2022) conducted a study on factors that influence inclusive finance in Pakistan. According to their findings, income plays a significant role in achieving greater financial inclusion based on Probit forecasts. Again, Tinta, Ouédraogo and Al-Hassan (2022) found that financial literacy induces financial inclusion in Africa. Shihadeh (2018) aimed to analyze the financial inclusion of individuals living in the Middle East, Afghanistan, Pakistan and North Africa. A probit model was engaged in examining the effect of individual characteristics on inclusive finance. Among these individual characteristics was income, which he established can be a barrier to having formal account motivations for borrowing.

The role of gender and the gender gap in inclusive finance too has been investigated. Botric and Broz (2017) assessed the gender dimension of inclusive finance in South Eastern and Central Europe and established that males are more financially included than females. Again,

in India Kulkarni and Ghosh (2021) used a regional profile on the gender gap and indicated that there is a negative gender gap in digital inclusive finance in India. Moreso, Manta (2019) assessed the gendered nature of barriers faced by rural women who access financial inclusion worldwide and confirmed that gender differences inhibit women's ability to access financial services. Furthermore, in Cameroon, Ndoya, and Tsala (2021) asserted that there is a gap in all indicators of access to financial institutions in favour of men. In addition, Dar et al.'s (2020) results reveal that gender impacts financial inclusion in India. Again, Ghosh and Vinod (2017) asked whether gender matters for financial inclusion and answered that there is a significant disparity in both the access and usage of finance by gender in India. Antonijević, Ljumović and Ivanović (2022) suggested that there should be a global focus policy that would improve women's involvement in financial inclusion, after assessing the relevance of gender gap on saving, borrowing, owning a credit card, using the internet and a mobile phone to access an account. Moreover, Shabir and Ali's (2022) article assessed the degree of inclusive finance through the use of financial products based on gender in Saudi Arabia. Their article indicated a link between inclusive finance and gender.

The studies also reviewed the role of Covid-19 in inclusive finance, since literature has been loud on it. Eton, Mwosi and Ejang (2022) examined the effect of Covid-19 on inclusive finance in two sub-regions in Uganda and found that COVID-19 has indeed contributed to financial inclusion in Uganda. Gutiérrez-Romero and Ahamed (2021) also stipulated that Covid-19 broaden financial inclusion in the world. Again, Yamada, Shimizutani and Murakami (2021) discovered Covid-19 outbreak was actually a saviour for financial inclusion in Philippines. Moreso, Guérin, Guermond, Joseph, Natarajan and Venkatasubramanian (2021) discuss how the Covid-19 pandemic influences microfinance borrowers in India. After an examination, they indicated Covid-19 pandemic exposes the restrictions and exclusionary practices for financial inclusion in India. Furthermore, according to Mousa and Ozili (2022), COVID-19 will increase financial inclusion among underserved populations in Grameen America. In support, Mansour (2021) finds that countries with low income encountered a significant response to digital means of payment during the pandemic. Additionally, Ozili (2020) specified that Covid-19 crisis remained a useful tool in improving access to finance. Again, Kumar and Singh (2021) assessed the current status of inclusive finance initiatives in India with special reference to the Covid-19 pandemic on financial inclusion by mediating digital financial inclusion and found that the Covid-19 pandemic affected digital payment and prepaid payment, positively. Agreeably,

Iordachi and Ciobu (2020) explained that in the attempt to fight Covid-19, financial inclusion was significantly boosted when individuals used technology and innovations to access financial services in România. Herrera, Lambert, Ramos and Torres (2021) also indicated that, in as much as a strict rule could have hindered fintech development, it seems the regulations in an attempt to curb the coronavirus pandemic were rather supportive of speeding up financial technology adoption in Latin America and Caribbean.

Again, the study assessed literature on the role of remittances in inclusive finance. Núñez Medina and López Arévalo (2021) employed the bayesian spatial techniques to examine remittance and inclusive finance data on a municipal level in Mexico. Their article indicated that remittances significantly improve inclusive finance. Likewise, Kokorović Jukan, Okičić and Hopić (2020) examine how remittances affect inclusive finance with a focus on youth and asserted that in South East Europe, remittances improve inclusive finance. In the same vein, Wellalage and Locke (2020) assessed the impact of remittances on the inclusive finance of refugee migrants. Their result proved that there is the possibility of increasing financial inclusion among refugees through remittances if given the opportunity. On the contrary, Eggoh and Bangaké (2021) provided a new shred of evidence on the association between remittances and inclusive finance via panel threshold regressions and generalized methods of moments in developing countries. The findings advocated that the nexus between remittances and inclusive finance in isolation is not significant. Also, Gautam (2019) assessed whether the presence of remittances contributes to inclusive finance. His findings showed that remittance inflows have an undesirable impact on financial inclusion because remittance reduces the demand for deposit accounts from formal financial institutions. Studies that reported mixed results include Issabayev, Saydaliyev, Avsar and Chin (2020) investigation how remittance influxes affect inclusive finance in developing economies, and their results suggested that the association between remittances and inclusive finance is dependent on the magnitude of remittances in the country. Naceur, Chami and Trabelsi (2020) confirm the mixed results provided by Issabayav et al. (2020) after investigating the association between remittances and financial inclusion using cross-country methods and the generalized method of moment. When remittances to gross domestic product are low, it reduces inclusive finance but enhances it when it is high. Moreover, Yamada et al. (2021) indicated that greater remittance inflow advanced inclusiveness in finance in the Philippines prior to the outbreak Covid-19 but extensively weakens financial inclusion during Covid-19.

In Sub- Saharan Africa:

Using the study's outline as a guide, studies reviewed from SSA focused on the factors identified in the aforementioned international review.

In SSA too, institutions – financial inclusion nexus—have received considerable attention. Zeqiraj, Sohag and Hammoudeh (2022) examined the role of institutional measures on inclusive financial systems in developing countries. By employing various dynamic methods to address possible heterogeneity, endogeneity problems and cross-sectional dependency. They revealed that institutional excellence promotes inclusive finance in developing countries. Similarly, Likewise, Nkoa and Song (2020) investigated the influence of institutions on inclusive finance in Africa, they found that institutional quality increases inclusive finance. Likewise, Nagpal, Jain and Jain (2020) discovered that governance and institutional indicators affect financial inclusion in emerging countries. Again, Ajide (2017) concluded that institutional infrastructure influences inclusive finance in SSA. In addition, Zulkhibri and Ghazal (2017) contended that governance and institutional factors impact inclusive finance.

The role of financial literacy in enhancing inclusive finance is understudied in SSA. Chikalipah (2017) investigated the role of literacy in inclusive finance and established that illiteracy is a key hindrance to inclusive finance in SSA. Again, in examining determinants of quality inclusive finance in South Africa, Chipunza and Fanta (2021) name literacy in finance as a determinant of improved financial inclusion. Moreso, Mhlanga (2021) argued financial literacy related to inclusive finance with a direct focus on Zimbabwe. Adetunj and David-West (2019) collected data from 22,000 respondents and specified that financial literacy improves and deepens financial access. Furthermore, Safinaz Zauro and aSecretariate (2019) assessed economic factors on financial inclusion in Africa and, through ordinary least squares regression, found that higher literacy rates are necessary to improve financial inclusion in Africa. Baidoo, Boateng and Amponsah (2018) engaged a binary probit regression model in investigating the role of financial literacy on savings and concluded that improving financial literacy among Ghanaians would help improve domestic savings and investment in banks. Likewise, Kodongo (2018) engaged in probit regression and found that financial literacy could expand financial access in Kenya. In a similar vein, Teka, Nahusenay and Asmare (2020) engaged probit and named financial literacy as one of the determinants of inclusive finance in Ethiopia. Moreso, in binary regression, Timbula, Mengesha, Mekonnen and

Kebede (2019) added financial literacy to the list of indicators related to financial inclusion in Ethiopia after assessing determinants of financial inclusion. Furthermore, Oyelami (2017) suggests that the government in SSA should put policies in place to promote financial literacy in order to enhance inclusive finance in the region. In addition, Zin and Weill (2016) found education to be a good influence on financial inclusion in African countries. Agreeably, Akudugu (2013) collected data from 1000 individuals across Ghana and, using the logit model, affirmed that literacy level affects financial inclusion in Ghana.

In SSA, the role of income in inclusive finance development has received attention. Girón, Kazemikhasragh, Cicchiello and Panetti (2022) assess the factors of inclusive finance in the least developed countries, including Africa and show that income is a key pillar for increasing financial inclusion. Again, Tinta et al. (2022) insisted that high-income turn to increase inclusive finance in Africa. Also, Ndanshau and Njau (2021) examined the demand side elements of inclusive finance in Tanzania involving 9,459 respondents from Tanzania and revealed that more income fosters financial inclusion in Tanzania. Correspondingly, Sanderson, Mutandwa and Le Roux (2018) purported to analyze the determinants of inclusive finance and found income to play an active role in enhancing financial inclusion in Zimbabwe. Also, in examining the determinants of financial inclusion in Africa. Zin et al. (2016) found income as a good element of inclusive finance. Supportively, Akudugu (2013) again established that the wealth of a person affects financial inclusion in Ghana. In consensus, Adetunji et al. (2019) indicated that income rather improves financial inclusion through informal saving in Nigeria. Additionally, Safinaz Zauro et al. (2019) assessed the effects of economic factors on inclusive finance in Africa and stated that income affects inclusive finance.

The nexus of gender and inclusive finance: According to Were, Odongo and Israel (2021), even though Tanzania has made significant progress in enhancing access to financial services, gender disparities in inclusive finance still exist. Also, Mndolwa and Alhassan (2020) undertook a study on the status and determinants of gender discrepancies in financial inclusion in Tanzania. Their results suggested that there were indeed gender disparities in financial inclusion in formal savings, formal accounts and mobile money accounts; however, there was a positive gender gap when it came to accessing formal credit. Moreso, Lotto (2018) revealed that gender have a pertinent role in the financial inclusion of Tanzania. Again, Kairiza, Kiprono and Magadzire (2017) investigated gender disparity in the prevalence of inclusive finance in Zimbabwe. Using Tobit and ordinary least square

regressions, they found weak evidence of female financial exclusion in the financial sector, thus, Kiprono et al. (2017) concluded that females are no less likely to access financial services than their male counterparts. Moreso, according to Zins and Weill (2016), gender has a meaningful impact on inclusive finance in Africa. Fanta and Mutsonziwa (2016) explained this by indicating that gender gap prevails even in countries with the highest financial inclusion. They specified that gender gap in bank account ownership is highest in African countries such as Botswana and Mauritius. Nonetheless, Fanta et al. (2016) credited South Africa with an optimistic gender gap because women are more involved in finance than men. Correspondingly, Asuming et al. (2019) confirmed the role of gender in inclusive finance of SSA.

The effect of Covid-19 on inclusive finance in SSA countries was reviewed. Mhlanga (2022) investigated the role of Covid-19 in digital inclusive finance and revealed that the pandemic provided an opportunity for digital financial inclusion. Also, Uwah, Udoayang and Uklala (2021) stipulated even after Covid-19, Nigeria should work to maintain acceptance of financial inclusion as the new normal in financial transactions. Again, Cicchiello (2020) Covid-19 helped the financial sector make vital promotions for the financial inclusion of South Africa. Again, Nakouwo and Akplehey (2020) stated that Covid-19 induced lockdown and restrictions in Ghana had a direct increase in mobile money patronage, which is a necessary indicator for financial inclusion in an economy. Consistently, Machasio (2020) indicated that lockdowns and curfews designed to curb the spread of the virus encouraged cashless and contactless modes of payment, thus creating new opportunities for the adoption of digital financial services.

The association between remittances and inclusive finance was also reviewed. Ajefu and Ogebe (2019) examined the impact of remittances on inclusive finance for households in Nigeria. Their result suggested that remittances surge the rate of using financial services. Supportively, Amidu, Abor and Issahaku (2019) designated that remittances increase the possibility of households owning an account, accessing credit, saving and holding insurance. Again, Arthur, Musau and Wanjohi (2020) analyzed the effect of remittances outside Kenya on financial inclusion in Kenya and found diaspora remittances boost inclusive finance in Kenya. Again, Oyelami (2019) assessed the effect of immigrant remittances on inclusive finance in SSA and demonstrated that remittances have no significant effect on financial inclusion. Gatsi (2020) reported a mixed result in Ghana when he examined the relationship between remittances and inclusive finance. Among his findings, he confirmed that domestic

remittances boost access to financial services, whereas international remittances increase the possibility of opening a bank account. International remittance, however, does not affect loan applications. His findings further suggested that both international and domestic money transfers have increased bank accounts. Other studies indicated no relationship between remittances and inclusive finance in Africa. For instance, Oyelami and Ogundipe (2020) examined the role of migrants' remittances on inclusive finance in SSA. Employing the pooled mean group, they concluded that remittances have no meaningful effect on inclusive finance in SSA.

Other studies that affect financial inclusion include Lee, Wang and Ho (2022). They divulge that financial aid is an important determinant of a country's inclusive finance. Also, Xu(2020) assessed the role of social trust in improving inclusive finance across the world and found social trust as a reliable element of inclusive finance. The study of Chinoda and Kwenda (2019), among other factors, assessed how economic growth impacts financial inclusion gaps in Africa and found that inclusive receives a positive response from growth. Moreso, Bozkurt, Karakuş and Yildiz (2018) examined the factors that cause changes in financial inclusion levels and found social and political factors cause a change in financial inclusion levels using the global Moran's I and local indicators of spatial association analyses.

These studies considered the effect of other factors (institutions, financial literacy, income, gender, Covid-19 and remittance) on financial inclusion. Paper two, instead, considered the effect of economic freedom on inclusive finance.

3.2.2.2 Economic freedom and inclusive finance

Previous works that support the association between economic freedom and financial inclusion are presented in Table 2a.

Table 2b

A summary of some of the empirical studies that support Paper two

Author (s)	Topic	Gap Filled
Economic freedom and inclusive finance		
Hussain, Yahya and Waqas (2021)	"Does strong governance stimulate the effect of economic freedom and financial literacy on financial inclusion? cross-country evidence. "	This study neglected to do a sub-regional analysis that would have produced results that accurately represented SSA. Therefore, paper two undertook an exclusive study on the connection between economic freedom and inclusive finance SSA. Paper two is again novel by considering the role of innovative facilities on the effect of economic freedom on inclusive finance.
Kimmitt and Munoz (2017)	"Entrepreneurship and financial inclusion through the lens of instrumental freedoms."	It concentrated on entrepreneur in Latin America and the Caribbean rather than SSA. Objective two on the other hand considered all residents in SSA. Again, objective two initiated the complementary role of innovative facilities on the effect of economic freedom on inclusive finance.

3.2.2.2 Economic freedom and inclusive finance nexus: the role of innovative facilities

From Table 2c, innovative facilitates facilitate financial inclusion. Since, economic freedom is highlighted in Table 2b to be meaningful in improving inclusive finance, the joint effort of both economic freedom and innovative facilities would have a better influence on financial inclusion.

Table 2c

A summary of empirical justification for introducing innovative facilities paper two:

Authors	**Findings**	**Empirical justification for the complementary role of innovative facilities**
Innovative facilities and inclusive finance		
Khera, Ng, Ogawa and Sahay (2022)	They found that the adoption of digital financial services is a key driver of inclusive finance.	Thus, in an economy where freedom policy is upheld, financial inclusion would be maximized if innovative facilities are made available to reduce the barrier of distance.
Kouladoum, Wirajing and Nchofoung (2022)	They insinuated that at all levels, innovative facility indicators have a significant positive impact on inclusive finance.	
Agyekum, Reddy, Wallace and Wellalage (2022)	They affirmed that the use of innovative facilities contributes to accessing external credit facilities.	
Shen, Hueng and Hu (2020)	They named innovative facilities as the key players in improving financial inclusion	
Lubis, Dalimunthe and Situmeang (2019)	They indicated innovative facilities influence financial inclusion.	
di Prisco, and Strangio (2021)	They consider blockchain technology as an instrument to reduce low financial inclusion	
Senou, Ouattara and Acclassato Houensou (2019)	They specified affirmed that innovative facilities are very key to enhancing financial inclusion	
Wayne, Soetan, Bajepade and Mogaji (2020)	They indicated that innovative facilities induced financial inclusion.	
Fanta and Makina, (2019)	They reported a substantial positive connection between innovative facilities and financial inclusion.	
Mhlanga (2020)	His study indicated that artificial intelligence strongly influences digital financial inclusivity.	
Lenka and Barik (2018)	They found that increase in financial inclusion is dependent on innovative facilities.	
Evans (2018)	His result indicated that innovative facilities are relevant to enhancing financial inclusion	

Okello Candiya Bongomin, Ntayi, Munene and Malinga (2018)	They suggested that the existence of innovative facilities promotes financial inclusion.	
Senyo and Osabutey (2020)	The findings implied that the intention to use innovative facilities deepens financial inclusion.	
Siwela and Njaya (2021)	They asserted that innovative facilities improve financial inclusion among females.	
Bayar, Gavriletea and Păun (2021)	They concluded that by increasing, financial inclusion is enhanced.	
Ozili (2021)	They found innovative facilities to be a good determinant of financial inclusion.	

3.2.3 Empirical review for paper three

To assess the complementary role of economic freedom in inclusive finance-economic wellbeing nexus of SSA.

Here, the study would examine earlier research that supports paper three and emphasize how it differs from them. It would start with studies at the international level and a summary of review on SSA studies would be highlighted in Tables 3b and 3c.

3.2.3.1 Inclusive finance and economic wellbeing

At the international level:

Chakrabarty and Mukherjee (2021) investigate how financial inclusion programs could raise welfare. Their study employs Theil's entropy-based index to evaluate consumption expenditure, which was employed as a proxy of welfare. The study found that greater inclusive finance increases the consumption of non-food items. Secondly, they found a shift in consumption from food items to non-food items when inclusive finance is enhanced. From their findings, they concluded that improvements in inclusive finance result in enhanced welfare. In support, Demir, Pesqué-Cela, Altunbas and Murinde (2022) analysed the interconnection between financial technology, inclusive finance and income inequality for 140 economies. In their study, they employed quantile regression to assess if the effect of inclusive finance on income inequality differs across countries with dissimilar levels of income inequality and found that inclusive finance reduces inequality at all levels of the

inequality distribution. Likewise, Susanti, Rochaida and Lestari (2022) evaluated the impact of inclusive finance on community welfare and economic development in East Kalimantan Province. Using dates ranging from 2007 to 2021 and multiple regression analysis, the results of their study demonstrate that inclusive finance boosts community welfare in East Kalimantan Province. Again, Wijaya and Hartini (2022) examined the role of inclusive finance in improving the welfare of the community through savings and loan cooperatives. Considering structural equation modeling. The results of their study established that inclusive fiance plays a key role in poverty reduction.

Chapuzet (2021) also discussed how social welfare and digital financial inclusion interact in Malaysia. His finding, in contrast, indicated that the role of inclusive finance on life expectancy depends on the period. Specifically, in the long run, the relationship between inclusive finance and life expectancy is negative but turns positive over a longer period. Also, Gautam, Bhimavarapu and Rawal (2022) analyzed the effect of rural banks on poverty reduction in India and revealed that regional rural banks favour poverty alleviation agendas and rural development. Again, Ahmed and Kitenge (2022) considered the influence of microfinance outreach on combined welfare. Financial inclusion improves welfare when income and household consumption growth are measured across countries. Intharak, Chancharat and Jearviriyaboonya (2021) examined whether banking development affects the welfare of homes in Thailand. Using the generalized method of moments, it suggested that access to banking services significantly affects the income and consumption of homes in Thailand, and therefore, recommended policies for banking development should be promoted to promote household welfare. Moreover, Stein and Yannelis (2020) investigated how access to financial services among a previously unbanked group affects labour market, human capital, and wealth outcomes. Their study used novel data from the Freedman's Savings Bank and revealed that homes with accounts are very likely to be literate, have their children in school, work, own businesses, and have real estate wealth.

Mallick and Zhang (2019) engaged in heteroscedasticity-based identification recently developed by Klein and Vella (2009a; 2010) to find the causal effect of inclusive finance and found inclusive finance meaningfully amplifies the consumption of urban more than rural households. Agreeably, Nanda and Kaur (2016) indicated that financial inclusion boosts human development. Again, Anwar, Uppun and Reviani (2016) assess poverty reduction by employing financial inclusion in 31 provinces of Indonesia. This study stated that inclusive finance has an optimistic and significant influence on investment, growth and poverty. Also,

Inoue (2018) investigated the impacts of financial inclusion through commercial banks on poverty conditions in India. He found that inclusive finance deepens poverty reduction in India. Moreso, Schmied and Ana (2016) conducted a study that purported to investigate the role of inclusive finance in poverty reduction. After analysis, the study suggested that to reduce poverty in Peru, inclusive finance needs to be enhanced.

Dawood, Pratama, Masbar and Effendi (2019), employing the binary model, examine the impact of inclusive finance on household poverty. Their result reveals that inclusive finance decreases households' possible poverty. Again, Wang and He (2020) assess the effects of digital inclusive finance on farmers' openness to poverty in China. The Asset-based vulnerability model measured openness to poverty. Their estimation proved that farmers' use of digital financial services has optimized poverty reduction.

Table 3b

A summary of SSA empirical studies that support paper three

Author (s)	**Topic**	**Gap Filled**
Financial inclusion and economic wellbeing		
Matekenya, Moyo and Jeke (2021)	"Financial inclusion and human development: Evidence from Sub-Saharan Africa."	Their financial inclusion index considered only financial institutions' measures and failed to include financial market inclusivity. Nevertheless, the measure adopted by objective three from the International Monetary Fund includes an inclusive financial market. In addition, objective three contributes to literature by considering economic freedom in financial inclusion-economic wellbeing nexus.

Ofori-Abebrese, Baidoo and Essiam (2020).	"Estimating the effects of financial inclusion on welfare in sub-Saharan Africa."	Their Inclusive finance index includes only financial institutions' measures, also failing to capture financial market inclusivity. Objective three, therefore, differs from it by adopting a measure that includes an inclusive financial market. Objective three further differentiates itself by considering the role of economic freedom.
Agyemang-Badu, Agyei, and Kwaku Duah (2018)	"Financial inclusion, poverty and income inequality: evidence from Africa"	They used poverty rate and top 10 percent income to bottom 40 percent income group to measure poverty and income inequality. Again, their measure for financial inclusion failed to capture financial market inclusivity. However, objective three employed human development index to measure economic wellbeing. Also, the measure adopted by objective three to proxy financial inclusion considered financial market inclusivity.
Atta-Ankomah and Okyere (2022)	"Welfare effects of financial inclusion services in Ghana: A comparative analysis of mobile money and other financial services."	It uses the remaining studies related to financial inclusion and economic wellbeing are cross-sectional. They considered a single country and not the whole of SSA. Objective three carried out panel studies in SSA.
Abiona and Koppensteiner (2022)	"Financial inclusion, shocks, and poverty evidence from the expansion of mobile money in Tanzania."	
Ebele, Uche and Joan (2022)	"Impact of financial inclusion on household welfare in Nigeria."	
Mulbah, Olumeh, Mantey and Ipara (2022)	"Impact of fnancial inclusion on household welfare in Liberia: A gendered perspective."	
Aidoo, Matthew, Saleh, and Bizoza	"Financial Inclusion and Household Welfare in	

(2022)	Burundi: What are the Gender Dynamics?"	
Ondoa, Bella and Bindop (2022)	"Mobile money, family assistance and welfare in Cameroon."	
Manja and Badjie (2022)	"The welfare effects of formal and informal financial access in the Gambia: A comparative Assessment."	

3.2.3.2 Inclusive finance and economic wellbeing: the complementary role of economic freedom.

In Table 3c below, empirical review justifies introducing economic freedom in the inclusive finance-economic wellbeing nexus. This is because economic freedom would not only influence economic wellbeing directly, but it would also boost the influence of inclusive finance on economic wellbeing, resulting in enhanced economic wellbeing.

Table 3c

A summary of empirical justification for introducing economic freedom for paper three

Authors	**Findings**	**Empirical justification for introducing economic freedom**
Economic freedom and economic wellbeing		
Atta-Ankomah and Okyere (2022)	Their result proved that economic freedom affects human development in the long run.	Thus, economic freedom is a necessary factor in boosting economic wellbeing.
Aydan, Bayin Donar and Arikan (2022)	They indicated that economic freedom optimized life.	
Graafland (2020)	He affirmed economic freedom has an impact on human development.	
Akinlo, and Okunlola (2022)	They found that economic freedom affects quality of life.	
Doran and Stratmann (2021)	They indicated that economic freedoms lower poverty rates.	
Bayar and Sezgin (2017)	They discovered that trade openness influences poverty and inequality negatively in the long term.	
Adegboyo, Efuntade, Olugbamiye and	Their result reveals that trade openness affects poverty in	

Efuntade (2021)	Nigeria.	
Aini, Purba, and Meilliana (2018)	Their finding revealed a negative and significant influence of globalization on welfare.	
Kelbore (2015)	Their findings show that trade openness initially worsens poverty by 1.3%, but after a period lag, it decreases by approximately 1.2%.	
Ullah, Zhang, Rehman and Zeeshan (2022)	Their finding suggested that trade liberalization increases industrial production, which results in poverty reduction.	
Shakil and Imran (2022)	They indicated that improving trade openness, in particular, is critical to reducing poverty in Pakistan.	
Atrkar Roshan and Hashemi (2016)	They found that trade openness eventually affects poverty.	
Chishti, Rehman and Murshed (2021)	They concluded that trade openness is equally effective in mitigating poverty.	
Maku, Ogede, Adelowokan and Oshinowo (2021)	Their result shows trade openness had a declining effect on inequality and poverty.	
Adha, Nahar and Azizurrohman (2018)	Their study confirmed that liberalization negatively affects poverty.	
Economic freedom and financial inclusion		
Hussain, Yahya and Waqas (2021)	Their estimation results show that economic freedom has a beneficial impact on financial inclusion.	Hence, economic freedom could increase financial access and affordability in SSA.
Asuming, Osei-Agyei, and Mohammed (2019)	They indicated business freedom are important to financial inclusion.	

3.3 Gaps in literature

In this phase discusses on empirical relevant of the study is made.

Paper one is the first to assess the influence of a novel financial development index that comprises financial efficiency, depth, concentration and stability on financial inclusion in SSA. Previous studies like Evan (2015), Kamalu et al. (2021) and Holphe (2018) provided evidence of one or two measures of only financial depth on inclusive finance. Also, no study has moderated financial development-financial inclusion nexus with regulation; hence, paper

one investigates it. Again, no study has employed regulation measures from Fraser Institute when examining the link between regulation and inclusive finance; hence, employing these measures is unique. The study further computed the threshold level that policymakers should consider when employing regulation to strengthen the impact of financial development on inclusive finance in SSA.

For paper two, SSA is deficient in the link between economic freedom and inclusive finance, implying that another pertinent gap in SSA's literature is filled. More so, a unique financial inclusion index was employed. The inclusive finance index computed by earlier studies ignored the financial market; paper one included the financial market of SSA in the financial inclusion index. There is a paucity of empirical work on the relationship between economic freedom and inclusive finance moderated by innovative facilities; this gap is being filled. Additionally, this study would be the first to compute the threshold levels required for innovative facilities to have a desirable impact on freedom-enhanced inclusive finance in SSA.

Paper three was conducted because there is a dearth of empirics that have moderated the nexus between inclusive finance and economic wellbeing with economic freedom. Previous works (like Ofori-Abebrese et al., 2020) examined inclusive finance- economic wellbeing nexus in isolation. Moreso, it computed an inclusive finance index. Earlier studies ignored the financial market; paper three included the financial market of SSA in the financial inclusion index.

3.4 Chapter Summary

The third chapter provided information on the theories that support each of the papers considered in this thesis. From the theoretical review, it was acknowledged that theories support the role of regulation in the association between financial development and inclusive finance, the complementary role of innovative facilities on the effect of economic freedom on inclusive finance and the relevance of economic freedom in inclusive finance-economic wellbeing nexus. It also provided empirical information on each of the paper considered in this thesis. Existing studies suggests that regulation could moderate financial development and financial inclusion, innovative facilities could enhance the link between economic freedom and inclusive finance, and economic freedom could boost the effect of inclusive finance on economic wellbeing.

CHAPTER FOUR
METHODOLOGY

4.0 Introduction

Chapter five gives a step-by-step presentation of how the three papers in this thesis would be achieved. This consists of the research philosophy, approach, design and data analysis employed.

4.1 Research Philosophy and Paradigm

Research philosophy, according to Žukauskas, Vveinhardt, and Andriukaitien (2018), is the evolution of research presumptions, knowledge, and nature. He went on to say that, while the assumption is viewed as a preliminary statement of reasoning, it is based on the knowledge and insights gained by philosophers through intellectual endeavor. This implies that many researchers may hold various presumptions regarding the nature of truth and knowledge and how they are acquired. In the context of research, scientific research philosophy is a technique that enables scientists to transform concepts into knowledge (Vveinhardt, 2018). The positivist and interpretivist research philosophies are the most prominent ones discussed in literature (Al-Ababneh, 2020; Adom, Yeboah & Ankrah, 2016). According to the interpretive research philosophy, it is difficult to understand social reality using its precepts (Ukauskas et al., 2018). The interpretive research theory states that there are various methods to interpret the social world (Rahi, 2017), this implies that understanding interpersonal relationships are of vital importance when research is guided by interpretivist principles. Thus, the notion that the researcher serves a specific purpose in perceiving social reality is the cornerstone of the interpretivism research approach (Rahi, 2017). Research philosophy interpretivism is opposed by positivism, which contends that it is possible to grasp social reality objectively (Ryan, 2018). A positivist separates himself from his personal ideals and conducts independent research as an impartial analyst. According to Edirisingha (2012) the four sets of assumptions that positivism makes are as follows:

Ontological presumptions (reality's nature): There is a single, clearly defined reality that is measurable, observable, and fixed.

Epistemological presumptions (knowledge-related): True knowledge is quantifiable and objective. Testing and extending theory are what science is all about.

Axiological presumptions (values role): Objectivity is preferable because subjectivity is by nature misleading.

Methodological presumptions (research strategies): The only acceptable approach to producing genuine knowledge is to use quantitative research methods, such as experiments, exploratory studies, quasi-experiments, and analytical models, which call for objective measurement and analysis.

From the discourse, this thesis is grounded in the positivist paradigm because it seeks objectives that are built on theories; they are objective, quantifiable, and independent of the researcher.

4.2 Research Approach

Qualitative and quantitative extreme approaches are the two main methods for reaching research goals. A qualitative research approach, according to Tenny, Brannan, Brannan, and Sharts-Hopko (2017), is a kind of inquiry that examines and offers insights into real-world issues; it collects participant experiences, perceptions, and behaviours and typically provides the hows and whys. On the other hand, quantitative approach, according to Bhandari (2020), is the process of gathering and evaluating numerical data. It often employs patterns and averages, makes predictions, tests causal linkages, and generalizes findings to larger populations based on objectivity. The quantitative technique is appropriate for this thesis because it will produce a mathematical model and guarantee objectivity in the analysis (Ahmad, Wasim, Irfan, Gogoi, Srivastava & Farheen, 2019). Also, this study is econometrics, and econometrics favours the quantitative application of statistical and mathematical models using data to develop theories and test existing hypotheses in economics. Again, a quantitative approach was employed because the findings of this thesis would be generalized to the whole of Sub-Saharan Africa.

4.3 Research Design

The research design is the overall strategy used to achieve your study's objectives in a coherent and logical manner (Akhtar, 2016). It serves as a guide for data gathering, measurement and analysis processes (Akhtar, 2016; Labaree, 2013). The four primary categories of research designs are descriptive, correlational, experimental and explanatory. The thesis elaborates on the categories of research design:

Descriptive: This describes events as they actually occur and is also referred to as statistical research (Kumar, 2008). It is used to identify and gather data about a specific event, such as a community, group, or individual (Pawar, 2020). In other words, this research genre describes social conditions, social structures, and social occurrences. The observer looked and

described what he discovered (Pawar, 2020). The questions normally answered by a descriptive research design include who, what, how, where and when. It is normally used when investigating current issues.

Correlational: A correlational research design investigates relationships between variables without the researcher controlling or manipulating any of them. A correlation reflects the strength and direction of the relationship between variables (Asenahabi, 2019). The direction of a correlation can be either positive, negative or zero (Asenahabi, 2019). Whereas positive correlation indicates that variables change in the same direction, negative correlation indicates that variables change in the opposite direction, and zero correlation indicates that the variables have no relationship (Ansari1, Rahim, Bhoje & Bhosale, 2022).

Experimental: It is a research design used to examine causal relationships in a controlled setting (Ansari1 et al., 2022). A controlled setting refers to manipulating some of the variables (independent variables are manipulated and their effect on the dependent variable is measured) (Asenahabi, 2019). Again, in a controlled setting, other factors are held constant while others are free to vary in the experiment (Ansari1 et al., 2022). Hence, when employing an experimental research design, various types of evidence have to be controlled so that the alternative hypothesis can be tested and causal relationships can be found.

Explanatory: It is also known as a causal research design and it is conducted to detect the extent and nature of cause-and-effect relationships (Asenahabi, 2019). Explanatory research can be conducted to assess the impacts of specific changes on existing norms, and various processes (Ansari1 et al., 2022). The primary drive of explanatory research is to explain why phenomena occur and to predict future occurrences (Akhtar, 2016). Explanatory studies are characterized by research hypotheses that specify the magnitude and direction of the relationships between the variables being studied (Akhtar, 2016).

`Based on the objectives that this thesis sought to achieve, it employed an explanatory research design. The objectives are to analyse the role of regulations in the relationship between financial development and financial inclusion in SSA; to examine the complementary role of innovative facilities on the effect of economic freedom on financial inclusion in SSA, and to assess the relevance of economic freedom in inclusive finance-economic wellbeing nexus in SSA. Hence, the objectives of the thesis established cause-and-effect relationships where independent and moderating variables explained the dependent

variables. Also, various hypotheses are tested in relation to the objectives. Again, the result given establishes magnitude (coefficient) and direction (positive or negative).

4.4 Econometric Approaches

4.4.1 A Panel Study

Econometric studies are classified into three types based on their data type: cross-sectional, time series, and panel. A cross-sectional study means having data from many units at one point in time. That is, collecting data over a single period without regard for the time element. An example is collecting data on financial literacy and financial inclusion from a country or group of people. A time series study, on the other hand, collects data from one unit (which could be a country or a firm) over a period of time (generally in equally spaced units such as days, weeks, months, quarters or years). An example is collecting data on many variables over a period of time for one country or one firm.

A panel study, which is the main concentration in this section, is a collection of data from many units (more than one country or firm) at various points in time. In other words, panel data consists of time-series data for each cross-sectional individual. Hence, analyzing panel data involves analyzing time series data on groups of firms, states or countries at the same time (Warsono, Utami, Kurniasari & Usman, 2014). It can be concluded that a panel study combines the qualities of cross-sectional and time-series studies. An example of a panel study is this thesis, which gathered data from many units (30 countries) over a period (from 2008 to 2020). A panel study is modelled as follows:

$$y_{it} = \alpha_{it} + \beta\, \delta_{it} + \varepsilon_{it}$$

In the above equation, y is the dependent variable, α is the constant, β is the variable's coefficient, δ is the variables employed, i is the cross-section number, t is the time series number, and e is the error term.

According to Matekenya et al. (2021), Baltagi (2005) and Hsiao (2003), statistical issues such as heteroscedasticity and multicollinearity are minimized by employing panel data. Moreso, since time-series observations are limited in this thesis, the panel analysis is more suitable because it allows for a higher degree of freedom and, thus, estimation is enhanced (Matekenya et al., 2021).

4.5 Measures to Address Data Limitations or Potential Biases

According to Law and Azman-Saini (2012) and Nutassey, Nomlala, and Sibanda (2023), all types of institutions are persistent and provide endogeneity issues that could skew the outcomes of empirical studies. Institutional variables such as regulations and economic freedom are the study's focus, which could bias the findings. Hence, an instrumental variable estimator was employed to control for endogeneity bias (Anderson & Hsiao, 1981). Anderson et al. (1981) indicated that variable instrumental techniques remove fixed effects and instrument the lagged of the regression to address endogeneity issues. Moreso, since data was collected from 30 different countries in SSA, the differences in conditions in the various countries could affect the study results. Hence, this study employed the generalized method of moments model by Arellano and Bond (1991) to mitigate country-specific effects.

4.6 Sampled Countries in Sub-Saharan Africa

To represent SSA, this thesis is intended to employ all 52 countries in SSA. However, the data for the variables employed for this study was available in some countries, while others were omitted. After the data mining and editing, 30 of the 52 SSA economies had enough data. Thus, this thesis employed 30 countries to represent the SSA. Below are the countries employed:

Table 4

SSA countries employed

Angola	Guinea	Rwanda
Botswana	Guinea-Bissau	Sierra Leone
Burundi	Kenya	Seychelles
Cameroon	Lesotho	South Africa
Chad	Malawi	South Sudan
Congo Democratic Republic	Mauritania	Tanzania
Eswatini	Mauritius	Togo
Gabon	Madagascar	Uganda
The Gambia	Namibia	Zambia

Ghana	Nigeria	Zimbabwe

4.7 Ethical Considerations

Ethics were upheld in this thesis. First, an application for ethical clearance was submitted to the ethics committee of University of KwaZulu-Natal through the Information Gate System on September 12, 2022, with application number 00019124 (see Appendix one**)**. This thesis was exempted from ethical review based on its nature (secondary data were used). Also, this thesis appropriately references all information taken from other studies and websites using American Psychological Association in-text and, subsequently, reference lists. Finally, all results were reported based on the findings without altering them.

4.8 Data Collection Tool and Tool for Analysis

With access to the internet, the study employed a laptop to collect all the data used to achieve this study's objectives. All the analyses in this study were made using STATA.

4.9 Chapter Summary

In chapter five, the thesis indicated that the study was based on a positivist philosophy, took a quantitative approach and used an explanatory design. Also, the study specified that this thesis is a panel study and that 30 out of 52 countries in SSA were employed.

CHAPTER FIVE
THE ROLE OF REGULATION IN THE RELATIONSHIP BETWEEN FINANCIAL DEVELOPMENT AND INCLUSIVE FINANCE IN SUB- SAHARAN AFRICA

Chapter five presents paper one.

5.0 Introduction

Inclusive finance is envisioned as being extremely important across every economy because it is considered a catalyst for accomplishing eight of the seventeen Sustainable Development Goals (SDG) (Ofori-Abebrese, Baidoo and Essiam, 2020). These eight objectives are no poverty, good health, no hunger, decent jobs, gender equality, economic growth, industry and innovation. Yet, the World Bank (2021) indicated that the economies in the Sub-Saharan African (SSA) region have been touted as possessing persistently low levels of access to financial services. This is confirmed statistically by Financial Access Survey (2019) statistics show that the average number of automatic teller machines per 100000 adults in SSA is less than 6. Concerning bank branches per 1000 kilometers squared, statistics show that SSA has about one bank branch every 1000 kilometers squared. Also, barely 24% of adults hold a formal financial institution account. From the discourse, even though enhancing financial inclusion is crucial to accomplishing Sustainable Development Goals (Sen & Laha, 2021; Ofori-Abebrese et al., 2020), financial inclusion in SSA is inadequate, which might hinder achieving Sustainable Development Goals. Hence, the need to investigate how to improve financial inclusion in SSA.

Financial development seeking inclusive finance cannot be underestimated (Kamalu & Ibrahim, 2021). This is because financial markets and financial institutions are the main agents that can make financial services easy and accessible to households, communities, and businesses. By offering credit at a lower cost, giving favourable interest on investment and savings, as well as making automated teller machines, mobile banking and internet banking services available, the financial sector can boost financial inclusion in SSA (Chatterjee, 2020). Financial intermediary theory advocates that the presence of information asymmetries and high transaction costs in the financial sector can impede financial inclusion by making financial services unattractive to citizens (Demir, Pesqué-Cela, Altunbas and Murinde, 2022). Moreover, Morgan and Pontines (2018) argued that the high cost of borrowing negatively impacts financial inclusion. However, the financial sector in SSA is still underdeveloped (Aluko & Ajayi, 2018). For instance, according to World Development Indicated (2022), domestic credit to the private sector as a percentage of GDP reduced repeatedly from 43.99

percent in 2017 to 37.92 percent in 2020. Thus, the underdeveloped financial sector might be a major reason for low inclusive finance in the region. According to Soumaré, Kanga, Tyson and Raga (2021), an underdeveloped financial system leads to credit restrictions for individuals and businesses as well as low investment rates. Thus, the financial development of an economy plays a vital role in inclusive finance.

Also, following law and finance theory by Porta, Lopez-de-Silanes, Shleifer, and Vishny (1998), which highlights that vibrant law in an economy enables the financial sector to operate efficiently, the financial sector may not include more individuals in the financial system when there is a poor regulatory system in an economy. According to Aymar and Fabrice-Gilles (2021), regulation and supervision eliminate market failures and lead to greater financial sector efficiency. Thus, an enabling regulatory environment is essential to ensure an inclusive financial system that supports the development of various financial service providers and new delivery channels to meet all residents' financial needs. According to Sohn, Lee and Kim (2020), poor regulations harm financial development by instilling distrust in the financial sector and discouraging people from using financial services more frequently, resulting in lower financial inclusion. Unfortunately, the regulation systems in SSA have been branded weak and not reliable (Bluhm, Crombrugghe & Szirmai, 2020; African Union, 2020). Thus, building a strong regulatory system might be a needed strategy for the financial sector to have the desired impact on SSA's inclusive finance. Hence, this study analyzes the role of regulations in the relationship between financial development and inclusive finance in SSA.

Prior studies by Evans (2015) considered the impact of money supply and credit to private sector on inclusive finance. Kamalu et al. (2021) also assessed the influence of total assets of Islamic banks as a percentage of GDP on inclusive finance. In addition, Hlophe (2018) investigated the impact of credit to the private sector on inclusive finance. However, a paper by the International Monetary Fund indicated that financial development has a complex, multidimensional nature and therefore cannot be measured by one or two indicators (Svirydzenka, 2016), which is the case for the three studies that considered the financial development-inclusive financial system nexus. This work contends that representing financial development in a study with only money supply and credit to the private sector or with only total assets is woefully inadequate. Also, the three measures of financial development (credit to private sector, money supply and total assets to gross domestic products) used by the three studies are one-sided as they all measure only financial depth, ignoring efficiency, stability

and concentration in the financial system (Global Financial Development Database, 2022; Svirydzenka, 2016). Thus, this study takes a noticeably different perspective from Evans' (2015), Kamalu et al.'s (2021) and Hlophe's (2018) studies by constructing a financial development index that summarizes how improved financial institutions and markets are in terms of depth, stability, efficiency and concentration. Hence, this study considers a more comprehensive and representative measure of financial development.

The study would further contribute to literature by moderating the relationship between financial development and inclusive finance in SSA with regulation. Following the literature, the study first assessed the direct relationship between regulation and inclusive finance before examining the role of regulation in the relationship between financial development and inclusive finance in SSA. Even though prior studies have examined the direct relationship between regulation and inclusive finance, they either employed bank regulation measures or general regulation measures from Worldwide Governance Indicators (Besong et al., 2022; Anarfo et al., 2020; Nguyen, 2021; Chen et al., 2019); thus, by employing regulation measures from Fraser Institute in this study, unique measures for regulation are explored in examining the direct link between regulation and financial inclusion. Again, unlike earlier studies, this study computed the threshold level that policymaker should consider when employing regulation to strengthen the impact of financial development on inclusive finance in SSA. Again, the study computed the threshold level that policymaker should consider when employing regulation to strengthen the impact of financial development on inclusive finance in SSA.

5.1 Development Hypothesis Based on Literature Review

The foundation of contemporary financial intermediation theory is that intermediation lowers transaction costs and asymmetries in the financial information of a country. Thus, financial intermediaries, in theory, help to lower transaction costs and increase the ability to obtain accurate information on time in an economy. Residents of an economy avoid using financial services when information asymmetry and cost of transactions are high (Demir et al., 2022). Thus, financial intermediary theory suggests that the presence of information asymmetries and high transaction costs in the financial sector may hinder financial inclusion. Thus, financial intermediary theory suggests that information asymmetries and high transaction costs in the financial sector may hinder financial inclusion. Thus, the modern financial intermediary theory is essential to this study because it acknowledges that the financial sector's activities might impede financial inclusion. This admonishes that financial

development is the cornerstone of inclusive finance since the financial sector is the primary driver of financial services' accessibility and affordability.

Also, as per Arthur Cecil Pigou's 1938 public-interest theory of regulation, regulation is provided in response to the public's need to reduce economic inefficiencies. So, according to the public-interest theory of regulation, laws should protect and benefit the entire public (where the general public includes both residents and firms). According to Harnay and Scialom (2016), the public-interest theory of regulation is upheld when government rules enhance markets, make up for weak competition, and minimize unfavourable market outcomes, which in general meet public needs. Financial inclusion in an economy is an important public interest due to its numerous benefits to individuals and the economy (Ozili, 2020). However, citizens expect the laws of their country to protect their financial dealings and agreements with financial firms (Chen & Divanbeigi, 2019). In other words, people want their money, investments, and credit agreements with financial institutions and markets in their country to be safeguarded so that they do not become victims of financial institutions. Issues including investment fraud, rapid financial institution failure, information asymmetry, and adverse selection are rare in an economy with active regulation (Haini, 2020). Thus, improving financial inclusion would be guaranteed in an economy where a dependable legal system is put in place.

The relevance of law to the advancement of the financial sector is highlighted by law and finance theory (La Porta, Lopez-deSilanes, Shleifer, & Vishny, 1997, 1998). And this argument is guided by the reality that the financial sector responds to the law more effectively in an economy where rules are well-organized, fair, and enforced. Thus, the role of conducive regulations in the developing financial sector of an economy is emphasized. Huang (2010a) stated that the supply side of financial development is seriously influenced by law. This presages that for an economy to achieve a stronger financial sector, the nature of the law in the economy must be considered. Thus, law and financial theory agree that the presence of a vibrant legal system could enable the financial sector to enhance financial inclusion better.

5.1.1 Financial development and inclusive finance

Kamalu et al. (2021) employed causality tests and generalized method of moment to examine the association between Islamic banking development and inclusive for 30 economies of the Organization of Islamic Cooperation. In their study, they employed total assets of Islamic

banks as a percentage of gross domestic product to measure financial development and revealed that Islamic banking improves financial inclusion. Also, Hlophe (2018) undertook a causal assessment of financial development and inclusive finance in Eswatini employing Engle and Granger's (1987) cointegration analysis, which examines whether financial development causes increased financial inclusion. His study confirmed that financial development causes financial inclusion by proxying financial development with domestic credit to the private sector as a percentage of GDP. Again, Evans (2015) assessed the connection between financial development and inclusive finance, where money supply and credit to private sector were the measures of financial development. Using a fully modified ordinary least square, Evan (2015) established that financial development improves inclusive finance in Africa. Hence, the study hypothesis that:

H_1: there is a significant positive effect of financial development on inclusive finance in SSA.

5.1.2 Regulation and inclusive finance

Understandably, improving regulation in an economy encourages residents to patronize financial services. This is because regulation reduces information asymmetry, enforces contracts and reduces transaction costs, which results in the protection of residents from adverse selection (Aluko et al., 2018) which can inspire individuals to access financial services. Empirically:

Yakubi, Basuki, Purwono and Usman (2022) tested business regulations on inclusive finance in low-income nations. Using secondary data and the PLS-SEM method they explained that business regulations drive financial inclusion. Again, Gichuru and Namada (2022) establish the influence of regulatory requirements on financial inclusion in Fintech companies. Using the Pearson correlation coefficient and multiple regression, they found that regulation has a significant influence on inclusive finance. Furthermore, Nguyen and Ha (2021) investigate the linkages between Asean's institutional quality and inclusive finance. They employed 6 governance measures from the World Governance Index and employed generalized moments method and stipulated, among others, that legal and judicial effectiveness are required for an inclusive financial system. In addition, Eldomiaty, Hammam and El Bakry (2020) indicated that financial inclusion in a feeble regulatory atmosphere creates great risk in terms of unnecessary borrowing and poor consumer protection and therefore leads to financial exclusion. Similarly, Chen and Divanbeigi (2019) assessed the association between regulatory quality and inclusive finance outcomes and found that in countries where

regulatory quality is heightened, people are more likely to have a financial account. Likewise, Kodongo's (2018) studies argued that agency banking regulations improve formal financial access. Barua, Kathuria and Malik (2016) stated that regulatory changes are necessary to make the new architecture for financial inclusion viable.

Nonetheless, Anarfo and Abor (2020)study examined the impact of financial regulation on inclusive finance in SSA. By analysing the relationship between inclusive finance and macro-prudential regulations, the study found that tightening prudential regulations could conflict with SSA economies' inclusive finance goals. Agreeable, Raksmey, Lin and Kakinaka (2022) findings advocate that regulation adversely affects access to the credit market in emerging countries but improves people's access to banking services in developed countries.

From the review, regulation could influence financial access negatively or positively. However, since most of the review studies portray regulation as a necessary tool for reducing financial exclusion. This study hypothesizes that:

H_2: *there is a significant positive effect of regulations on inclusive finance in SSA.*

5.1.3 Financial development and inclusive finance: the role of regulations

According to African Development Report (2020), the regulatory and legal environment is critical for the success of every business (financial institutions and markets) in any country. Thus, financial institutions and markets can flourish in a sound legal and regulatory environment characterized by transparency and strong enforcement institutions and mechanisms. An economy with a reliable legal and regulatory environment reduces transaction costs and non-commercial risks, helps to create fair competition, ensures efficiency and enables stability in the financial sector (Qian, 2017). Various studies have supported this argument:

Bousnina and Gabsi (2022) investigated the association between current accounts, financial development, and institutional quality and discovered that the financial sector must be within a sound legal atmosphere for people to benefit from financial systems. Also, Abaidoo and Agyapong (2022) explain that improvements in the elements of institutional quality, such as the rule of law and regulatory values enhance the efficiency of financial institutions among economies in SSA. Again, Ikpesu, Akinola and Ikpesu (2022), employing a panel-estimated generalized least square approach, confirm that rule of law and regulations affect banking sector development positively. Moreso, Atanga Ondoa and Seabrook (2022) assessed the effect of regulations on financial development using the dynamic common correlated mean

group technique and affirmed that implementing sound regulation quality enables financial sector development. In a similar vein, Savari, Rostami, Fallah Shams and Jamali (2022) indicated that among the factors that affect stock market returns, rule of law and regulatory excellence cannot be underrated. The result was achieved using generalized system method of moments. Consistently, Atellu, Muriu, and Sule (2021) suggest that prudential regulations are important drivers of financial stability. Similarly, Aluko and Ibrahim (2021) commissioned the augmented mean group estimator and specified that market regulations induce financial sector development in ECOWAS economies. Likewise, Feng and Yu (2021) indicated that improvements in regulatory quality and the rule of law reduce transaction costs and make the financial operating environment fairer and more efficient. Agreeably, Sarhangi, Mohaghegh Niya and Amiri (2021) analysed the effect of quality regulations on financial development. Their finding confirmed a significant positive impact of the rule of law and quality of regulation on financial development using smooth transition autoregressive. Again, Azmeh (2018) discloses that financial sector improvement in an economy is more intense when sound regulation is upheld, after employing several dynamic techniques on the influence of regulation on the financial sector of the Middle East and North Africa. Additionally, Muye and Muye (2017) concluded that regulation is a needed factor to boost the financial sector in the BRICS and MINT. Moreover, Xiao, Tian and Yuan (2018) also indicated that regulation is a needed strategy for every economy that wants to improve its financial system.

According to Mwega (2016), since the global financial crisis, most economies have strengthened regulations in order to strengthen stability in the financial sector. Correspondingly, Klomp and De Haan (2015), examining data from 1238 banks located in both developing and emerging countries, stipulated that regulation and supervision reduce banking risk. In addition, Marcelin and Mathur (2014) approved the relevance of law in financial enhancement by indicating that common law legal heritage is more suitable than French civil law when financial development wants to be sustained. Furthermore, using the generalized method of moment, Hoshmand, Hosseini and Rajabzadeh Moghani (2013) recommend regulation quality as a conditional factor for enhancing financial development. Congruously, Huang's (2010) studies examined the relevance of political institutions in financial development and agreed with most studies that improved regulations can promote financial development in the world. In line with the above, Rathinam and Raja (2010) constructed a new index of procedural law, institutions and regulation and engaged the

multivariate VAR framework, Granger causality tests, and policy simulations to ascertain the determinants of the financial sector. Their findings show that legal and institutional developments and financial deregulation cause the financial sector to grow. Kombo and Koumou (2021) discovered that the level of financial development in the CEMAC is generally lower due to poor regulation and political stability.

Corolla to the discourse on the role of regulation on financial development, empirically, there is a high level of interconnectedness between regulation and financial development in an economy. Hence, the nature of regulation in an economy has a lasting imprint on the efficient operation of its financial sector. Specifically, vibrant regulation has very strong imperatives for monitoring the financial sector and making sure financial institutions and markets within the region are liquid, adequately capitalized, and run in a manner that protects customers while improving the overall health and development of the sector. New institutions theory advocates that regulations shape the operations of firms such as financial institutions and markets in an economy (Meyer & Rowan, 1970). Therefore, the nature of regulation in an economy has a lasting bearing on the efficient operation of its financial sector which in turn reflect in the financial inclusion of the residents. In support systems theory of financial inclusion by Ozili (2020) states that the nature of sub-systems such as financial and legal systems in an economy would determine the level of inclusive finance of that economy. Overall, improved regulation is necessary to propagate the effect of the financial sector on inclusive finance in SSA. The argument here is that, although financial inclusion may depend on financial development, financial inclusion would heighten better with the presence of a sound legal system in economies. Thus, the study hypothesizes that:

H_3: Ceteris paribus, the presence of sound regulations enhances the relationship between financial development and inclusive finance in SSA.

5.2 Methodology

This section discusses the data and variables, as well as the estimation technique and model specification.

5.2.1 Data and variables

Annual panel data from 30 countries for the period of 2008 to 2020 was employed in this study. The period of the study was guided by the data available for the variables in this study. Table 1 gives details of the variables that were employed in this study and how they will be measured.

Table 1 of paper 1

Variables

Variables	Meaning and Measurement	Source	Literature justification and sign
Regressand			
Inclusive Finance index	It is making financial services and products affordable and accessible to all in an economy. It was computed from the number of deposit accounts with commercial banks per 1000 adults, the number of loan accounts with commercial banks per 1,000 adults, the number of commercial bank branches per 100000 adults, the number of commercial bank branches per 1000 km2, the number of ATMs per 1000 km2, the number of ATMs per 100000 adults and financial market access index using Principal Component Analysis (PCA).	International Monetary Funds	Kouladoum, Wirajing and Nchofoung (2022)
Regressor Financial development	It is conceptualized as the depth, efficiency, stability and concentration of the financial sector in an economy. It was computed from financial depth (financial market depth index and financial institutions depth index), financial efficiency (financial market efficiency index and financial institutions efficiency index), financial stability (bank Z-score, bank credit to bank deposits %, liquid assets to deposits and short-term funding %) and financial concentration (Bank concentration % and 5-bank asset concentration) using Principal Component Analysis (PCA).	International Monetary Funds and Global Financial Development	Evan (2015) Positive (+)
Moderating Regulation	It reflects the degree to which rules and legal systems in an economy are reliable. ***Main Estimation Measure*** Regulation index was created from regulation and legal system and property rights using simple average.	Fraser Institute	Abaidoo et al. (2022) Positive (+)

	Robustness Check Measure Regulation index was computed from regulatory quality and rule of law using simple average	Worldwide Governance Indicators	
Covariates Education	It reflects the proportion of the population that has received formal education in an economy. Secondary school enrollment (% gross)	World Development Indicators	Mutandwa and Le Roux (2018) Positive (+)
Unemployment	It is explained as the share of the labour force that are not working but are ready and looking for employment. Unemployment, total (% of the labour force)	World Development Indicators	Tinta, Ouédraogo and Al-Hassan (2022) Negative (+)
Gross domestic product per capita	It is the gross domestic product divided by the midyear population. Gross domestic credit per capita	World Development Indicators	Zeqiraj, Sohag and Hammoudeh (2022) Positive (+)
Population	Total number of people in an economy. Population, total	World Development Indicators	Yadav and Sharma (2016) Negative (+)

5.2.2 Estimation Procedure

Dynamic Generalized Method of Moments (DGMM) would be employed to execute this study. The dynamic estimation technique would circumvent a number of issues inherent in our model specification and data structure. First, the regressand (financial inclusion) employed in the study can be persistent. This is because current levels of financial inclusion can predict their future. Second, the DGMM is a dynamic specification control for country-specific effects that vary across countries but remain constant over time. Further, Law and Azman-Saini (2012) argue that all forms of institutions are persistent and pose endogeneity problems that may bias the empirical results. Some of the variables (regulations) employed in the study pertain to institutions (Fraiser Institute, 2022; World Development Indicators, 2022). In this regard, the generalized method of moments is efficient in solving the endogeneity concerns that arise from the use of the institution variables (see Arellano & Bond, 1991). Furthermore, the DGMM is more efficient when the cross-sections are larger than the time coverage (N > T). The number of countries considered in the study is 30, which is more than the 13-year period (2008-2020). Accordingly, this study employs the two-step DGMM estimators (Blundell & Bond, 1998) with robust standard errors. This is more efficient compared to the standard generalized method of moments (Baltagi, 2005).

However, the consistency of the DGMM depends on the instrument's validity and the absence of autocorrelation. In this case, two-specimen tests are employed to examine the reliability of the estimates: the Hansen test of over-identification restrictions and Arellano and Bond test for second-order serial correlation (AR2) are used to test the null hypothesis that the instruments are valid, and the latter also tests the null hypothesis of no autocorrelation in error. Following Asongu and Acha-Anyi (2019) and Tchamyou, Asongu and Odhiambo (2019), further discussion of GMM is made on identification and exclusion restrictions. Identification refers to the choice of the dependent, endogenous explaining, or strictly exogenous variable. While exclusion restriction is the method by which the dependent variable is influenced by the strictly exogenous variables exclusively through the endogenous explaining variables. All explanatory indicators under exclusive restrictions are characterized as either endogenous or predefined in terms of the exclusion requirements, and only time-invariant variables are thought to be strictly exogenous. It should be noted that in this study, consistent with the identification process, the time-invariant variables should affect the dependent variable exclusively through the suspected endogenous explaining (or predetermined or suspected endogenous) variables. Furthermore, the underlying exclusion restriction assumption is binding when the null hypothesis corresponding to the Difference in Hansen Test (DHT) for instrument exogeneity is not rejected. Therefore, the instruments need to influence inclusive finance exclusively through suspected endogenous variables. Finally, Fisher test should be significant to indicate the overall validity of the models.

5.2.3 Model development

Following the two-step DGMM estimator with moderation in Kouladoum et al. (2022), the study specifies the models:

$$INCF_{it} = \alpha_{it} + \delta INCF_{it-1} + B_1 FD_{it} + B_2 REG_{it} + B_3(FD_{it} \times REG_{it}) + B_4 COV_{it} + u_i + \varepsilon_{it} \quad (1)$$

Where INCF is inclusive finance, $INCF_{it-1}$ is the first lag of inclusive finance, FD is financial development, REG is regulations, FD*REG is the interaction between financial development and regulation, and Convari is the covariates (unemployment, education, population growth and economic growth), i is country (i = 30), t is period from (t = 1 to 13), and is the error term presumed to be serially uncorrelated.

5.3 Discussion of Empirical Results

This section presents the study's empirical results and discusses the findings accordingly. It begins with the summary statistics, then the correlation results and ends with the regression.

5.3.1 Summary statistics

In Table 2, summary statistics of the data employed were presented to provide pertinent information about the nature of the variable employed in SSA.

Table 2 of paper 1

Variables' statistics described

Variable	Observation	Mean	Standard Deviation	Minimum	Maximum
NCBB100000	378	7.120447	9.271501	.4726674	55.07052
NCBB1000	378	8.386532	22.25739	.004656	111.8227
NDAwCB	378	420.1053	491.7646	.0417441	2946.407
NLAwCB	365	113.4195	153.5612	.213429	642.8558
ATM100000	378	14.43806	42.31035	.0127065	228.5714
ATM1000	378	14.66726	19.39577	.0679605	89.99328
FMA	365	0.0945929	0.1889007	0	0.9154567
FID	339	0.1602954	0.2153917	0.0056185	0.8781426
FMD	352	0.0860133	0.1454131	0	0.7890149
FIE	352	0.5011421	0.111109	0	0.7787408
FME	352	0.0468197	0.1675532	0	0.9921474
BZS	378	14.58466	5.980007	1.643001	27.94649
BCBD	378	69.70007	25.31553	4.557696	130.9451
LADLSF	378	52.25758	31.3422	-16.67457	108.2813
BC	378	72.64698	20.09263	29.10951	104.251
5BAC	378	87.10433	15.12716	44.33098	103.2975
REG	335	6.670887	1.023877	4.073408	8.615148
LSPR	339	4.447795	1.244149	2.123833	6.935325
CoREG (REG+LSPR)	335	5.561848	0.9915758	3.323512	7.565168
RoL	372	-0.6017346	.6552205	-2.00266	1.023956
RQ	372	-0.5577064	.6081141	-2.080982	1.196947
CoREG (RoL+RQ)	372	0.7021617	0.8232082	-0.0671215	3.980458
UNEMPL	365	8.927348	7.870426	0.6	29.22
EDU	233	50.03917	23.01298	9.68862	109.4441
GDPC	373	2750.601	3354.931	198.3529	17252.02
POP	378	23500000	35200000	86956	208000000

Note. NCBB100000 - Number of Commercial Bank Branches per 100,000 adults, NCBB1000 - Number of Commercial Bank Branches per 1,000 km2, NDAwCB - Number of Deposit Accounts with Commercial Banks per 1,000 adults, NLAwCB - Number of Loan Accounts with Commercial Banks per 1,000 adults, ATM100000 - number of ATMs per 100,000 adults, ATM1000 - Number of ATMs per 1,000 km2, FMAI -Financial Market Access, FID- Financial Institutions Depth, FMD- Financial Market Depth, FIE- Financial Institutions Efficiency, FME- Financial Market Efficiency, BZS- Bank Z-score, BCBD- Bank Credit to Bank Deposits, LADSTF- Liquid Assets to Deposits and Short Term Funding, BC- Bank Concentration, 5BAC- 5- Bank Asset Concentration, REG - Regulation, LSPR- Legal System and Property Rights, RoL – Rule of Law, RQ -Regulatory Quality, CoREG – Composite of Regulation UNEMPL - Unemployment , EDU – Education, GDP -Gross Domestic Product per Capita and POP – Population.

Source: Author's computation

In assessing the performance of inclusive finance in SSA, all measures employed to create the inclusive finance index were employed (*see* the first seven variables in Table 2). The average value of the number of commercial banks per 100,000 adults is 7.120sss, indicating that out of every 100,000 people in SSA, only 7.120 have access to commercial banks. In support, 8.387 mean for the number of commercial banks per 1,000 km2 was recorded. Thus, access to commercial banks in SSA is low. Again, 420.105 average score was recorded for the number of deposit accounts with commercial banks per 1,000 adults, this suggests that the number of deposit accounts in SSA is below average. Also, a poor average score of 113.420 was documented for the number of loan accounts with commercial banks. Moreso, a mean of 14.438 was revealed for the number of ATMs per 100,000, implying that out of every 100,000 people in SSA, only 14.438 have access to ATMs. This is very poor. It was reaffirmed by another poor average score of 14.667 for the number of ATMs per 1,000 km2. When it comes to financial market access, again a low access of 0.094 was recorded. From the discussion of the performance of variables employed to assess the performance of inclusive finance in SSA, inclusive finance in SSA is indeed low as professed by earlier studies such as Chikalipah (2017) and Asuming, Osei-Agyei and Mohammed (2019).

Likewise, in evaluating the performance of financial development in SSA, the raw scores of variables employed to create an index for financial development were used. Financial institution depth had an average score of 0.160, and financial market depth also had a mean of 0.086; hence, financial depth in SSA is low. Again, financial institution efficiency reveals an average performance of 0.501, while the performance of financial market efficiency remains very low with a mean of 0.046. The stability of the financial sector in SSA gives a mean of 14.585%, 69.700% and 52.258% for bank z-score, bank credit to bank deposits, liquid assets to deposits, and short-term funding. Hence, apart from the bank z-score, bank stability in SSA is above average. In addition, bank concentration recorded a mean of 72.647%, and 5-bank asset concentration documented an average score of 87.104%. Thus, bank concentration in SSA is good. Therefore, in as much as financial development in SSA is doing well in bank concentration, the other indicator mostly revealed poor performance, implying an underdeveloped financial system in SSA, and this confirms the assertion of Aluko et al. (2018). Hence, the argument of this study that low financial development might be the cause of low financial inclusion is validated by the poor average score of the two variables.

Again, the indicators for creating an index for regulation were used to assess the reliability of regulation in SSA. Regulation scored an average of 6.671, while the legal system and property rights scored a mean of 4.448. In all, the composite of regulation had a mean of 5.562, indicating that on a scale of 1 to 10, where 1 is the low level of regulation and 10 is the high level of regulation, the regulation level in SSA is a little above average (Fraser Institute, 2022). This is supported by the composite index regulation created from rule of law and regulatory quality by scoring an average of 0.702 on a scale of -2.5 to 2.5, even though rule of law and regulatory quality separately indicated a poor nature (World Development Indicator, 2023).

With the covariates, unemployment had an average of 8.927, education had an average of 50.039, GDPC had an average of 2750.601 and population had an average of 23500000. Hence, the values of GDPC and population are very high and therefore outliers; hence, GDPC and population were logged to avoid spurious results.

6.3.2 Correlation analysis

This section discusses the pairwise correlation results among the variables employed in the study. This provides a preliminary indication of the association among the variables in the study and also assesses the presence of multicollinearity, which could bias the estimates.

Table 3 of paper 1

Pairwise correlations

Variables	INCF	FD	REG	LSPR	CoREG	EMPL	EDU	lnGDP	lnPOP
INCF	1.000								
FD	0.537***	1.000							
REG	0.461***	0.302***	1.000						
LSPR	0.566***	0.321***	0.520***	1.000					
CoREG	0.590***	0.367***	0.843***	0.898***	1.000				
UNEMPL	0.416***	0.410***	0.358***	0.242***	0.349***	1.000			
EDU	0.776***	0.562***	0.389***	0.513***	0.516***	0.590***	1.000		
lnGDP	0.785***	0.581***	0.407***	0.304***	0.406***	0.651***	0.714***	1.000	
lnPOP	-0.577***	-0.315***	-0.215***	-0.152***	-0.213***	-0.503***	-0.345***	-0.473***	1.000

*Note.*** pv<0.01, ** pv<0.05 and * pv<0.1. INCF – Inclusive Finance, FD - Financial Development, REG - Regulation, LSPR- Legal System and Property Rights, CoREG – Composite of Regulation, UNEMPL - Unemployment , EDU – Education, InGDP -Natural log of Gross Domestic Product per Capita and InPOP – Natural log of Population.

Source: Author's computation

From Table 3, the study records significant correlations between financial development and inclusive finance. This indicates that inclusive finance depends on financial development. Likewise, financial inclusion relies on regulation since significant correlations were recorded. Again, all the covariates have significant correlations with financial inclusion. In effect, financial development, which is employed as the regressor, regulation indicators, which were employed as moderating variables and all the covariates employed for financial inclusion are justified. No matter how high the correlation is between a variable and its regressand, multicollinearity issues cannot take place. However, high correlations among regressors, moderation and covariates can call for multicollinearity issues. Using Kennedy (2008) recommended threshold, which indicates that to avoid multicollinearity, the correlation value should not be more than 0.8. Except for a high correlation of 0.898 between the legal system and property rights and the composite measure of regulation, the correlation among regressors, moderation and covariates were below 0.8, and therefore, there was no multicollinearity issue recorded.

The high correlation between regulation and the composite measure for regulation is because regulation was one of the measures used in the computation of the composite of regulation. To avoid possible multicollinearity arising from the two variables, regulation and composite of regulation were employed in two different models (see Table 6 and 7). For example, in Table 6, regulation was used in Column 1, while the composite of regulation was used in Column 3. Multicollinearity issues would have only occurred if the two highly correlated variables were put in the same model, which this study has avoided.

6.3.3 Regression result and discussion

This part of the study discusses Table 4 and 5. In both tables, results are given in coefficients and standard errors for the variables of interest.

Table 4 of paper 1

Effect of financial development and regulation on inclusive finance

Variable	**(1)**	**(2)**	**(3)**
	INCF	**INCF**	**INCF**
L.INCF	0.9685***	1.0211***	1.0046***
	(0.0183)	(0.0226)	(0.0144)
FD	0.0307***	0.0470**	0.0464**
	(0.0084)	(0.0200)	(0.0187)
REG	0.0308**		
	(0.0144)		
LSPR		0.0400***	
		(0.0069)	
CoREG			0.0300***
			(0.0067)
	Covariates		
UNEMPL	0.0045	0.0034	-0.0021
	(-0.0047)	(0.0053)	(0.0045)
EDU	-0.0014	0.0068***	-0.0056***
	(0.0012)	(0.0017)	(0.0015)
LnGDP	-0.0258	-0.0506**	-0.0433**
	(0.0150)	(0.0167)	(0.0151)
LnPOP	0.0347	-0.0296	-0.0552**
	(0.5524)	(0.02455)	(0.0252)
_cons	0.6062	0.9670*	1.3236***
	(0.5524)	(0.4816)	(0.5121)
	Diagnostics		
AR(1)-Pv	**0.155**	**0.150**	**0.153**
AR(2)-Pv	**0.168**	**0.162**	**0.163**
Sargan OIR-Pv	**0.791**	**0.919**	**0.924**
Hansen OIR-Pv	**0.399**	**0.572**	**0.507**
DHT for instrument:			
Hansen test excluding group-Pv	**0.581**	**0.938**	**0.761**
Diff. (null H = exogenous)-Pv	**0.310**	**0.391**	**0.366**
iv(Time, eq(diff))			
Hansen test excluding group-Pv	**0.657**	**0.584**	**0.649**
Diff. (null H = exogenous)-Pv	**0.055**	**0.301**	**0.122**
Fisher test	**7589.49*** **	**17027.19*** **	**103246.43*** **
Instruments	**18**	**18**	**18**
Groups	**19**	**19**	**19**
N	**160**	**162**	**160**

*Note.*** pv<0.01, ** pv<0.05 and * pv<0.1. Also, L.INCF – lag of Inclusive Finance, INCF– Inclusive Finance, FD - Financial Development, REG - Regulation, LSPR- Legal System and Property Rights, Co REG – Composite of Regulation, UNEMPL - Unemployment, EDU – Education, InGDP - Natural log of Gross Domestic Product per Capita and InPOP – Natural log of Population, OIR - a test for Overid Restrictions, DHT represent Difference-in-Hansen test and AR- Arellano-Bond, Pv- Probability value. Again, N - the number of observations,

Source: Author's computation

Table 4 depicts the direct association between financial development and financial inclusion, as well as the direct relationship between regulation and inclusive finance. From observation,

the diagnostic requirements of GMM are all met: Hansen and Sargan tests failed to reject the assumption of the validity of instruments. Also, Difference-in-Hansen test for instrument exogeneity is accepted. Thus, the entire instruments adopted in the models are valid; again, the probability value of the AR2 test is in favour of the null hypothesis of no autocorrelation, and this means that there is an absence of autocorrelation in the regression results. Furthermore, the lag of inclusive finance is positively related to inclusive finance in all of the models in Table 6. indicating autoregressiveness and justifying GMM as an appropriate technique for this study.

In Columns 1 to 3, financial development has a significant positive impact on inclusive finance. This means, to increase financial inclusion in SSA, the financial sector should be enhanced. The intuition here is that by playing the intermediatory role, the financial sector of an SSA makes financial services accessible to households, communities, and businesses (Demir et al., 2022). This is not surprising since obviously, the financial sector of every economy is the main agent in making financial services easy and accessible to households, communities, and businesses. Chatterjee (2020) specifically contended that by offering credit at a lower cost, giving favourable interest on investment and savings, as well as making automated teller machines, mobile banking and internet banking services available, the financial sector could boost financial inclusion in SSA. This finding confirms the argument made in this paper that low financial development gives birth to low financial inclusion. Hence, this finding corroborates hypothesis 1 that there is a significant positive effect of financial development on inclusive finance in SSA. Evans (2015), Kamalu et al. (2021) and Hlophe (2018) agree that financial development leads to financial inclusion.

Column 1 shows that regulation optimized inclusive finance, implying that when governments in SSA economies implement regulations that promote the financial sector, more people will be included in the financial system. Column 2 also shows that the legal system and property rights has a positive influence on inclusive finance. Residents will use financial services if the rules governing contracts, property rights, and crime are enforced. Again, Column 3 records a positive direct association between the composite of regulation and inclusive finance. This agrees with hypothesis 2, there is a significant positive effect of regulations on inclusive finance in SSA. Since regulation is a composite of regulation and the legal system, the result insinuates that overall sound regulation in SSA economies would help get more people into the financial system. This is because regulation reduces information asymmetry, enforces contracts and reduces transaction costs, which results in the protection

of residents from adverse selection (Aluko et al., 2018). Moreover, regulations instil trust in the financial system of an economy. Thus, regulations play a double role of enhancing the financial inclusion activities of the financial sector while also encouraging residents to patronize financial services. These findings are in line with Besong et al. (2022), Yakubi et al. (2022) and Gichuru et al. (2022), who established that regulation plays a positive role in enhancing financial inclusivity.

For covariates, it was observed that education had a significant negative effect on inclusive finance. This could be possible if the education system lacks financial education. This is because the financial literacy theory of financial inclusion states that inclusive finance can be achieved through education that improves financial literacy (Ozile, 2020). In most SSA countries, the education system lacks financial education, which could be the reason for the negative link found between education and financial inclusion. Also, lnGDP had an inverse effect on inclusive finance. This finding is vindicated by the current discussion that GDP growth in SSA does not affect the income level of the people (Kapoo et al., 2019), resulting in limited income for SSA residents and preventing them from accessing financial services. However, unemployment and population had no significant relationship with inclusive finance.

Table 5 of paper 1

The role of regulations in the relationship between financial development and inclusive finance

Variable	**(1)**	**(2)**	**(3)**
	INCF	INCF	INC
L.INCF	1.0424***	1.0096***	0.9832***
	(0.0227)	(0.0493)	(0.0192)
FD (Unconditional effect)	0.0516***	0.2108***	0.3079***
	(0.1630)	(0.0450)	(0.0646)
REG	0.0013		
	(0.0191)		
LSPR		0.0095	
		(0.0242)	
CoREG			-0.0031
			(0.0129)
Interaction (Conditional effect)	-0.0809***	-0.0431***	-0.0486***
	(0.0275)	(0.0149)	(0.0130)
Net effect	-0.4881	0.0191	0.0376
Threshold	Negative	4.8910	6.3354

	synergy		
Covariates			
UNEMPL	-0.0019	0.0060	0.0011
	(0.0030)	(0.0065)	(0.0048)
EDU	-0.0016**	-0.0027***	-0.0002
	(0.0014)	(0.0025)	(0.0017)
LnGDP	-0.0166**	0.0134	-0.0133
	(0.0391)	(0.0238)	(0.0202)
LnPOP	-0.0701	-0.0559**	0.0584**
	(0.0232)	(0.0250)	(0.0233)
_cons	1.3966***	0.9434*	1.1669**
	(0.3696)	(0.5213)	(0.5020)
Diagnostics			
AR(1)-Pv	**0.144**	**0.165**	**0.155**
AR(2)-Pv	**0.204**	**0.183**	**0.182**
Sargan OIR-Pv	0.002	**0.862**	**0.908**
Hansen OIR-Pv	**0.212**	**0.498**	**0.484**
DHT for instrument:			
Hansen test excluding group-Pv	**0.923**	**0.655**	**0.761**
Difference (null H = exogenous)-Pv	**0.150**	**0.418**	**0.366**
iv(Time, eq(diff))			
Hansen test excluding group-Pv	**0.763**	**0.547**	**0.786**
Diff. (null H = exogenous)-Pv	0.008	**0.227**	**0.326**
Fisher test	**4260000*** **	**291627.25*** **	**43404.25*** **
Instruments	**18**	**18**	**18**
Groups	**19**	**19**	**19**
N	**160**	**162**	**160**

Note. *** pv<0.01, ** pv<0.05 and * pv<0.1. Also, L.INCF – lag of Inclusive Finance, INCF– Inclusive Finance, FD - Financial Development, REG - Regulation, LSPR- Legal System and Property Rights, Co REG – Composite of Regulation, UNEMPL - Unemployment, EDU – Education, InGDP - Natural log of Gross Domestic Product per Capita and InPOP – Natural log of Population, OIR - a test for Overid Restrictions, DHT represent Difference-in-Hansen test and AR- Arellano-Bond, Pv- Probability value. Again, N - the number of observations.

Source: Author's computation

To explain the role of regulation in the association between financial development and inclusive finance, the interaction of regulation and financial development is presented in Table 5. However, it was observed that the direction of the conditional effects changed to negative from the positive unconditional effect, which contradicts intuition. Hence, additionally, Table 5 presents the net effects and thresholds of the interactions of regulation and financial development on inclusive finance to avoid ambiguities in reporting the moderating effect (*see* Tchamyou, 2019; Tchamyou et al., 2019). Nonetheless, before further

discourse, it is relevant to appreciate the meaning of net effect, threshold, conditional and unconditional effects.

- Unconditional effect is the direct relationship established between the regressor and the regressand. In the study, it is the direct influence of financial development and inclusive finance.
- Conditional effect is where the influence of the regressor (financial development) on the regressand (inclusive finance) is contingent on a third variable or moderator (regulation). The interaction value given in Table 5 is the conditional effect in this study.
- Net effect is the overall effect, which is the combined influence of regressor and moderating variables on the regressand. It is mathematically determined by: (the coefficient of the conditional effect × the mean of the moderator) + (the coefficient of the unconditional effect). For instance, the net effect of Column 3 (CoREG*FD) would be 0.0376 = [(-0.0486 ×5.5618) + (0.3079)] (see Table 5 for the computed net effect for the rest of the columns).
- Threshold of an effect is the level at which the direction of the influence of a moderator on the link between regressor and regressand changes. It is also mathematically given as: (the coefficient of the unconditional effect / the coefficient of the conditional effect). However, if both the net effect and the conditional effect move in the same direction, then computation of the threshold is not necessary; it assumes that that direction is obvious. For example, in Column 1, both the net and conditional effects are negative; hence, negative synergy is obvious. However, in Column 3, the net effect is positive (0.0376) while the conditional effect is negative (-0.0486). Hence, thresholds need to be calculated. The threshold of Column 3 is 6.3354 within a range of 3.3235 to 7.5652 (see Table 2). Thresholds should always be within the range given for the moderating variable to be accepted.

Continuing with the discourse of the results, Column 1 reports a negative synergy of regulation and financial development (REG*FD) on financial inclusion. Column 2 demonstrates a positive net effect of legal system and property rights and financial development (LSPR *FD) on inclusive finance; however, at a threshold of 4.8910, it starts having an adverse effect on inclusive finance. Finally, the net influence of the overall measure of regulation and financial development (CoREG* FD) on inclusive finance was

also recorded in Column 3 as positive but changes to negative at threshold of 6.3354. This implies general introducing regulation in SSA start by causing financial development to improve inclusive finance but as it increases over a coverage of 6.3354, it turns to hinder the financial sector from improving inclusive finance in the region. Consequently, regulation-induced financial sector-enhanced inclusive finance in SSA could be good at certain points and a barrier at other points. Hence, the finding partially support hypothesis three, which indicates that the presence of sound regulations improves the relationship between financial development and inclusive finance in SSA.

In as much as certain studies' findings indicate that regulation boosts the efficient operations of financial sector services (*see* Bousnina et al., 2022; Abaidoo et al., 2022; Ikpesu et al., 2022) which is in line with law and finance theory (La Porta, Lopez-deSilanes, Shleifer, & Vishny, 1997, 1998), this study further considered the threshold of the effect of regulation. Hence, based on our findings. This paper argued that, yes, regulation in SSA can help boost the impact of financial sector on inclusive finance because it helps eliminate market failures and lead to greater financial sector efficiency (Aymar and Fabrice-Gilles, 2021) but as this strict regulation (restriction) cover a threshold 6.3354 it turns to align with the school of thought that preaches lessening regulation (freedom) to enhance financial sector's financial inclusivity agenda. Financial liberalization theory by McKinnon (1973) and Shaw (1973) posits that financial services are improved in a free economy. The thinking here is that if there is an increase in the regulations of SSA (with specific emphasis on those that limit the financial sector) above a threshold of 6.3354, the activities of financial firms would be hindered. For instance, if a country has high requirements for starting a business, then establishing new financial institutions and new branches for existing financial institutions would be stalled. Again, if a country's tax laws are too harsh on businesses, financial institutions will be discouraged from going above and beyond to make financial services available to residents. In support of this Anarfo et al (2020) established that tightening regulations could conflict with SSA economies' financial inclusion goals. Also, the findings of Raksmey et al. (2022) also suggests that in developing countries, excess regulation adversely affects access to the credit market. Agreeably, Hafer (2013) argued in that economic freedom enhances the financial sector's development. Hussain, Yahya and Waqas (2021) also found that extreme restrictions on economic activities hinder access to finance.

Like Table 6, most of the models in Table 7 met all the necessary diagnostic requirements of DGMM.

5.4 Robustness Check

To test the robustness of the outcomes, the study used the Worldwide Development Indicator's regulatory quality and rule of law instead of the Fraser Institute's regulation and legal system and property rights. The study still recorded that both financial development and regulation in isolation optimized inclusive finance (see Table 6), but regulations have a positive role on the effect of financial development on inclusive finance up to a threshold of 1.2936, after which it turns negative (see interaction in Column 3 of Table 7). Since the results obtained were similar to the main results, the findings of this study can be relied upon.

Table 6 of paper 1

Effect of financial development and regulation on inclusive finance

Variable	**(1)** **INCF**	**(2)** **INCF**	**(3)** **INCF**
L.INCF	0.9734*** (0.0232)	1.0428*** (0.0319)	0.9866*** (0.0216)
FD	0.0441*** (0.0131)	0.0300* (0.0165)	0.0610*** (0.0196)
RQ	0.1110*** (0.0374)		
RoL		0.1441*** (0.0495)	
REG			0.0581* (0.0295)
Covariates			
UNEMPL	0.0071 (0.0054)	-0.0028 (0.0075)	-0.00004 (0.0075)
EDU	-0.0024** (0.0011)	-0.0068*** (0.0017)	-0.0040** (0.0018)
LnGDP	-0.0738** (0.0266)	-0.0599** (0.0230)	-0.0406** (0.0190)
LnPOP	0.6605 (0.5725)	-0.0349 (0.0400)	-0.0540 (0.0313)
_cons	0.6605 (0.5725)	1.4701** (0.6615)	1.4106** (0.5967)
Diagnostics			
AR(1)-Pv	**0.154**	**0.147**	**0.149**
AR(2)-Pv	**0.160**	**0.163**	**0.158**
Sargan OIR-Pv	**0.843**	**0.827**	**0.913**
Hansen OIR-Pv	**0.684**	**0.507**	**0.572**
DHT for instrument:			
Hansen test excluding group-Pv	**0.470**	**0.363**	**0.450**
Diff. (null H = exogenous)-Pv	**0.656**	**0.511**	**0.538**
iv(Time, eq(diff))			
Hansen test excluding group-Pv	**0.610**	**0.549**	**0.555**
Diff. (null H = exogenous)-Pv	**0.675**	**0.236**	**0.374**
Fisher test	**8155.36*****	**5188.29*****	**4752.96*****
Instruments	**18**	**18**	**18**

Groups	**19**	**19**	**19**
N	**169**	**169**	**169**

**** pv<0.01, ** pv<0.05 and * pv<0.1.* Also, L.INCF – lag of Inclusive Finance, INCF– Inclusive Finance, FD - Financial Development, REG - Regulation, LSPR- Legal System and Property Rights, Co REG – Composite of Regulation, UNEMPL - Unemployment, EDU – Education, InGDP - Natural log of Gross Domestic Product per Capita and InPOP – Natural log of Population, OIR - a test for Overid Restrictions, DHT represent Difference-in-Hansen test and AR- Arellano-Bond, Pv- Probability value. Again, *N - the number of observations,*

Source: Author's computation

Table 7 of paper 1

The role of regulations in the relationship between financial development and inclusive finance.

Variable	**(1)** INCF	**(2)** INCF	**(3)** INCF
L.INCF	1.0197***	0.9476***	0.9150***
	(0.02235)	(0.0384)	(0.0362)
FD	0.0302**	0.1534**	0.1022**
	(0.0123)	(0.0542)	(0.0395)
RQ	0.1043**		
	(0.0405)		
RoL		0.1402***	
		(0.0375)	
CoREG			-0.0392
			(0.0377)
Interaction	0.0113	0.1633***	-0.0790*
	(0.0062)	(0.0514)	(0.0383)
Net effect	**0.0239**	**N.A**	**0.0467**
Threshold	**Positive synergy**	**N.A**	**1.2936**
Covariates			
UNEMPL	0.0016	0.0038	0.0086
	(0.0062)	(0.0061)	(0.0058)
EDU	-0.0047**	-0.0056***	-0.0002
	(0.0018)	(0.0015)	(0.0021)
LnGDP	-0.0686**	-0.0425	-0.0098
	(0.0251)	(0.0286)	(0.0262)
LnPOP	-0.0393	0.0029	0.0156
	(0.0330)	(0.0267)	(0.0280)
_cons	1.4332**	0.5447	-0.2220
	(0.6212)	(0.4415)	(0.6143)
Diagnostics			
AR(1)-Pv	**0.149**	**0.139**	**0.154**
AR(2)-Pv	**0.155**	**0.142**	**0.171**
Sargan OIR-Pv	**0.763**	**0.926**	**0.669**
Hansen OIR-Pv	**0.545**	**0.908**	**0.957**
DHT for instrument:			
Hansen test excluding group-Pv	**0.315**	**0.222**	**0.560**
Diff. (null H = exogenous)-Pv	**0.550**	**0.959**	**0.944**
iv(Time, eq(diff))			

Hansen test excluding group-Pv	**0.457**	**0.861**	**0.924**
Diff. (null H = exogenous)-Pv	**0.722**	**0.749**	**0.903**
Fisher test	**9908.50*** **	**2548.31*** **	**9201.89*** **
Instruments	**18**	**18**	**18**
Groups	**19**	**19**	**19**
N	**169**	**169**	**169**

*** *pv<0.01, ** pv<0.05 and * pv<0.1.* Also, L.INCF – lag of Inclusive Finance, INCF– Inclusive Finance, FD - Financial Development, REG - Regulation, LSPR- Legal System and Property Rights, Co REG – Composite of Regulation, UNEMPL - Unemployment, EDU – Education, InGDP - Natural log of Gross Domestic Product per Capita and InPOP – Natural log of Population, OIR - a test for Overid Restrictions, DHT represent Difference-in-Hansen test and AR- Arellano-Bond, Pv- Probability value. Again, *N - the number of observations,*

Source: Author's computation

5.5 Hypotheses Tested and Decisions

In this phase, the paper presents the decisions made on the various hypotheses tested in this study.

Table 8 of paper 1: Hypotheses Tested and Decisions

Hypotheses	**Decisions**
H_1: there is a significant positive effect of financial development on inclusive finance in SSA.	Supported
H_2: there is a significant positive effect of regulations on inclusive finance in SSA.	Supported
H_3: Ceteris paribus, the presence of sound regulations enhances the relationship between financial development and inclusive finance in SSA.	Partially supported

5.6 Conclusions and Policy Recommendations

The study sought to analyse the role of regulation in the relationship between financial development and inclusive finance in SSA. The study found a significant positive direct effect of financial development on inclusive finance and a direct positive influence of regulation on inclusive finance, but it also discovered a significant positive role of regulation in the relationship between financial development and financial inclusion at a threshold of 6.3354. Hence, in as much as financial development enhances inclusive finance in SSA and regulation on its own brings more people into the financial system, increasing the regulations that restrict financial sector activities in the region should not be above the level of 6.3354, or it would hinder financial development from improving financial inclusion. The paper recommends that first, the financial sector should introduce user-friendly products, including low-cost financial services that overcome distance barriers. Second, the central banks of SSA economies can recognise or award financial firms that are the best contributors to financial

inclusion. This will encourage other financial firms to do their best. Additionally, the study recommends that when employing regulations (especially those that limit the services of the financial sector) to improve the financial sector's enhanced inclusive finance in SSA, policymakers should take the threshold into consideration. Regulations such as requirements for starting a business, minimum capital requirements and tax laws should be made taking the threshold into consideration to prevent the negative role of regulation after the threshold and to encourage the financial sector to go above and beyond to make financial services available and accessible to residents. Specifically, policymakers should always check the mean of their economies' regulations before deciding whether to be more restrictive or not. Tchamyou (2019) indicates that the mean of the current two years would help make more appropriate and current-fitting policies.

5.7 Limitations and Suggestions for Further Studies

In as much as the financial development index employed in this paper is comprehensive (depth, efficiency, stability and concentration) compared to previous studies, competition was not included due to the time period employed. Also, it cannot be denied that the main platform through which most SSA has been involved in the financial system is the mobile money platform. Yet, this paper was not able to include mobile money usage in the calculation of the inclusive finance index because the date range for mobile money is just three years, which is insufficient for the time period and the number of countries considered in this paper. Apart from the listed limitations, all efforts were made to come out with a robust result that can help policymakers enhance financial inclusion in SSA. Based on the limitations of the paper and its findings, the following research suggestions are put forth: other researchers can include competition measures to the indicators employed in computing financial development index in this paper; other studies can also consider mobile money in the computation of the inclusive finance index; and finally, other researchers can examine the role of freedom in the relationship between financial development and inclusive finance in SSA. This can help reaffirm the argument made in support of the final finding in this paper.

CHAPTER SIX
ENHANCING INCLUSIVE FINANCE IN SUB-SAHARAN AFRICA: THE COLLABORATIVE ROLE OF ECONOMIC FREEDOM AND INNOVATIVE FACILITIES

Chapter six presents paper two.

6.0 Introduction

According to financial liberalization theory, financial services are improved in a free market (McKinnon, 1973; Shaw, 1973). Aluko and Ajayi (2018) argue that the financial sector is rationally incentivized to offer a variety of cutting-edge services (like internet banking and mobile money services) that increase financial accessibility in an economy where government restrictions are minimal. Additionally, the competition that results from a free economy might influence financial institutions to lower transaction costs to attract customers (Mavrakana & Psillaki, 2019). Thus, if free economic activity is maintained in an economy, the two major prerequisites for financial inclusion—accessibility and affordability—would be met. Also, economic agents need the required level of economic freedom to participate in the financial system (Hussain, Yahya and Waqas, 2021). Hence, economic freedom does not only enhance the operation of the financial sector in providing financial inclusion services (Chortareas, Girardone & Ventouri, 2013), but it also incites the participation of the populace in financial services. In other words, economic freedom also creates a conducive atmosphere for the involvement of residents in the financial system (Zins & Weill, 2016).

According to The Heritage Foundation (2023), economic freedom guarantees not only market freedom but also encompasses the protection of legal rights and government efficiency. As a result, increasing economic freedom, which promotes voluntary exchange, personal choice, market freedom, and the protection of people and assets, has the potential to increase inclusive finance in Sub-Saharan Africa (SSA) (Doran & Stratmann, 2021). Hussain et al. (2021) specifically argued that extreme restrictions on economic activities hinder access to finance. Logically, when there are excessive restrictions in an economy, people will not be encouraged to engage in financial services. This, therefore, suggests that freedom in an economy could have repercussions on its level of financial inclusion.

As it stands now, financial inclusion in SSA is low (Financial Access Survey, 2019; Global Financial Index, 2020). Meanwhile, financial inclusion is necessary for growth, poverty reduction and inequality reduction in SSA (Sen and Laha, 2021; Matekenya, Moyo & Jeke,

2021; Tita & Aziakpono, 2017). Hence, including more people in the financial system is necessary for achieving two targets of African Union agenda of improving growth and reducing poverty in SSA by 2063 (African Union, 2015). This is because finance affects all spheres of economic activity (Snaije, 2017). Consequently, it is imperative that SSA economies increase economic freedom to include more people in the financial system. However, without access to innovative facilities such as mobile phones, internet services and information technology, the relevance of economic freedom for financial inclusion is likely to be limited. This is because innovative facilities such as information technology, phones, and the internet provide enhanced means for accessing and using financial services (Singh, 2017). Inferring from technological determinism theory, which suggests that when innovative facilities are made available in an economy, residents develop a culture of using them (Thorstein Veblen, 1857–1929), the study reasons that accessibility of innovative facilities such as phones, the internet, and computers could help society cultivate the culture of accessing financial services through their phones, the internet, and computers. Logically, the study argues that innovative facilities help individuals access financial services from their homes or wherever they are without having to walk to the premises of a financial institution or an automatic teller machine. This means that the magnitude of innovative facilities available to individuals in an economy does not only makes it easy for people to use financial services, but it also kills the barrier of distance to financial inclusion.

However, Ozili (2018) takes a different perspective, indicating that innovative facilities do not always play a positive role in enhancing inclusive finance. He poises that innovative facilities can negatively influence financial inclusion in an economy, with much emphasis on low- income countries which most SSA economies are victims. He explained that the negative role of innovative facilities in financial inclusion occurs when there is a high cost of using innovative facilities to access financial services and low literacy. Law of demand and Nutassey, Agyei, Frimpong and Nokoe (2023) indicated that high cost of using electronic transactions reduces financial inclusion, while Munari and Susanti (2021) asserted that low financial literacy reduces the use of innovative facilities in accessing financial services. Hence, innovative facilities could weaken economic freedom-induced financial inclusion.

From this, the argument here is that in a free economy, innovative facilities might either weaken or enhance financial inclusion. Either way, innovative facilities influence the role of economic freedom in inclusive finance. Hence, this study assessed the role of innovative facilities on the effect of economic freedom on inclusive finance in SSA.

Hussain et al. (2021) undertook a cross-country study on the effect of economic freedom on financial inclusion; however, their study neglected sub-regional analysis that would have produced results that accurately represented SSA. Thus, SSA is deficient in a study on the nexus between economic freedom and inclusive finance. It is believed that the wide difference in the level of financial inclusion between European countries and SSA countries might bias the results of Hussain et al. (2021) and their results might not fit the conditions in SSA; therefore, there is a need for an exclusive study on the connection between economic freedom and inclusive finance in SSA. Also, unlike Hussain et al.'s (2021) inclusive finance index, which is made up of only financial institution measures, the inclusive finance index in this study includes financial market measures and therefore better represents the financial inclusion of SSA. Additionally, this study would be the first to consider the role of innovative facilities in the association between economic freedom and inclusive finance. In addition, the study would compute the threshold at which inclusive finance is enhanced by the collaborative effect of innovative facilities and economic freedom. Corollary to this, analysing the role of innovative facilities in the relationship between economic freedom and inclusive finance in SSA fills a significant gap in the literature.

6.1 Related Literature Survey and Hypothesis Development

Financial liberalisation theory is the foundation for economic freedom and inclusive finance being related. This is because it explains that financial services are improved in a free market (McKinnon, 1973; Shaw, 1973). Thus, the financial sector will be liberalized to offer a variety of financial services and thereby boost financial accessibility in an economy when governmental limitations on financial activity are loosened or repealed (Aluko et al., 2018). Also, the role of innovative facilities in inclusive finance was guided by technological determinism theory and technology acceptance model. Technological determinism theory argues that innovative facilities influence how people in an economy think, feel, and act, as well as how our society functions (McLuhan, 1969; Thorstein Veblen, 1857–1929). The rising popularity of innovative facilities such as phones, the internet, and computers would cause people to access financial services in an economy using these innovative facilities (Singh, 2017). The technology acceptance model, on the other hand, contends that a person's use of innovative facilities is dependent on their utility and simplicity (Davis, 1989). Corolla to this, this paper argues that people would use innovative facilities in accessing financial services because of their ease and usefulness in accessing financial services. The introduction of the role of innovative facilities on the effect of economic freedom on inclusive finance was

built on collaborative intervention theory of financial inclusion, which states that a joint effort is required for the delivery of formal financial services in an economy (Ozili, 2020). This implies that less government involvement in an economy alone will not optimize inclusive finance if the distance to access financial services is fairly far (or rural areas). In other words, innovative facilities are still required to achieve financial inclusion more quickly, even if people have free access to financial services.

6.1.1 Economic freedom and inclusive finance

There are several ways literature has indicated economic freedom contributes to the financial health of an economy. For instance, Frimpong, Yusuf, Boateng, Ankomah and Abeka (2023) explain that economic freedom causes stability in the financial sector, which is a need for inclusive finance. Also, Khan, Islam and Akbar (2021) argue that a low level of freedom hinders the financial system's service. Asuming, Osei-Agyei and Mohammed (2019) stated that business freedom predicts inclusive finance. Hussain et al. (2021) conducted a cross-country study on interlinkages among financial literacy, government quality, economic freedom and inclusive finance in 98 countries from 2007 to 2018. The study employed ordinary least squares and system GMM techniques to achieve its objectives. Among their objectives is the role of government qualities in the effect of economic freedom on inclusive finance. Their studies created a composite financial inclusion index using automatic teller machines, deposit accounts with commercial banks, bank branches and borrowers from commercial banks per 100,000 adults. The estimation results indicate a positive effect of economic freedom on inclusive finance. Also, Kimmitt and Munoz (2017) also investigated how the interrelated instrumental freedoms combine to engender financial inclusion among entrepreneurs with low income. They revealed that instrumental freedom is not essential for inclusive finance.

H_1*: Economic freedom affects inclusive finance in SSA, positively.*

6.1.2 Economic freedom and inclusive finance nexus: the role of innovative facilities

One barrier to financial inclusion is distance; thus, even in a free economy, covering long distances and moving from rural areas to access financial services is stalled. To bring a solution to distance hindering financial inclusion, Wellalage, Hunjra, Manita and Locke (2021) suggested that innovative facilities would be the best facilitator in terms of speed, convenience, costs and ease in terms of accessing and using financial services. Tian and Kling (2022) argued that due to advancements in innovative facilities, financial services have

been transformed, exhibiting increased competition, market entry and convenient forms of banking, promising better access to finance and inclusive finance for everyone in Sub-Saharan Africa, which has made significant progress in advancing innovative facilities. Kouladoum, Wirajing and Nchofoung (2022) argued that telephone and mobile banking had become obvious ways of accessing financial services. Thus, financial inclusion is highly dependent on the level of innovative facilities in an economy.

Empirically, Khera, Ng, Ogawa and Sahay (2022) assessed the contribution of innovative facilities to inclusive finance in 52 emerging economies and found that embracing digital financial services is a key driver of inclusive finance. Likewise, Kouladoum et al. (2022) considered the nexus between digital innovative facilities and financial inclusion in 43 countries in SSA from 2004 to 2019. Adopting generalized method of moment and IV Tobit, their result insinuated that at all levels, innovative facility indicators such as subscription rate of fixed, internet users, mobile telephone users, and fixed broadband have optimized inclusive finance. Also, Agyekum, Reddy, Wallace and Wellalage (2022) evaluated how owning and using innovative facilities enhances access to external credit. Using random panel logistic regression techniques, their results affirmed that the use of innovative facilities contributes to accessing external credit facilities, which is one of the measures for financial inclusion. Similarly, Shen, Hueng and Hu (2020) examined the means by which financial inclusion can be achieved in China. Employing a partial least squares approach named internet usage and digital financial product usage as the key players in improving financial inclusion in China.

Agreeably, Lubis, Dalimunthe and Situmeang (2019) stated that innovative facilities partially influence financial inclusion in North Sumatra after determining the effect of financial technology on the inclusive finance of the residents in North Sumatra. Their studies involved 100 respondents, and the analysis was done using multiple linear regression analysis. Again, di Prisco, and Strangio (2021) considered blockchain technology as an instrument to reduce low financial inclusion in developing countries. Moreso, Senou, Ouattara and Acclassato Houensou (2019) purported to analyze the accelerating role of technologies such as internet usage and mobile phones on the dynamics of inclusive finance. Their estimated result using a random effect model and system generalized method of moment affirmed that internet usage and mobile phone usage are very key to enhancing inclusive finance in the economies of the WAEMU. In Nigeria, Wayne, Soetan, Bajepade and Mogaji (2020) highlighted the role of innovative facilities in enhancing inclusive finance in Nigeria in their working paper. Again,

Fanta and Makina, (2019) examined if the progress in innovative facilities contributes to wider usage and access to financial services and they reported a substantial positive connection between inclusive finance and innovative facilities.

Mhlanga (2020) sought the impact of artificial intelligence on inclusive digital finance. He used conceptual and documentary analysis of journals, authoritative documents and reports on digital financial inclusivity. His study indicated that artificial intelligence strongly influences digital financial inclusivity. Consistently, Lenka and Barik (2018) purported to analyse the effects of the increase in internet and mobile phone use on inclusive finance in South Asia. The study created financial inclusion using principal component analysis. And found that the increase in financial inclusion is dependent on internet services and mobile phones. Again, Ouma, Odongo and Were (2017) analysed mobile telephony in Africa has been helpful in integrating the unbanked sections of the population into the financial systems. The study specified that mobile telephony encourages savings in Sub-Saharan Africa. Moreso, Evans (2018) asked: "Can the internet and mobile phones shoot up the inclusion of the excluded poor?" Employing the FMOLS approach and Granger causality, his result indicated that internet and mobile phones are relevant to enhancing inclusive finance in Africa. Moreso, Siwela and Njaya (2021) asserted that mobile phone affordability, convenience, reliability and accessibility improve financial inclusion among females.

The review above approved of the role of innovative facilities in financial inclusion. Other studies have also found that economic freedom increases financial inclusion. This paper follows the collaborative intervention theory of financial inclusion and argues that the collaborative effect of economic freedom and innovative facilities would maximize financial inclusion more effectively than only economic freedom. Hence, the study hypothesizes that:

H_2*: Innovative facilities affect inclusive finance in SSA, positively.*

H_3*: Ceteris paribus, innovative facilities positively influence the effect of economic freedom on inclusive finance in SSA.*

6.2 Methodology

6.3.1 Variables

Here, the study discusses the variables of concern. Due to the availability and consistency of variable data, unbalanced data for the period from 2008 to 2020 was used to achieve the objectives of the study. Table 1 gives the details of the variables.

Table 1 of paper 2

Variables

Variables	Meaning and Measurement	Source	Literature justification and sign
Regressand			
Inclusive finance index	It is making financial services and products affordable and accessible to all in an economy. It was computed from the number of deposit accounts with commercial banks per 1,000 adults, the number of loan accounts with commercial banks per 1,000 adults, the number of commercial bank branches per 100,000 adults, the number of commercial bank branches per 1,000 km2, the number of ATMs per 1,000 km2, the number of ATMs per 100,000 adults and financial market access index using Principal Component Analysis (PCA).	International Monetary Funds	
Regressor			
Economic freedom	It is the degree to which the policies and institutions of SSA economies are favourable to freedom. ***Main Estimation Measure*** Economic freedom summary index. On a scale of 1 to 10, where 1 represents low economic freedom and 10 represents high economic freedom. ***Robustness Check Measure*** Economic freedom overall score. On a scale of 0 to 100, where 0 signifies high repressed and 100 signifies freedom.	Fraser Institute The Heritage Foundation	Hussain et al. (2021). Positive (+)
Moderating			
Innovative Facilities index.	It reflects the use of technology in an economy. It was computed from mobile cellular	World Development Indicators	Kouladoum et al. (2022) Positive (+)

	subscriptions (per 100 people), individuals using the internet (% of population), fixed broadband subscriptions (per 100 people) and Fixed telephone subscriptions (per 100 people) using PCA.		or Ozili (2018) Negative (-)
Covariates			
Inflation	It is the yearly percentage variation in the cost of procuring a basket of services and goods for the average customer. Consumer prices index (annual%).	World Development Indicators	Omar and Inaba (2020) Positive (+)
Education	It reflects the proportion of the population that has received formal education in an economy. Secondary school enrollment (% gross)	World Development Indicators	Yan and Qi (2021) Positive (+)
Unemployment	It is explained as the share of the labour force that are not working but are ready and looking for employment. Unemployment, total (% of the labour force)	World Development Indicators	Ndanshau, and Njau, (2021) Negative (+)
Economic growth per person	It is the gross domestic product divided by the midyear population. Gross domestic credit per capita	World Development Indicators	Evans (2016) Positive (+)
Population	Total number of people in an economy. Population, total	World Development Indicators	Chikalipah (2017) Negative (+)

6.2.2 Empirical model and technique

Following Kouladoum et al. (2022) and Bede Uzoma, Omankhanlen, Obindah, Arewa, and Okoye (2020), the two-step system generalized method of moments model was estimated as:

$$INCF_{it} = \alpha_{it} + \delta FINC_{it-1} + B_1\ EF_{it} + B_2 INNF_{it} + B_3(EF_{it} \times INNF_{it}) + B_4\ INFL_{it} + B_5\ EDU_{it} + B_6\ UNEMP_{it} + B_7\ EGP_{it} + B_8\ POP_{it} + u_i + \varepsilon_{it} \quad (1)$$

Where *INCF* is financial inclusion, $INCF_{it-1}$ is the first lag of financial inclusion, EF is economic freedom, *INNF* is innovative facilities, *EF* INNF* is the interaction between economic freedom and innovative facilities, $INFL$ is inflation, EDU is education, $UNEMP$ is unemployment, EGP is economic growth per person and POP is population. It should also be noted that i refers to the country (i = 30); t refers to the period from (t = 1 to 13); u unobserved country-specific effect and ε is the error term assumed to be serially uncorrelated.

The models of both Kouladoum et al. (2022) and Bede Uzoma et al. (2020) have statistically proved that financial inclusion is autoregressive and autoregressiveness causes endogeneity issues in an empirical model. Also, economic freedom contains institutional variables such as the size of government and legal system and property rights, which, according to Law and

Azman-Saini (2012), are persistent and therefore cause endogeneity issues. Moreso, the data employed in this study is characterized by a shorter timeframe (13 years) compared to a longer cross-section (30 countries). Again, the 30 countries combined in this study have different conditions in their economies that might bias the results when put together.

For these reasons, the study used Blundell and Bond's (1998) dynamic two-step generalized method of moments estimators with robust standard errors. Dynamic Generalized Method of Moments (DGMM) control for endogeneity issues (Frimpong et al., 2023). Also, it is an appropriate technique when the cross-section of the data is more than the time series. It controls for country-specific effects caused by putting more than one unit together in an estimation.

In estimating the results, generalized method of moment required certain checks: that is, to ensure there is no overriding identity of instrument, that there is the absence of autocorrelation and the overall model is valid. Hence, Hansen and Sargan test of over-identification limits is used to investigate the null hypothesis that the instruments are valid, while the Arellano and Bond test for second-order serial correlation (AR2) is used to investigate the null hypothesis that the error term has no autocorrelation. Both tests' null hypotheses are expected to be rejected. Again, Fisher statistic tests need to be significant to ensure the overall validity of the models.

6.3 Discussion of Estimation Results

This phase addresses the results presented in Tables 2 to 5.

6.3.1 Descriptive Statistics

Table 2 presents the statistics for the raw score of all the variables employed in this study. Employing the raw score helps to detect possible outliers that could affect the efficiency of the results.

Table 2 of paper 2

Descriptive Statistics

Variable	Observation	Mean	Standard Deviation	Minimum	Maximum
INCF	352	-0.0000000052	2.074467	-1.575566	8.664826
NCBB100000	378	7.120447	9.271501	.4726674	55.07052
NCBB1000	378	8.386532	22.25739	.004656	111.8227
NDAwCB	378	420.1053	491.7646	.0417441	2946.407
NLAwCB	365	113.4195	153.5612	.213429	642.8558
ATM100000	378	14.43806	42.31035	.0127065	228.5714
ATM1000	378	14.66726	19.39577	.0679605	89.99328
FMA	365	0.0945929	0.1889007	0	0.9154567
EF	335	6.350746	0.7702708	4.48	8.26
MOB	375	76.60455	40.61684	5.914078	198.1522
INTER	366	17.87626	17.17596	0.25	79
FBB	350	1.513531	4.348267	0	35.5537
TEL	371	3.526121	7.041582	0	37.64051
INNOV	338	0.0000000012	1.000005	-1.810234	2.932335
INFLA	369	11.5845	38.95726	-2.814698	557.2018
UNEMP	365	8.927348	7.870426	0.6	29.22
EDU	233	50.03917	23.01298	9.68862	109.4441
EGP	373	2750.601	3354.931	198.3529	17252.02
POP	378	23500000	35200000	86956	208000000

Note. INCF is Inclusive Finance, NCBB100000 - Number of Commercial Bank Branches per 100,000 adults, NCBB1000 - Number of Commercial Bank Branches per 1,000 km2, NDAwCB - Number of Deposit Accounts with Commercial Banks per 1,000 adults, NLAwCB - Number of Loan Accounts with Commercial Banks per 1,000 adults, ATM100000 - number of ATMs per 100,000 adults, ATM1000 - Number of ATMs per 1,000 km2, FMAI -Financial Market Access, EF is Economic Freedom, MOB is Mobile Phone Usage , INTER is Internet Usage, FBB is Fixed Broad Band Usage, TEL is Telephone Usage, INNOV is Innovative Facilities, INFLA is Inflation , UNEMPL is Unemployment, EDU is Education, EG is Economic Growth per Person and POP is Population.

Source: Author's computation

The study identified the average scores of economic growth per person of 2750.601 and population of 23500000 as outliers; hence, in further analysis, a natural log would be applied to economic growth per person and population to avoid biased results.

The study records that within the range of -1.5756 to 8.6648, the average for the inclusive finance index in SSA is -0.0000000052. Thus, inclusive finance in SSA, as per the countries employed from 2008 to 2020, is poor. The study further employed the individual measure to assess financial inclusivity in SSA. The average value of the number of commercial banks

per 100,000 adults is 7.120, indicating that out of every 100,000 people in SSA, only 7.120 have access to commercial banks. In support, 8.387 mean for the number of commercial banks per 1,000 km2 was recorded. Thus, access to commercial banks in SSA is low. Again, 420.105 average score was recorded for the number of deposit accounts with commercial banks per 1,000 adults; this suggests that the number of deposit accounts in SSA is below average. Also, a poor average score of 113.420 was documented for the number of loan accounts with commercial banks. Moreso, a mean of 14.438 was revealed for the number of ATMs per 100,000, implying that out of every 100,000 people in SSA, only 14.438 have access to ATMs. This is very poor. It was reaffirmed by another poor average score of 14.667 for the number of ATMs per 1,000 km2. When it comes to financial market access, again, a low of 0.094 was recorded. This confirms Chikalipah (2017) and Asuming et al. (2019) earlier findings that financial inclusion in SSA is poor. It also affirms the need to undertake this study, which could encourage SSA's policymakers to integrate more people into the financial system.

On the other hand, economic freedom in SSA scored a mean of 6.351, which is above average since Fraser Institute's given range is 1 to 10. Innovative facilities, which is the composite index for mobile, internet, fixed broadband and telephone usage, had a mean score of 0.0000000012, within a range of -1.8102 to 2.9323 and like the inclusive finance index, the study further assessed innovative facility usage using individual indicators. High mobile phone usage is depicted by an average of 76.605 per 100 people in SSA. Internet, fixed broadband and telephone usage in SSA are, however, low, with an average score of 17.876 percent of the population, 1.514 per 100 people and 3.526 per 100 people, respectively. Hence, the use of innovative facilities in SSA is poor, as indicated earlier by Akpa et al. (2022). Also, the average score of inflation is 11.585 and unemployment is 8.927, respectively.

6.3.2 Correlation Analysis

Correlation analysis was conducted in this section. By setting the threshold at 0.80 (*see* Kennedy, 2008 and Frimpong et al., 2023), this study detects possible multicollinearity in the regression analysis to avoid spurious results.

From Table 3 below, a correlation value above 0.80 was recorded between inclusive finance and some of the variables (specifically, fixed broadband and telephone); since multicollinearity does not occur between regressand and other variables, a high correlation among a variable and its regressand is not a treat to the reliability of the results. Again, the study depicts an above 0.8 correlation value among the measures of innovative facilities:

internet and mobile phone is 0.842, innovation facilities and mobile phone is 1.000 and innovative facilities and internet is 0.839. Hence, innovative facilities measures will not enter the same model. From Tables 4 and 5, the measures of innovative facilities were put in different columns, representing different models. The correlation values among the rest of the variables that would be regressed on the dependent variable are below 0.8 and there is therefore no evidence of multicollinearity.

Table 3 of paper 2

Correlation Analysis

Variables	INCF	EF	MOB	INTER	FBB	TEL	INNOV	INFLA	UNEMP	EDU	lnEGP	lnPOP
INCF	1.000											
EF	0.596***	1.000										
MOB	0.715***	0.423***	1.000									
INTER	0.745***	0.335***	0.842***	1.000								
FBB	0.827***	0.431***	0.531***	0.622***	1.000							
TEL	0.895***	0.489***	0.528***	0.550***	0.825***	1.000						
INNOV	0.715***	0.423***	1.000***	0.839***	0.534***	0.523***	1.000					
INFLA	-0.105*	-0.186***	-0.101*	-0.044	-0.048	-0.060	-0.097*	1.000				
UNEMP	0.416***	0.158***	0.529***	0.477***	0.070	0.215***	0.541***	-0.020	1.000			
EDU	0.776***	0.519***	0.765***	0.739***	0.532***	0.679***	0.769***	-0.181***	0.590***	1.000		
lnEGP	0.785***	0.315***	0.749***	0.694***	0.539***	0.652***	0.753***	-0.047	0.651***	0.714***	1.000	
lnPOP	-0.577***	-0.133**	-0.461***	-0.376***	-0.523***	-0.596***	-0.466***	0.054	-0.503***	-0.345***	-0.473***	1.000

**** is significant at 0.01, ** is significant at 0.05 and * is significant at 0.1.* Also, INCF is Inclusive Finance, EF is Economic Freedom, MOB is Mobile Phone Usage , INTER is Internet Usage, FBB is Fixed Broad Band Usage, TEL is Telephone Usage, INNOV is Innovative Facilities, INFLA is Inflation , UNEMPL is Unemployment, EDU is Education, lnEGP is Natural Log Economic Growth per Person and lnPOP is Natural Log Population.

Source: Author's computation

6.3.3 Discussing DGMM results

Table 4 presents the regression results for the relationship between economic freedom and inclusive finance as well as innovative facilities and financial inclusion, while Table 5 gives the effect of the interaction of economic freedom and innovative facilities on inclusive finance. All findings are reported with their coefficients and standard errors.

Table 4 of paper 2: Effect of Economic freedom and innovative facilities on inclusive finance

Variable	(1) INCF	(2) INCF	(3) INCF	(4) INCF	(5) INCF
L.INCF	0.9816***	1.0590***	0.9275***	0.9511***	0.9216***
	(0.0282)	(0.0331)	(0.0290)	(0.0538)	(0.0285)
EF	0.0631***	0.0543**	0.0627**	0.0745**	0.0988***
	(0.0187)	(0.0234)	(0.0248)	(0.0268)	(0.0239)
MOB	-0.0011**				
	(0.00004)				
INTER		-0.0023***			
		(0.0004)			
FBB			-0.0124***		
			(0.0027)		
TEL				0.0286***	
				(0.0055)	
INNOV					-0.0846***
					(0.0239)
INFLA	0.0030**	0.0026**	0.0060**	0.0043**	0.0022*
	(0.0014)	(0.0010)	(0.047)	(0.0018)	(0.0012)
UNEMP	0.0042	-0.0082	0.0060***	-0.0121	0.0014
	(0.0063)	(0.0067)	(0.0016)	(0.0121)	(0.0020)
EDU	-0.0085	0.0025*	0.0063	-0.0024	0.0041**
	(0.0012)	(0.0014)	(0.0011)	(0.0023)	(0.0017)
lnEGP	0.0903***	0.0556**	0.0329	0.0709**	0.0584
	(0.0277)	(0.0259)	(0.0247)	(0.0300)	(0.0384)
lnPOP	0.0098	-0.0149	-0.0140	-0.0158	0.0118
	(0.0342)	(0.0265)	(0.0320)	(0.0254)	(0.0324)
_cons	-1.0907	-0.2214	-0.4493	-0.5829	-1.4515*
	(0.6858)	(0.6212)	(0.6559)	(0.0254)	(0.71070
AR(1)- Pv	**0.093**	**0.092**	**0.098**	**0.094**	**0.095**
AR(2)- Pv	**0.160**	**0.171**	**0.165**	**0.146**	**0.164**
Sargan OIR (Pv)	**0.554**	**0.828**	**0.727**	**0.812**	**0.546**
Hansen OIR (Pv)	**0.441**	**0.782**	**0.355**	**0.809**	**0.283**
Fisher	**26271.00*** **	**13969.24*** **	**45101.04*** **	**40552.98*** **	**152161.88*** **
Instruments	**18**	**18**	**18**	**18**	**18**
Groups	**21**	**21**	**20**	**21**	**20**
N	**179**	**178**	**169**	**179**	**168**

Note. *** is significant at 0.01, ** is significant at 0.05 and * is significant at 0.1. Also, INCF is Inclusive Finance, EF is Economic Freedom, MOB is Mobile Phone Usage , INTER is Internet Usage, FBB is Fixed Broad Band Usage, TEL is Telephone Usage, INNOV is Innovative Facilities, INFLA is Inflation , UNEMPL is Unemployment, EDU is Education, lnEGP is Natural Log Economic Growth per Person and lnPOP is Natural Log Population. Again, N is the number of observations, AR is Arellano-Bond, Pv is the probability value and OIR is a test for Overid Restrictions.

Source: Author's computation

From Table 4, a direct positive relationship between economic freedom and inclusive finance is observed in columns 1 to 5. This implies that an increase in freedom in an economy enhances financial inclusion in SSA. This finding is in line with "financial liberalization theory" that freedom induces the financial sector to offer a variety of financial services, thereby boosting financial accessibility in an economy (Aluko et al., 2018). In support, Mavrakana et al. (2019) indicated that competition arises from a free economy, which influences financial institutions to lower transaction costs, which increases patronage of financial services. Further, the result corroborates the argument of Zins et al. (2016) that economic freedom creates a conducive environment for the involvement of residents in the financial system. In line with earlier findings, Khan et al. (2021) and Hussain et al. (2021) found that freedom enhances financial inclusion. This study agrees with hypothesis one, which reads, economic freedom affects financial inclusion in SSA positively.

In addition, except for telephone usage, all the indicators (mobile usage, internet usage and fixed broadband usage) of innovative facilities including the composite of innovative facilities, had a negative direct effect on inclusive finance in SSA (*see* Columns 1, 2, 3 and 5). Meaning SSA's innovative facilities reduce inclusive finance. This finding is in line with Ozili (2018) argument that innovative facilities can negatively influence inclusive finance in low-income countries. In his argument, he indicated that these negative manifests when there is a high cost of using innovative facilities to access financial services and low literacy. Since internet and broadband cost is high in most SSA economies and there is low technical and financial literacy in SSA (Chikalipah, 2017), innovative facilities that induce financial inclusion in SSA could be altered. As this finding contradicts hypothesis two, which indicates that innovative facilities affect financial inclusion in SSA positively, it confirms the finding of Akpa et al. (2022) that innovative facilities negatively influence financial inclusion in SSA.

For the covariates:

In all of Table 4's columns, there was evidence that inflation had a positive impact on inclusive finance. This suggests that rising SSA inflation would result in greater financial inclusion. The economic rationale, in this case, is twofold: first, when prices for goods and services grow, citizens' incomes have less purchasing power, necessitating increased borrowing, which broadens access to financial services. Second, as inflation rises, borrowing becomes less expensive in real terms, which encourages people to borrow more and expands

the financial system (Neely, 2022). In support of this finding, Bakari and Ibrahim (2018) and Omar et al. (2020) indicated that a rise in inflation has a beneficial impact on inclusive finance.

Moreover, education is shown to have a beneficial influence on improving inclusive finance in columns 2 and 5. This shows that SSA financial inclusion rises with education. More educated individuals save and utilize credit more frequently, leading to increased financial inclusion since they are more aware of financial services and products, according to Tinta, Ouédraogo, and Al-Hassan (2022). Education enlightens people and influences their decisions, according to Sabic-El-Rayess (2019), who also said that participation in the financial system is necessary. The result confirms studies by Yan et al. (2021) and Sanderson, Mutandwa and Le Roux (2018) that increased educational attainment increases the likelihood of using financial services.

Moreso, economic group per person mostly specified a positive effect on inclusive finance (*see C*olumns 1, 2 and 4). Hence, when an economy is performing well, it reflects an increase in its financial inclusion. Evans (2016) and Zeqiraj, Sohag and Hammoudeh (2022) concluded that economic growth causes a surge in financial inclusion.

Finally, population and unemployment mostly play an insignificant role in inclusive finance.

Table 5 of paper 2

The role of innovative facilities in the link between economic freedom and inclusive finance

Variable	(1) INCF	(2) INCF	(3) INCF	(4) INCF	(5) INCF
L.INCF	1.0267***	0.7025***	1.0262***	0.8181***	0.9667***
	(0.0453)	(0.0767)	(0.0460)	(0.0294)	(0.0323)
EF	0.1209***	0.1603***	0.1171**	0.2216	0.0656*
	(0.0293)	(0.0487)	(0.0521)	(0.1917)	(0.0332)
MOB	0.0066*				
	(0.0033)				
MOB * EF	-0.0012**				
	(0.0005)				
INTER		0.3360**			
		(0.0134)			
INTER*EF		-0.0047**			
		(0.0018)			
FBB			-0.5479***		
			(0.9962)		
FBB*EF			0.0643***		
			(0.0120)		
TEL				0.1367**	
				(0.0647)	
TEL*EF				-0.0166**	
				(0.0072)	
INNOV					0.1998
					(0.1416)
INNOV*EF					-0.0420**
					(0.0201)
INFLA	0.0025*	0.0156**	0.0061	0.0044*	0.0028**
	(0.0014)	(0.0060)	(0.0040)	(0.0023)	(0.0012)
UNEMP	0.0035	-0.0068	-0.0039	0.0228	-0.0048
	(0.0061)	(0.0131)	(0.0059)	(0.0204)	(0.0043)
EDU	-0.0023	0.0009	-0.0018	0.0013	0.0025
	(0.0024)	(0.0028)	(0.0024)	(0.0033)	(0.0022)
lnEGP	0.1069***	0.3397**	0.0814	0.0869	0.03400
	(0.0212)	(0.1291)	(0.0742)	(0.1027)	(0.0304)
lnPOP	0.0123	-0.0984	0.0129	0.0432	-0.0265
	(0.0359)	(0.0685)	(0.0571)	(0.1084)	(0.0232)
_cons	-1.4857	-2.0650	-1.3173	-3.1360	-0.2823
	(0.5812)	(0.8753)	(1.1018)	(2.8270)	(0.5051)
Net influence	**0.0290**	**0.0763**	**N.A**	**0.1631**	**0.0656**
Threshold	**100.75**	**34.1064**	**N.A**	**13.3494**	**1.5619**
AR(1)-Pv	**0.089**	**0.093**	**0.116**	**0.080**	**0.092**
AR(2)-Pv	**0.146**	**0.360**	**0.220**	**0.143**	**0.154**
Sargan OIR-Pv	**0.567**	**0.400**	**0.020**	**0.396**	**0.615**
Hansen OIR-Pv	**0.484**	**0.873**	**0.575**	**0.866**	**0.377**
Fisher	**18967.92*** **	**1024.57*** **	**431530.13*** **	**385.72*** **	**20886.65*** **
Instruments	**18**	**18**	**18**	**18**	**18**
Groups	**21**	**21**	**20**	**21**	**20**
N	**179**	**178**	**169**	**179**	**168**

Note. *** is significant at 0.01, ** is significant at 0.05 and * is significant at 0.1. Also, INCF is Inclusive Finance, EF is Economic Freedom, MOB is Mobile Phone Usage , INTER is Internet Usage, FBB is Fixed Broad Band Usage, TEL is Telephone Usage, INNOV is Innovative Facilities, INFLA is Inflation , UNEMPL is Unemployment, EDU is Education, lnEGP is Natural Log Economic Growth per Person and lnPOP is Natural Log Population. Again, *N is the number of observations,* AR is Arellano-Bond, Pv is the probability value and OIR is a test for Overid Restrictions.

Source: Author's computation

In Table 5, the role of innovative facilities in the association between economic freedom and inclusive finance is documented. This was accomplished by interacting the indicators of innovative facilities with economic freedom and examining their effect on inclusive finance in SSA. It can be seen that the interaction terms (conditional influences) were negative, and this opposed unconditional influence and expectations. Hence, to avoid ambiguous interpretation, discussing them was guided by net influence and thresholds (*see* Tchamyou, 2019).

Moving forward, the above terms are discussed before the results. Unconditional influence means the effect of a regressor on a regressand in isolation. Conditional influence is when the role of the regressor (economic freedom) on the regressand (inclusive finance) is moderated. Example: INNOV*EF in the last column of Table 5. Net influence is the total impact of the regressor and moderating variables on the regressor. It is calculated by multiplying the coefficient of the conditional influence with the mean of the moderator plus the coefficient of the unconditional influence. Therefore, to calculate the net influence in Column 5, it will be [(-0.0420 ×0.0000000012) + (0.0656)] = 0.0656. Also, when the direction of conditional influence and net influence differ, a threshold can be calculated. This is calculated by dividing the coefficient of the unconditional influence by the coefficient of the conditional influence. Hence, the threshold of influence in Column 5 will be 1.5619 (0.0656/0.0420). However, if both the conditional and net influence are in the same direction, it means that the given direction of the influence is guaranteed and there is no need to calculate a threshold. Where you see N.A. (Not Applicable) the conditional influence supports intuition of the study, and no ambiguity is recorded for a further calculation of net influence.

Fast forwarding to the discussion of the results in Table 5, Column 1 exhibits a positive role of the net of mobile usage and economic freedom on inclusion finance up to a threshold of 100.75, and subsequently, a negative role is birth. Similarly, Column 2 portrays a positive net role of internet usage and economic freedom on inclusive finance to a limit of 34.1064. Likewise, Column 4 documented a positive collaborative influence of telephone usage and economic freedom on inclusive finance at a threshold of 13.3494. Reaffirming this, Column 5 indicated a negative joint role of the overall innovative facility index and economic freedom on inclusive finance at a coverage of 0.0656. However, the net role of fixed broadband and economic freedom in inclusive finance is positive with no limit. Thus, except for the net influence of fixed broadband and economic freedom, the collaborative role of innovative facility indicators and economic freedom portrayed positive effects on financial inclusion up

to certain coverages (*see* net effect and threshold in Table 5). Indicating that SSA's innovative facilities initiate a strengthening role in the relationship between economic freedom and inclusive finance and subsequently weaken the relationship. In other words, even in freedom-enhanced economies in SSA, innovative facilities improve financial inclusion to a coverage of 0.0656, above which it turns to hinder inclusive finance.

The positive role of innovative facilities on the effect of economic freedom on inclusive finance is justified by the fact that innovative facilities kill the barrier of distance to financial inclusion and make it easy to access financial services. Its negative role in the economic freedom-inclusive finance nexus after a certain threshold brings us back to the argument of Ozili (2018) that innovative facilities can negatively influence inclusive finance in low-income countries (like SSA) because of the high cost of using innovative facilities to access financial services and low literacy.

Extending from the two main reasons given for the negative role of innovative facilities in freedom-induced financial inclusion after a certain threshold. The study argues that one main ingredient essential to achieving financial inclusion is affordability. Modern financial intermediation theory specifies low transaction costs as the foundation for including more people in the financial system (Demir, Pesqué-Cela, Altunbas and Murinde, 2022); the Law of Demand indicates that high costs reduce consumption; and Nutassey et al. (2023) found high electronic transaction costs hinder financial inclusion. Thus, if the cost of using innovative facilities for patronizing financial services in an economy is high, a freedom-induced financial inclusion agenda is likely to be limited. Since SSA is known for high internet and fixed broadband costs (Business Insider Africa, 2021), internet banking could be discouraged even if freedom is given to residents and financial sectors to operate. Also, the cost of using mobile phones to access financial services (bank charges and taxation on electronic transactions) could adversely impact innovative facilities on economic freedom – financial inclusion nexus. Practically, a person who gets access to a phone and internet may be eager to access financial services using his phone and internet due to its convenience, but as he realizes the high cost involved, he might return to an informal form of saving if the distance to a financial institution is too far.

In addition, the positive role of innovative facilities in promoting freedom-inducing financial inclusion can be limited if literacy in technology use and financial products is low.

In SSA, low-technical knowledge is recorded (World Economic Forum, 2019). Low technical know-how for innovative facilities is likely to make the use of innovative facilities for accessing financial services difficult, even in a less restricted economy. Meanwhile, the technology acceptance model contends that a person's use of an innovative facility is dependent on its ease and usefulness (Davis, 1989). From this, easy use of innovative facilities is a key requirement for accessing financial services; thus, low technical knowledge will make the use of innovative facilities in accessing financial services difficult, resulting in low financial access even in a free economy. Implying that financial services would provide services that are innovative and friendly in a free economy, but lack of technical know-how on the use of innovative facilities would frustrate its financial inclusion goal. In this case, the study argues that the barrier of distance to financial inclusion, especially in rural areas of an economy, is very likely to persist in a free economy even if innovative facilities are made available when residents have low knowledge and skills in the use of innovative facilities. Hence, weakening financial inclusion in a free economy. Also, low financial literacy implies people lack knowledge of financial products and the importance of participating in the financial system (Munari et al., 2021; Ozili, 2020). This means that people might have access to innovative facilities but lack knowledge of the kinds of financial products they can access using their phones and the internet. Hence, the usefulness of innovative facilities for financial services, which is the second requirement according to the technology acceptance model to facilitate the use of innovative facilities in accessing financial services, would be hindered. In other words, if residents lack knowledge on how innovative facilities can be useful for financial services, then the usage of innovative facilities would rather weaken the role of economic freedom in enhancing inclusive finance. Hence, with low technical and financial knowledge in SSA, the positive role of innovative facilities in freedom-induced inclusive finance is limited. This is because only the literate would mostly use innovative facilities to access financial services, and it is known that most residents in SSA are illiterate in both technology and finance (World Economic Forum, 2019).

From the outcomes of Akpa et al. (2022), the study further argues that the undesirable role of innovative facilities on the effect of economic freedom on inclusive finance in SSA after a threshold could be a result of poor governance. This is because after Akpa et al. (2022) moderated the impact of innovative facility measures on financial inclusion in SSA, the direction of the relationship, which was initially negative between innovative facilities and financial inclusion, changed to positive.

The findings in Table 5 partially confirm the third hypothesis that innovative facilities positively influence the effect of economic freedom on inclusive finance in SSA. Therefore, even in a free SSA, innovative facilities' positive role in financial inclusion is limited based on certain factors in the economy.

In all the columns of Tables 4 and 5, the lag of financial inclusion significantly influences financial inclusion positively. Implying that past inclusive finance has repercussions for current inclusive finance. Hence, DGMM is a good technique for this study. Again, all the columns in Tables 4 and 5 depict that the diagnostic necessities of DGMM are met: Hansen and Sargan tests failed to reject the assumption of the validity of instruments, which implies that the entire set of instruments used in the models is valid; additionally, the probability value of the AR2 test is in favour of the null hypothesis of no autocorrelation, which means that there is an absence of autocorrelation in the regression results. Also, Fisher statistic tests are significant, implying the overall validity of the models.

6.4 Robustness Check

The reliability of the findings in this paper was checked using the overall freedom score from the Heritage Foundation in place of the economic freedom index from the Fraser Institute to measure economic freedom. The main findings were maintained in Tables 7 and 8 (*see* Appendix). This implies that the result obtained in this paper is consistent.

6.5 Hypotheses Tested and Decisions

In this phase, the paper presents the decisions made on the various hypotheses tested in this study.

Table 6 of paper 2

Hypotheses Tested and Decisions

Hypotheses	**Decisions**
H_1: Economic freedom affects inclusive finance in SSA, positively.	Confirmed
H_2: Innovative facilities affect inclusive finance in SSA, positively.	Unconfirmed
H_3: Ceteris paribus, innovative facilities positively influence the effect of economic freedom on inclusive finance in SSA.	Partially confirmed

6.6 Conclusions and Policy Recommendation

The study shed light on the role of innovative facilities in the effect of economic freedom on inclusive finance in SSA. The study found that strengthening economic freedom encourages

financial inclusion, while increasing innovative facilities in SSA reduces financial inclusion. Further, the study found that innovative facilities strengthen the effect of economic freedom on inclusive finance, but after certain thresholds (see the various thresholds in Table 5), they start weakening the relationship. Thus, the paper suggests that to increase financial inclusion, first, policymakers in SSA should ensure freedom in their economies by ensuring that bureaucracy for establishing financial institutions is minimized, licensing regulations for financial services are friendly and institutions that ensure property rights and free will should be instituted to encourage people to participate in financial services. When it comes to using innovative facilities to enhance freedom-induced inclusivity in finance, technical and financial knowledge should be enhanced in addition to lowering the cost of using innovative facilities to access financial services to prevent negative influence after the thresholds.

6.7 Limitations and Suggestions for Further Studies

It cannot be denied that the main platform through which most Sub-Saharan Africans have been involved in the financial system is the mobile money platform. However, mobile money usage was not included in the calculation of the inclusive finance index because the time range for data available on mobile money is short and insufficient for the time period and the number of countries considered in this study. Hence, other researchers can reduce the time coverage and the number of countries considered in the study to be able to include mobile money in inclusive finance index computation and reexamine the role of innovative facilities on the effect of economic freedom on inclusive finance in SSA. Again, based on the findings, this study suggests a study should be conducted on the role of literacy and the cost of using technology on the effect of technology use on inclusive finance in SSA. This is to confirm the high cost and low literacy justifications given for the negative impact of innovative facilities after the threshold. Additionally, even though Akpa et al. (2022) have considered the role of governance in the internet-inclusive finance nexus in SSA and their findings support the negative effect of the internet on inclusive finance in SSA, on the basis that the internet alone does not represent the overall technological use in SSA, the role of governance in the relationship between technology and inclusive finance in SSA should be examined. 'This is to confirm the argument that poor governance causes the negative role of technology in inclusive finance after the threshold, which is built on Akpa et al. (2022) findings. Finally, other studies can consider threesome interactions such as:

- the interaction among innovative facilities, economic freedom and cost of using innovative facilities on inclusive finance in SSA.

- the interaction among innovative facilities, economic freedom and literacy on inclusive finance in SSA.
- the interaction among innovative facilities, economic freedom and governance on inclusive finance in SSA.

This is to see if statistically the threshold on the positive role of innovative facilities on economic freedom and inclusive finance in SSA would reduce or be eliminated with the present cost of using innovative facilities, literacy, or governance.

6.8 Appendices to Paper Two (2)

Table 7 of paper 2

Effect of economic freedom and innovative facilities on financial inclusion

Variable	**(1)** INCF	**(2)** INCF	**(3)** INCF	**(4)** INCF	**(5)** INCF
L.INCF	0.9904***	1.0259***	0.9521***	1.0510***	0.9973***
	(0.0267)	(0.0183)	(0.0233)	(0.1208)	(0.0312)
EF	0.0087***	0.0101**	0.0071*	0.0004	0.0120***
	(0.0024)	(0.0036)	(0.0041)	(0.0031)	(0.0030)
MOB	-0.0014**				
	(0.0005)				
INTER		-0.0027***			
		(0.0004)			
FBB			-0.0164**		
			(0.0068)		
TEL				0.0301***	
				(0.0093)	
INNOV					-0.0888***
					(0.0241)
INFLA	0.0090**	0.0013**	0.0016*	0.0026	-0.0007
	(0.0007)	(0.0014)	(0.0008)	(0.0021)	(0.0008)
UNEMP	0.0028	-0.0072***	0.0070**	-0.0141	0.0023
	(0.0045)	(0.0024)	(0.0027)	(0.0149)	(0.0029)
EDU	-0.0012	-0.0019	0.0003	-0.0077	0.0012
	(0.0015)	(0.0012)	(0.0007)	(0.0058)	(0.0022)
lnEGP	0.0686***	0.0412	-0.0055	0.0791	-0.0218
	(0.0503)	(0.0275)	(0.0354)	(0.0785)	(0.0421)
lnPOP	0.0018	-0.0197	-0.0422***	0.0338	-0.0160
	(0.0422)	(0.0413)	(0.0122)	(0.0463)	(0.0448)
_cons	-0.8177	-0.2976	0.3007	-0.7069	-0.2980
	(0.8747)	(0.7313)	(0.2817)	(0.8591)	(0.9725)
AR(1)-Pv	**0.096**	**0.095**	**0.101**	**0.094**	**0.099**

AR(2)-Pv	**0.159**	**0.169**	**0.166**	**0.146**	**0.159**
Sargan OIR (Pv)	**0.745**	**0.967**	**0.699**	**0.812**	**0.659**
Hansen OIR (Pv)	**0.489**	**0.619**	**0.442**	**0.809**	**0.404**
Fisher	**5386.63*** **	**3266.51*** **	**4834.91*** **	**3868.44*** **	**5791.28*** **
Instruments	**18**	**18**	**18**	**18**	**18**
Groups	**22**	**21**	**21**	**22**	**21**
N	**189**	**188**	**179**	**188**	**177**

Note. *** is significant at 0.01, ** is significant at 0.05 and * is significant at 0.1. Also, INCF is Inclusive Finance, EF is Economic Freedom, MOB is Mobile Phone Usage , INTER is Internet Usage, FBB is Fixed Broad Band Usage, TEL is Telephone Usage, INNOV is Innovative Facilities, INFLA is Inflation , UNEMPL is Unemployment, EDU is Education, lnEGP is Natural Log Economic Growth per Person and lnPOP is Natural Log Population. Again, *N is the number of observations,* AR is Arellano-Bond, Pv is the probability value and OIR is a test for Overid Restrictions.

Source: Author's computation

Table 8 of paper 2

The role of innovative facilities in the link between economic freedom and inclusive finance

Variable	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**
	INCF	INCF	INCF	INCF	INCF
L.INCF	1.0341***	0.8484***	0.9504***	0.7095***	1.0479***
	(0.0569)	(0.0786)	(0.0301)	(0.0138)	(0.0778)
EF	0.0280***	0.0140**	0.0006	0.0118**	0.0119*
	(0.0051)	(0.0056)	(0.0049)	(0.0056)	(0.0062)
MOB	0.0137**				
	(0.0058)				
MOB * OF	-0.0003**				
	(0.0001)				
INTER		0.0225*			
		(0.0122)			
INTER*EF		-0.0004**			
		(0.0002)			
FBB			-0.4634***		
			(0.0498)		
FBB*EF			0.0061***		
			(0.0018)		
TEL				-0.1940**	
				(0.0758)	
TEL*EF				0.0029**	
				(0.0011)	
INNOV					0.4700**
					(0.2117)

INNOV * EF					-0.0101**
					(0.0040)
INFLA	-0.0010	-0.0020	0.0028	0.0059	-0.0024
	(0.0032)	(0.0032)	(0.0027)	(0.0021)	(0.0020)
UNEMP	0.0406***	-0.0068	-0.0032	0.0276**	-.0203
	(0.0127)	(0.0131)	(0.0052)	(0.0080)	(0.0148)
EDU	0.0047	0.0009	-0.0002	0.0052**	-0.0004
	(0.0051)	(0.0028)	(0.0020)	(0.0017)	(0.0017)
lnEGP	-0.0768	0.3397**	0.1619**	-0.0470	-0.0196
	(0.0951)	(0.1291)	(0.0606)	(0.0687)	(0.0731)
lnPOP	-0.0509	-0.0984	-0.0033	-0.0828	0.0606
	(0.0595)	(0.0685)	(0.0447)	(0.0671)	(0.0463)
_cons	0.0649	-2.0650	-1.0428	0.5169	-1.5507
	(1.2897)	(0.8753)	(0.8975)	(1.1670)	(1.0206)
Net influence	0.0050	0.0068	N.A	N.A	0.0119
Threshold	93.3333	35	N.A	N.A	1.1782
AR(1)-Pv	**0.090**	**0.120**	**0.067**	**0.084**	**0.087**
AR(2)-Pv	**0.140**	**0.171**	**0.173**	**0.166**	**0.143**
Sargan OIR (Pv)	**0.860**	**0.409**	0.000	0.016	**0.898**
Hansen OIR (Pv)	**0.261**	**0.602**	**0.402**	**0.537**	**0.452**
Fisher	**5856.53*** **	**1010.76*** **	**255430.32*** **	**6911.05*** **	**1771.03*** **
Instruments	**18**	**18**	**18**	**18**	**18**
Groups	**22**	**22**	**21**	**22**	**20**
N	**189**	**188**	**179**	**188**	**168**

Note. *** is significant at 0.01, ** is significant at 0.05 and * is significant at 0.1. Also, INCF is Inclusive Finance, EF is Economic Freedom, MOB is Mobile Phone Usage , INTER is Internet Usage, FBB is Fixed Broad Band Usage, TEL is Telephone Usage, INNOV is Innovative Facilities, INFLA is Inflation , UNEMPL is Unemployment, EDU is Education, lnEGP is Natural Log Economic Growth per Person and lnPOP is Natural Log Population. Again, *N is the number of observations,* AR is Arellano-Bond, Pv is the probability value and OIR is a test for Overid Restrictions.

Source: Author's computation

CHAPTER SEVEN

INCLUSIVE FINANCE-ECONOMIC WELLBEING NEXUS IN SUB-SAHARAN AFRICA: THE COMPLEMENTARY ROLE OF ECONOMIC FREEDOM.

Chapter seven presents paper three.

7.1 Introduction

Economies in the Sub-Saharan Africa (SSA) region possess poor economic conditions. For example, World Bank (2018) indicated that the extremely poor population in SSA rose to 437 million in 2018 from 278 million in 1990. Also, evidence from the human development index shows Sub-Saharan Africa's economy to be among the top economies housing individuals with the poorest economic wellbeing (UNESCO Institute of Statistics, 2015). Hence, while global economic hardship is decreasing, the number of people in SSA living in extreme hardship is increasing (World Bank, 2018). This severe condition is expected to worsen in 2020 and 2021 amid the shock of the coronavirus pandemic that has affected employment and collapsed businesses (Mehtar et al., 2020; Shen, Fu, Pan & Chen, 2020). Also, Ukraine-Russian war could also increase the poor economic wellbeing of people in SSA (Ali, Azaroual, Bourhriba, and Dadush, 2022). Before the emergence of the novel coronavirus pandemic and the Ukraine-Russian war, the World Bank had forecasted that, by 2030, roughly nine out of ten severely poor individuals would be living in SSA economies. These might be a major setback for one of the set 2015 African Union Agenda of enhancing economic wellbeing of the people of Africa by 2063. Hence, this paper investigates possible ways of achieving Africa Union's agenda of enhancing economic wellbeing in SSA. Economic wellbeing is conceptualized in this paper as enhancing quality education, health access and income level of residents.

Toward enhancing economic wellbeing, financial inclusion cannot be sidelined (Malekano, 2020; Ofori-Abebrese, Baidoo & Essiam, 2020). This is because supply-leading hypothesis indicates that inclusive finance is necessary for growth and economic wellbeing (Sen & Laha, 2021; Schumpeter, 1911). Also, finance dictates who can access and pay for quality education, health, and other social and economic opportunities (Malekano, 2020). Intuitively, access to financial services enables individuals to save and invest to enhance their income as well as access to credit for businesses, education and health facilities. Since enhancing financial inclusion can be a pre-condition for spurring the economic wellbeing of people in SSA, SSA economies must include more people in the financial system to enhance their living conditions in the region (N'dri & Kakinaka, 2020).

However, access to the financial system may not offer a better solution unless individuals with access to funding can engage in economic wellbeing-enhancing outcomes with minimum government interference. Thus, economic agents with access to funding also require the needed level of economic freedom to engage in economic activity. Thus, promoting economic freedom could improve economic wellbeing in SSA (Doran & Stratmann, 2021). Free market theory by Smith (1776) has brought to light the importance of openness in economic outcomes. In a seminal paper, Acemoglu, Johnson and Robinson (2005) explain how strengthening certain economic institutions that guarantee freedom from expropriation by powerful elites can promote economic wellbeing. Again, Sen's capability theory states that freedom to pursue economic wellbeing is only possible when people have the required capabilities (Sen, 1985). Therefore, the collaborative effort of economic freedom and inclusive finance could result in higher economic wellbeing because financial inclusion builds the capacity of residents in an economy by offering funds to undertake business activities and a secure place to save and invest (Ofori-Abebrese et al., 2020). Extending on the argument, this paper contends that in an economy where freedom is increased, people are more likely to engage in a variety of activities that can complement financial inclusion in improving people's economic wellbeing.

Yet, there is a paucity of empirical evidence on the moderating role of economic freedom in the inclusive finance-wellbeing nexus in SSA. Therefore, the study contributes to existing studies in SSA by examining the complementary role of economic freedom in the association between inclusive finance and economic wellbeing. Also, earlier studies on the effect of inclusive finance on economic wellbeing in SSA failed to include the financial market aspect in the index they computed for financial inclusion (Ofori-Abebrese et al., 2020; Tita & Aziakpono, 2017). This might be because the financial markets in SSA are vulnerable compared to financial institutions. Thus, in this paper, a novel index for financial inclusion which includes the financial market of SSA was computed.

7.2 Developing Hypotheses Based on Literature

Even though supply-leading hypothesis originally indicated that financial services result in economic growth (Schumpeter, 1911). Sen et al. (2021) expanded supply-leading hypothesis by indicating that supply-leading hypothesis implies that financial inclusion facilitates achieving higher economic wellbeing for the people in an economy. Hence, the link between inclusive finance and economic wellbeing is built on supply-leading hypothesis. From Sen et al. (2021) explanation for supply-leading hypothesis implies people are incentivized to save

and invest when financial services are made available and affordable in an economy. Hence, the presumption that a well-functioning financial sector has the power to increase capital accumulation, transfer resources from the economy's non-growth sectors to its more recent growth-promoting ones, mobilize savings, expand liquidity and drive total economic efficiency (Ozigbu, 2018) with the overall aim of improving economic wellbeing is supported by this hypothesis.

In support, finance-inequality narrowing theory states that people struggling financially are barred from using financial services such as borrowing money to invest in physical and human (Banerjee & Newman, 1993; Galor & Zeira, 1993). In other words, individuals with less wealth have to borrow from financial institutions to invest in their education and economic activities to improve their wellbeing (Ofori- Abebrese et al., 2020). According to the financial-inequality narrowing hypothesis, financial inclusion and income inequality are inversely correlated ; as inclusive finance advances, inequality declines and economic wellbeing is enhanced**.** This implies that inclusive finance which increases access to credit and other financial services gives the poor the platform to borrow funds to invest in their human capital and raise their earning potential, both of which contribute to their overall economic wellbeing. This further implies that less wealthy inheritors will likely continue to experience poor economic wellbeing if they do not have access to financial services, and this can pass down from generation to generation. Therefore, financial inclusion as a relevant tool for boosting SSA's economic wellbeing is reinforced by financial-inequality narrowing hypothesis.

When it comes to the relationship between economic freedom and wellbeing, free market theory by Smith (1776) contends that in a less constrained market, supply and demand will naturally approach an equilibrium where the highest possible financial and economic good for the individuals in the economy will be realized. Corporate Finance Institute (2023) indicated that free market theory is characterized by private property, consumer sovereignty, competition, profit, voluntary exchange and limited government involvement. Drawing from this, the study indicates fewer restrictions or interferences from the government in an economy's market can solve poor economic issues (Le Goff & Singh, 2014).

Nevertheless, Amartya Sen's capability theory 1980s detailed that freedom to pursue economic wellbeing is only possible when people have the required capabilities. According to Kimmitt and Munoz (2017), Sen's capability theory generally argues that freedom-induced

economic wellbeing only makes sense if freedom is interconnected and complementary. Hence, paper three's suggests that the interconnection between economic freedom and inclusive finance could result in higher economic wellbeing is theoretically backed. This is because financial inclusion builds the capacity of residents in an economy by offering them credits, insurance and providing a secure place for residents to save and invest (Ofori-Abebrese et al., 2020). Thus, making financial services accessible and affordable is one way the capacity of individuals could be built for their economic wellbeing to improve in an economy where restrictions are minimal.

7.2.1 Inclusive finance and economic wellbeing

In SSA, Atta-Ankomah and Okyere (2022) studied the effects of inclusive financial services such as mobile money on consumption expenditure and poverty by using the inverse probability weighted technique. Using nationwide representative data in Ghana, the findings revealed that the adoption of inclusive finance services surges household consumption expenditure and decreases poverty. Likewise, Abiona and Koppensteiner (2022) estimated the effect of mobile money implementation on poverty, consumption smoothing, and human capital investments in Tanzania. They found that households are able to smooth consumption during periods of shock and uphold their investments in human capital. Supportively, Ebele, Uche and Joan (2022) assessed the effect of inclusive finance on the welfare of households. The study indicated that inclusive finance optimized the welfare of households. Moreso, Mulbah, Olumeh, Mantey and Ipara (2022) analyzed the effect of inclusive finance on the welfare of households in Liberia with data from the Liberian Household Income and Expenditure Survey between 2016 and 2017. The study used an inverse probability-weighted regression adjustment and confirmed that mobile money significantly improves household food security. The study shows that scaling up financial inclusion is a catalyst for improving household welfare.

Aidoo, Matthew, Saleh, and Bizoza (2022) investigated the impact of inclusive finance on Burundians' household asset-based welfare. Their study engaged the two-stage least squares regression method, and their data revealed that most Burundians' financial inclusion boosts welfare households. In the same vein, Ondoa, Bella and Bindop (2022) undertook the effect of mobile money services on the welfare of the people in Cameroon. It specifically focuses on whether the welfare of people receiving help from family through mobile money services has improved. Their findings show a positive and substantial effect of mobile money on welfare. Likewise, Manja and Badjie (2022) did a comparative evaluation of the effect of

formal and informal finance on household welfare in the Gambia. The study employed data from the Gambia 2015–2016 Integrated Household Survey to assess the relevance of access to various forms of finance on household food and non-food expenditures, total income, education expenditure, and a subjective assessment of welfare. The study found that access to either formal or informal finance has some harmful impacts on welfare.

Makuluni and Dunga (2022) looked at the relevance of credit availability on welfare inequality in Malawi. It examined whether access to credit is relevant to the welfare of Malawian households using data from Malawi's Integrated Household Survey 2017 and the propensity score. Welfare was measured by consumption per capita as a proxy for household welfare. The results showed a positive impact of access to credit on welfare, as households with access to credit experienced lower levels of inequality than those without. Again, Iddrisu and Danquah (2021), using a household survey of the whole of Ghana, assessed the role of inclusive finance on household welfare. It computed a multidimensional index to represent inclusive finance and assessed its effect on household welfare. The study found that households experiencing financial exclusion have lower welfare compared to those who are financially included. Moreso, Quansah (2021), among others, considered the effect of inclusive finance on social welfare in Ghana. The main data source for the study was the Ghana Living Standard Survey data compiled by the Ghana Statistical Service between 2016 and 2017. The results revealed that inclusive finance has positive effects on households' social welfare in Ghana. Furthermore, Matekenya et al. (2021) examined the effect of inclusive finance on human development in SSA. Their finding demonstrated that inclusive finance positively impacts human development. Moreso, Agyemang-Badu, Agyei, and Kwaku Duah (2018) constructed an inclusive finance index and examined its impact on poverty and income inequality in African economies. Their study found that inclusive finance is inversely related to poverty and income inequality in Africa.

Ofori-Abebrese et al. (2020) estimated the effects of inclusive finance on SSA countries and revealed that inclusive finance has a positive link with welfare. Likewise, Abor, Amidu, and Issahaku (2018) examined whether households' ability to live fulfilling lives is improved by having access to a wide range of financial services. According to their findings, inclusive finance penetration considerably lowers the likelihood that a household will become impoverished and raise per capita consumption of food and non-food products. Similarly, Koomson, Villano and Hadley (2020) examined the effect of inclusive finance on the poverty of Ghanaian households. Their result showed that inclusive finance addresses poverty issues

and enhances income for food and non-food items. Moreso, Abiona, and Foureaux Koppensteiner (2020) calculated the influence of mobile money in Tanzania on poverty, consumption smoothing, and human capital investments. They concluded that mobile money influences poverty, consumption smoothing, and human capital investments in Tanzania.

Sani Ibrahim, Ozdeser and Cavusoglu (2019), using micro-level data on 1750 rural Nigerian households, examined the finance-welfare nexus by constructing a multi-variable inclusive finance index. Its first results show that inclusive finance exerts a strong positive influence on household welfare. Likewise, Tita (2017) revealed that inclusive finance optimises welfare. In addition, Williams (2017) considered the role of inclusive finance in poverty reduction in developing economies. It concluded that an increase in inclusive finance reduces poverty in developing economies. Furthermore, Hussaini and Chibuzo (2018) investigated the effects of inclusive finance on poverty reduction. They collected data from 384 respondents, and it disclosed a favourable exertion of inclusionary finance on poverty reduction. Again, Khan, Khan, Sayal and Khan (2021) examined the impact of inclusive finance on poverty. To achieve their objectives, they used multiple regressions and established that inclusive finance reduces poverty. Also, Awaworyi Churchill, Nuhu and Smyth (2020) conducted a study on the association between inclusive finance and poverty. The study demonstrated that an increase in inclusive finance is associated with a decline in poverty. Moreover, Vitenu-Sackey and Hongli (2020) delve into how inclusive finance can alleviate poverty and discovered that inclusive finance optimizes poverty alleviation, but when the number of commercial banks is taken into account, it has a negative impact, while the number of ATMs and total amount of loans granted have no impact on poverty alleviation.

Mhlanga, Dunga and Moloi (2020) assessed the impact of inclusive finance on poverty reduction among farmers in Zimbabwe. Using the simple regression method, they discovered that inclusive finance has a strong impact on poverty reduction among smallholder farmers. Equally, Ibrahim (2019) examined the impact of inclusive finance on poverty reduction in SSA countries using data spanning from 1980 to 2017. He found that inclusive finance plays a vital role in poverty reduction. Ogbeide (2019) also considered the impact of inclusive finance on poverty alleviation in Nigeria. The study employed the ordinary least squares multivariate regression technique. Financial inclusion is found to exert favourable influence on per capita income, reduce poverty levels, and improve living standard. Furthermore, Zia and Prasetyo (2018) found that inclusive finance can reduce poverty, but it has not been effective in closing the economic gap in society. Again, Ouechtati (2020) revealed a negative

link between inclusive finance and poverty reduction as well as inclusive finance and income inequality.

From the review, most studies were cross-sectional considering one country (such as Ghana, Brundi and Tanzania) and not the whole of SSA. Another recognition was that few studies had employed human development index as a measure for their dependent variable in SSA. These studies include Matekenya et al. (2021) and Ofori-Abebrese et al. (2020); thus, this study to verify the role of inclusive finance on economic wellbeing. The novelty of this study starts by including financial market access index created by the International Monetary Fund to the inclusive finance index. The earlier two studies in SSA did not consider financial market inclusivity. This implies that the even financial index computed in this study is more comprehensive.

Also, it was revealed from the review that except for a few studies that suggested that financial inclusion does not affect economic wellbeing, most studies agreed that financial inclusion indeed enhances economic wellbeing. Specifically, the studies above indicated that financial inclusion significantly relates to welfare, human development, life expectancy, consumption expenditure and income, positively, while negatively relating to poverty and income inequality. Thus, the study hypothesizes that:

H1: Inclusive finance improves the economic wellbeing of people in SSA.

7.2.2 Economic freedom and inclusive finance

Tyrrell (2019) indicated that greater economic freedom increases economic wellbeing in terms of health outcomes, educational achievement, income and clean natural environments. Tyrrell (2019) justified its argument on various grounds: First, it indicated that economic freedom boosts health. The evidence backed the contention that it is not by chance that the top five freest economies in the 2019 Index of Economic Freedom have a much greater life expectancy than the bottom five repressed economies in the index. Secondly, education outcomes are increased when economic freedom is enhanced. According to Tyrrell (2019), a wide choice of education options unhindered by government control is only possible with a high degree of economic freedom. And education provides individuals with the ability to think critically, acquire valuable skills, and compete more effectively in the marketplace, which results in enhanced economic wellbeing. Again, in a free economy, people can engage in business and investment activities with fewer government restrictions, which reflects in their income. These arguments are supported empirically.

For example, Okunlola and Ayetigbo (2022) considered the role of political institutions in the relationship between economic freedom and human development. Their primary focus was on 15 ECOWAS countries. To achieve long- and short-term relationships, they used pooled mean group ARDL techniques. Their result proved that economic freedom affects human development in the long run. Likewise, Aydan, Bayin Donar and Arikan (2022) investigated the influence of health and social expenditures as well as the economic freedom index on wellbeing in OECD economies. Economic wellbeing was measured with a better life index. We estimated panel models to observe the social and health expenditure effects according to their sources and the overall impact of economic changes among countries. According to their findings, economic freedom improves life. In support of Graafland (2020) argued that economic freedom has an impact on human development in 29 OECD countries. Moreso, Akinlo, and Okunlola (2022) investigated the influence of economic liberty on quality of life. Using the moment technique's generalized method, they found that economic freedom affects quality of life.

Doran et al. (2021) deliberated on the relationship between economic freedom and the rate of poverty in 151 countries. Employing the World Bank's poverty counts, their results indicated that economic freedoms lower poverty rates. In the same vein, Bayar and Sezgin (2017) investigated the interaction among trade openness, inequality and poverty alleviation. They discovered that trade openness influences poverty and inequality negatively in the long term. Again, Adegboyo, Efuntade, Olugbamiye and Efuntade (2021) examined the influence of trade openness on Nigeria's poverty. The study employs an autoregressive distributed lag estimation technique, and the result reveals that trade openness affects poverty in Nigeria. Moreso, Aini, Purba, and Meilliana (2018) found that trade globalization hurts Indonesian welfare. Their finding revealed a negative and significant influence of globalization on welfare. Similarly, Kelbore (2015), assessed the poverty reduction effects of trade openness in Africa. The study employs system-generalized methods of moments, and their findings show that trade openness initially worsens poverty by 1.3%, but after a period lag, it decreases by approximately 1.2%.

Ullah, Zhang, Rehman and Zeeshan (2022) investigated a nexus between natural gas, trade and poverty in Pakistan. Their finding suggested that trade liberalization increases industrial production, which results in poverty reduction. Equally, Shakil and Imran (2022) used an autoregressive distributed lag model to assess direct foreign investment, trade openness, and gross domestic product on poverty. Their finding indicated that globalization has a dominant

impact on poverty. Improving trade openness, in particular, is critical to reducing poverty in Pakistan. Mbah, Agu, Fasina and Oshodi (2022) conducted a study on the association between trade openness and Nigeria's poverty rate. Trade openness, according to their findings, influences poverty rates. Supportively, Atrkar Roshan and Hashemi (2016) found that trade openness eventually affects poverty.

Chishti, Rehman and Murshed (2021) examined the influence of direct foreign investment and trade openness on poverty in Pakistan. The non-linear autoregressive with distributed lag approach was used y. Using the ARDL bound testing technique confirms the long-run association among the selected variables. They concluded that trade openness is equally effective in mitigating poverty. Again, Maku, Ogede, Adelowokan and Oshinowo (2021) examined the impact of trade openness on income inequality and poverty in Nigeria. Their result shows trade openness had a declining effect on inequality and poverty. Moreso, Manka (2014) looked at the effect of trade openness on poverty in Mexico and Korea. They discovered that trade aided in the reduction of poverty in Mexico. Additionally, Adha, Nahar and Azizurrohman (2018) studied the effect of trade liberalization on poverty reduction. Employing ordinary least, their study confirmed that liberalization negatively affects poverty.

There have been studies with contradictory conclusions, including the following. For 70 emerging and developed countries, Migheli and Saccone (2022) investigated the relationship between economic freedom and income distribution. An instrumental-variable technique is used to evaluate the impacts of economic freedom on income shares by deciles and top percentiles, eliminating the possibility of reverse causation. The findings indicate that economic freedom reduces the income of the medium and upper-middle segments while increasing the income shares of the percentiles included in the top decile. The poor, however, do not seem to be affected. Furthermore, Okunlola and Akinlo (2021) demonstrated how economic freedom improves the quality of life using a generalized method of moments estimation. The quality of life, however, is inversely correlated with economic independence in Africa. Again, Agusalim (2017) examined the dynamic effects of global trade openness on poverty in Indonesia. It was found using VECM analysis that trade openness significantly affects poverty. However, it has a long-term influence on lowering poverty. Also, Fambeu (2021) investigated how democracy and unrestricted trade affected poverty. They used the generalized method of moments for Sub-Saharan African nations to accomplish their objectives. According to the study, trade openness has little bearing on poverty. Once more, they discovered that, on the non-linear side, imports raise household living standards in

democratic oil-producing nations while lowering poverty rates in democratic non-oil-producing nations. Munir (2022) also evaluated the impact of trade openness on the decline of poverty in Asia and Africa. The study found that trade openness directly affects poverty. Since most studies suggest that economic freedom enhances economic wellbeing, this study further hypothesizes that:

H2: In a free economy, the economic wellbeing of residents is improved.

7.2.3 Inclusive finance and economic wellbeing: the complementary role of economic freedom

Economic freedom does not only has a recognized place in the agenda for economic prosperity, but it also increases financial inclusion in a nation. For the macro level, economic independence raises sovereign credit ratings, but at the micro level, it makes credit allocation more efficient (Hussain, Yahya & Waqas, 2021). Economic freedom speeds up technological development and financial institution competition (Lyons, Grable, and Joo, 2018), therefore banks may prosper by promoting more financially inclusive strategies. And by so doing, financial inclusion would be enhanced. From 2007 to 2018, Hussain et al. (2021) conducted a global study on the connections among inclusive finance, economic freedom, and government quality in 98 nations. To accomplish its goals, the study used system GMM and the ordinary least squares approach. The role of government characteristics in the relationship between economic freedom and inclusive finance was one of their goals. They used automated teller machines, commercial bank deposit accounts, number of bank branches, and commercial bank borrowers per 100000 adults to produce a composite financial inclusion indicator. The estimation results show that economic freedom has a beneficial influence on inclusive finance. Similarly, Asuming, et al. (2019) looked at the causes and developments of inclusive finance in SSA. Business freedom was one of the many factors cited as important indications of inclusive finance. Their research used a probit model to investigate the factors that influence inclusive finance, utilizing account ownership, savings, and borrowing as indicators. Since economic freedom improves both economic wellbeing and inclusive finance, this paper asserts that financial inclusion can accelerate economic wellbeing with the help of economic freedom. In effect, this paper hypothesizes that:

H3: Ceteris paribus, economic freedom plays a complementary role in inclusive finance-economic wellbeing nexus of SSA.

7.3 Methodology

To assess the complementary role of economic freedom in the inclusive finance-economic wellbeing nexus, this study employed relevant variables from the period of 2008 to 2020. The variables are detailed below:

7.3.1 Variables

Economic wellbeing

Economic wellbeing is the dependent variable in this paper and following Ofori-Abebrese et al. (2020), this study conceptualizes economic wellbeing as representing people's living conditions, educational level, and health in an economy. Thus, if an economy has high income, high proportion of its population is educated and most of the population have access to quality health services, then that economy is experiencing high economic wellbeing. Guided by Ofori-Abebrese et al. (2020) and Onakoya, Johnson and Ogundajo (2019), the study adopted human development index from the United Nations Development Programme. This is because human development index is a composite of income level, literacy level, health and therefore a perfect measure based on the conceptualized meaning of economic wellbeing.

Inclusive finance

Inclusive finance is the independent variable and it represents making financial services and products affordable and accessible to all in an economy. Arguing on the premise of public good theory of financial inclusion, which indicates that everyone, regardless of their status or income level, will benefit from financial inclusion (Ozili, 2020), the study contends that inclusive finance could help enhance the economic wellbeing of people in SSA. This is because finance enables economic agents to engage in economic activity (Malekano, 2020; Snaije, 2017). Also, according to Ofori-Abebrese et al. (2020), financial inclusion includes providing funds to people to undertake economic activities, encouraging people to save and invest, and making financial services easy and accessible to the populace, which results in empowering their economic wellbeing. As a result of earlier findings, this study expects a positive relationship between inclusive finance and economic wellbeing.

In this study, financial inclusion was computed from the number of deposit accounts with commercial banks per 1000 adults, the number of loan accounts with commercial banks per 1000 adults, the number of commercial bank branches per 100000 adults, the number of commercial bank branches per 1000 km2, the number of ATMs per 1000 km2, the number of

ATMs per 100000 adults and financial market index using Principal Component Analysis. According to Jolliffe and Cadima (2016), principal component analysis is a dimensionality-reduction technique used to convert multiple variables into a single index maintaining most information in all the individual variables employed.

Hence, following Kouladoum, Wirajing and Nchofoung (2022) and Hussain et al. (2021), the jth factor indices of the inclusive finance index were guided:

$$FINCI_j = lnW_{j1}DAwCB_1 + lnW_{j2}NoLAwCB_2 + lnW_{j3}NoCB100{,}000_3 + lnW_{j4}NoCB1{,}000_4 + lnW_{j5}NoATM100{,}000_5 + lnW_{j7}NoATM1{,}000_7\ lnW_{j8}FMI_8 \quad (1)$$

$FINC_j$ is financial inclusion index, $DAwCB$ is number of deposit accounts with commercial banks per 1000 adults, $NoLAwCB$ is number of loan accounts with commercial banks per 1000 adults $NoCB100{,}000$ is number of commercial bank branches per 100000 adults, $NoCB1{,}000$ is number of commercial bank branches per 1000 km2, $NoATM100{,}000$ is number of ATMs per 100000 adults, $NoATM1{,}000$ is number of ATMs per 100000 adults and FMI is financial market index. Also, W_j is the factor score weight of the parameter.

Economic Freedom

Economic freedom, according to the Fraser Institute, is the basic right of every man to control his property and labour. Economic freedom, which is the moderating variable in this study, was measured with economic freedom summary index from Fraser Institute, where 1 represents low economic freedom and 10 represents high economic freedom. Economic freedom could assist financial inclusion in improving the economic wellbeing of its citizens. This is because individuals with access to funding and other financial services are likely to engage in economic activities when there is minimum government interference (Hussain et al., 2021). Empirically, Tyrrell (2019) indicated that greater economic freedom increases economic wellbeing in terms of health outcomes, educational achievement and income. In support, Okunlola et al. (2022) proved that economic freedom enhances economic wellbeing. Furthermore, Akinlo et al. (2022) demonstrated that economic freedom improves quality of life. In addition, Asuming et al. (2019) cited business freedom as an important indicator of inclusive finance. Thus, this study expects economic freedom to moderate the association between inclusive finance and economic wellbeing, positively.

When testing the robustness of the findings, the Heritage Foundation's economic freedom overall score was used instead of the Fraser Institute's economic freedom summary index to measure economic freedom.

Justification for the control variables

To avoid a biased result and ensure a reliable outcome for this study, control variables were employed (Nielsen & Raswant, 2018).

Inflation

Inflation was used as the first control variable to assess economic well-being. Inflation is the yearly percentage variation in the cost of procuring a basket of services and goods for the average customer (World Development Indicators, 2022). Consumer prices (annual percent) from World Development Indicators were used as a proxy for inflation. Yolanda (2017) argued that a high inflation rate makes it difficult for investors and businesses to plan, discourages savings and causes residents in an economy to spend more, which affects their overall wellbeing. Education and health care become expensive, leaving little income available to indigenous people. Siyan, Adegoriola and Adolphus (2016) indicated that a reduction in inflation would result in poverty reduction. Agreeably, Olabiyi (2022) stated that a percentage increase in inflation hampers wellbeing. Neaime and Gaysset (2018) confirmed inflation surges poverty. Hence, the possibility of a negative relationship between inflation and economic wellbeing is predicted.

Unemployment

When the majority of a country's population is unable to find work, the country's economic well-being suffers because regular income to meet basic needs such as education and health becomes a scarce commodity for them. For this reason, unemployment is employed as the second control variable in this study (Feriyanto, El Aiyubbi and Nurdany, 2020). Unemployment is proxied by unemployment, total (% of labour force), which is defined by the World Development Indicators as the proportion of the labour force that is available for work but unable to find it. Empirically, Quy (2016) established that unemployment hinders economic wellbeing. Also, Alimova (2021) found a negative effect of unemployment on economic wellbeing. Again, Dahliah and Nur (2021) reinforced the earlier findings by indicating negative effect of unemployment on economic wellbeing. As such, this study expects a negative effect of unemployment on economic wellbeing.

Population

Understandably, speedy population growth could reduce the per capita income of residents, put pressure on health and educational facilities and hence harm the economic wellbeing of residents. Population is the third control variable employed, and it is explained as the total number of residents in a country (World Development Indicators, 2022). It is measured with total population from World Development Indicators. Meo, Khan, Ibrahim, Khan, Ali, and Noor (2018) argued that population growth weakens the wellbeing of the people in an economy. Again, Neaime et al. (2018) indicate that population significantly increases the poverty level in an economy. In effect, this study predicts that population growth will have a negative impact on Sub-Saharan Africans' economic wellbeing.

Gross domestic product per capita

GDP per capita was also used as a control variable. Gross domestic product is explained as the gross value added by all residing producers in an economy, plus any applicable product taxes, minus any unaccounted-for subsidies. While GDP per person, the measure, is captured in World Development Indicators as gross domestic product divided by midyear population. According to Sasmal and Sasmal (2016), growth increases income in an economy and therefore reduces poverty. Lee and Sissons (2016) also argued that growth raises the bargaining power of labour and raises wages. Growth, according to Škare and Družeta (2016) improves wellbeing at all levels. In a similar vein, Dewi, Majid and Kassim (2018) found that economic growth causes poverty to decrease. Thus, this study expects a positive effect of economic growth on economic wellbeing.

Internet usage

Internet usage, according to Galperin and Fernanda Viecens (2017), contributes to the economic wellbeing of residents in an economy by promoting social capital and ICT skills. Internet usage enables profitable, speed-up transactions and enhances communications, which in turn enhances economic wellbeing. In this study, internet usage is explained as access to and use of internet and it is measured by individuals using the internet as percentage of population from World Development Indicators. Galperin et al. (2017) indicated that internet fights poverty. Likewise, Mora-Rivera and García-Mora (2021) revealed that internet access helps reduce poverty levels. In support, Yilmaz and Koyuncu (2018) confirmed that internet usage has the strongest influence on all poverty measures. From the evidence given by earlier

studies on internet usage and poverty, this study envisages a positive influence of internet usage on economic wellbeing.

7.3.2 Estimation procedure

This study used the dynamic generalized methods-of-moments (DGMM) technique proposed by Arellano and Bover (1995) and Blundell & Bond (1998) for panel model estimations. This is because DGMM employs the lag of the dependent variable (in this case) as an explanatory variable in a model. With Ofosu-Mensah Ababio, Attah-Botchwey, Osei-Assibey and Barnor (2021) findings indicating that preceding wellbeing influences the current wellbeing of residents, the lag requirement in DGMM is proven. The logical argument in support of this is that the economic condition of a person determines his or her financial and literacy ability to pursue an activity that can enhance his or her wellbeing in the future. In other words, the money and educational level of a person would determine the kind of economic activities he or she can engage in or the kind of education he or she can pursue to improve his economic condition.

Also, DGMM is a good technique to apply when the cross-sectional data is more than the time dimension of panel data. The data in this study is made up of 30 countries (cross-sectional nature) and 13 years (representing 13-time dimensions). Again, DGMM is able to remove any bias created by unobserved country-specific effects, which are likely to occur in our analysis due to putting thirty different countries together. The possibility of this bias is due to the different conditions in the twenty-nine countries put together in this analysis. Moreso, the DGMM controls for potential endogeneity bias. Hall (2004) indicated that endogeneity is caused by persistent variables, simultaneity bias and omitted variables. Endogeneity makes covariance estimators unreliable (Arrellano, 2003); hence, DGMM employs instrumental variables to ensure consistent and unbiased coefficients.

In the discourse, DGMM is considered a superior technique for the complementary role of economic freedom in the association between inclusive finance and economic wellbeing. While employing DGMM, three important checks are performed. Hansen tests to examine the overall validity of the instruments employed. Also, second-order autocorrelation tests confirm the error terms are not serially correlated (Arellano & Bond, 1991; Baltagi, 2008). Accordingly, DGMM gives reliable results with the postulation that there is no second-order autocorrelation and that the instruments are not correlated with the error terms. Again, Fisher statistic tests assess the viability of the models. It needs to be significant to indicate that the

models in the study are generally viable. Hence, the DGMM model in this study is specified as:

$$EW_{it} = \alpha_{it} + \delta EW_{it-1} + B_1\ INCF_{it} + B_2 EF_{it} + B_3(EF_{it} \times INCF_{it}) + B_4\ INFLA_{it} + B_5\ EDU_{it} + B_6\ UNEMP_{it} + B_7\ lnGDPC_{it} + B_8\ lnPOP_{it} + B_8\ INTERNET_{it} + u_i + \varepsilon_{it} \quad (2)$$

Where EW is economic wellbeing, $EW_{it-1}$is the first lag of economic wellbeing, INCF is economic wellbeing, EF is economic freedom, EF^* $INCF$ is the interaction between economic freedom and financial inclusion, $INFL$ is inflation, EDU is education, $UNEMP$ is unemployment, $lnGDPC$ is the log of gross domestic product per capita, $lnPOP$ is log population and $INTERNET$ is internet. It should also be noted that i refers to the country (i = 30); t refers to the period from (t = 1 to 13); u unobserved country-specific effect and ε is the error term assumed to be serially uncorrelated.

7.4 Results Discussion

Here, the study discusses the results presented in Table 1, 2, 3 and 4.

Table 1 of paper 3

Summary of statistics

Variable	Observation	Mean	Standard Deviation	Minimum	Maximum
EW	376	0.5410293	0.1026372	.346	.804
INCF	352	-0.0000000052	2.074467	-1.575566	8.664826
NCBB100000	378	7.120447	9.271501	.4726674	55.07052
NCBB1000	378	8.386532	22.25739	.004656	111.8227
NDAwCB	378	420.1053	491.7646	.0417441	2946.407
NLAwCB	365	113.4195	153.5612	.213429	642.8558
ATM100000	378	14.43806	42.31035	.0127065	228.5714
ATM1000	378	14.66726	19.39577	.0679605	89.99328
FMAI	365	0.0945929	0.1889007	0	0.9154567
EF	335	6.350746	.7702708	4.48	8.26
INFLA	369	11.5845	38.95726	-2.814698	557.2018
UNEMP	365	8.927348	7.870426	0.6	29.22
lnGDPC	373	7.328843	1.056199	5.290048	9.755685
lnPOP	378	16.06194	1.557703	11.37316	19.15462
INTERNET	366	17.87626	17.17596	.25	79

Note. EW- Economic Wellbeing, INCF – Inclusive Finance, NCBB100000 - Number of Commercial Bank Branches per 100,000 adults, NCBB1000 - Number of Commercial Bank Branches per 1,000 km2, NDAwCB - Number of Deposit Accounts with Commercial Banks per 1,000 adults, NLAwCB - Number of Loan Accounts with Commercial Banks per 1,000 adults, ATM100000 - number of ATMs per 100,000 adults, ATM1000 - Number of ATMs per 1,000 km2, FMAI -Financial Market Index, EF- Economic Freedom, INFLA - inflation, EDU is education, UNEMP -unemployment, lnGDPC- log of gross domestic product per capita and lnPOP -log population and INTERNET – Internet.

Source: Author's computation

In Table 1, the nature of the variable of interest was discussed based on the mean performance. Table 1 reveals that SSA's average economic wellbeing from 2008 to 2020 was

0.541. According to United Nations Development Programme, the scale of measurement for human development index used to measure economic wellbeing is from 0 to 1, and a score from 0.0 and 0.55 indicates low human development. Insinuating that SSA residents are experiencing low economic wellbeing. Also, on the range of -1.576 to 8.665, financial inclusion in SSA had an average of -0.0000000052, proving low financial inclusion. When it comes to financial market access, again, a low of 0.094 was recorded. Again, based on the scale of 1 to 10 given by Fraser Institute, 1 represents low economic freedom and 10 represents high economic freedom. SSA recorded a mean score of 6.351, signifying that freedom in SSA is above average. Moreso, the average scores for the control variables were 11.585, 8.927, 7.329, 16.062 and 17.876 for inflation, unemployment, log of GDP per capita, log of population and internet, respectively.

Table 2 of paper 3

Pairwise correlations

Variables	EW	INCF	NCBB 100000	NCBB 1000	NDAwCB	NLAwCB	NATM 100000	NATM 1000	FMAI	EF	INFLA	UNE	lnGDP	lnPOP	INTERNET
EW	1.000														
INCF	0.868***	1.000													
NCBB100000	0.719***	0.860***	1.000												
NCBB1000	0.605***	0.823***	0.761***	1.000											
NDAwCB	0.669***	0.773***	0.730***	0.419***	1.000										
NLAwCB	0.773***	0.790***	0.508***	0.430***	0.626***	1.000									
NATM100000	0.613***	0.805***	0.621***	0.957***	0.342***	0.489***	1.000								
NATM1000	0.798***	0.884***	0.727***	0.518***	0.795***	0.812***	0.522***	1.000							
FMAI	0.480***	0.485***	0.130**	0.305***	0.179***	0.467***	0.420***	0.346***	1.000						
EF	0.504***	0.596***	0.406***	0.476***	0.404***	0.437***	0.473***	0.393***	0.549***	1.000					
INFLA	-0.068	-0.105*	-0.065	-0.055	-0.028	-0.085	-0.056	-0.086*	-0.045	-0.186***	1.000				
UNEMP	0.474***	0.416***	0.387***	-0.081	0.451***	0.527***	-0.003	0.671***	0.201***	0.158***	-0.020	1.000			
lnGDPC	0.876***	0.785***	0.667***	0.475***	0.633***	0.742***	0.493***	0.799***	0.438***	0.315***	-0.047	0.651***	1.000		
lnPOP	-0.435***	-0.577***	-0.670***	-0.533***	-0.308***	-0.309***	-0.435***	-0.478***	0.048	-0.133**	0.054	-0.503***	-0.473***	1.000	
INTERNET	0.791***	0.745***	0.637***	0.486***	0.674***	0.634***	0.503***	0.726***	0.328***	0.335***	-0.044	0.477***	0.694***	-0.376***	1.000

Note. *** pv<0.01, ** pv<0.05, * pv<0.1. EW- Economic Wellbeing, INCF - Financial Inclusion, NCBB100000 - Number of Commercial Bank Branches per 100,000 adults, NCBB1000 - Number of Commercial Bank Branches per 1,000 km2, NDAwCB - Number of Deposit Accounts with Commercial Banks per 1,000 adults, NLAwCB - Number of Loan Accounts with Commercial Banks per 1,000 adults, ATM100000 - number of ATMs per 100,000 adults, ATM1000 - Number of ATMs per 1,000 km2, FMAI -Financial Market Index, EF- Economic Freedom, INFLA - inflation, EDU is education, UNEMP -unemployment, lnGDPC- log of gross domestic product per capita and lnPOP -log population and INTERNET – Internet.

Source: Author's computation

To assess possible multicollinearity issues, Table 2 presents the correlation among the variables employed. Multicollinearity issues occur in regressors; hence, attention is given to the correlations among the exogenous, moderating and control variables. Using Kennedy (2008) threshold of 0.8, it was observed that apart from the financial inclusion measures, which recorded above 0.8 values for correlation, the rest of the variables had values below 0.8. The study specifies that there is no multicollinearity issue because measures of inclusive finance were employed in separate models (*see* the 8 models in Tables 3 and 4). Again, most of the explanatory variables have significant relationships with economic wellbeing. Indicating the independent, moderating and control variables employed explains economic wellbeing.

7.4.1 Discussing DGMM Results

Using coefficients and standard errors in Tables 3 and 4, the empirical DGMM results are explained. The stars attached to the coefficients are explained as follows " ***", "**" and "*" are interpreted as 1, 5 and 10 percent significant levels, respectively.

Table 3 of paper 3

Direct effect of inclusive finance and economic freedom on economic wellbeing

Variable	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**
	EW	EW	EW	EW	EW	EW	EW	EW
L.EW	0.80220***	0.78474***	0.84085***	0.73488***	0.87999***	0.72019***	0.71258***	0.79964***
	(0.06052)	(0.03643)	(0.04178)	(0.02825)	(0.04384)	(0.06607)	(0.04388)	(0.05132)
INCF	0.00235*							
	(0.00129)							
NCBB100000		0.00127***						
		(0.00049)						
NCBB1000			0.00048***					
			(0.00015)					
NDAwCB				0.00001*				
				(0.000008)				
NLAwCB					0.00003*			
					(0.00001)			
NATM100000						0.00014		
						(0.00020)		
NATM1000							0.00011*	
							(0.00006)	
FMAI								0.00005
								(0.00541)
EF	0.00587***	0.00816*	0.00404	0.01688***	0.00669**	0.00985***	0.00007***	0.00042
	(0.00168)	(0.00416)	(0.00441)	(0.00492)	(0.00250)	(0.00124)	(0.00130)	(0.00257)
				Control Variables				

INFLA	0.00018*	0.00006***	0.00005***	0.00010***	0.00006***	0.00008***	0.00007***	-0.00001
	(0.00008)	(0.00001)	(0.00001)	(0.00002)	(0.000009)	(0.000003)	(0.00004)	(0.00021)
UNEMP	-0.00071**	-0.00189***	-0.00127**	-0.00024	-0.00056	-0.00105	0.00059	-0.00088*
	(0.00031)	(0.00059)	(0.00050)	(0.00029)	(0.00042)	(0.00065)	(0.00064)	(0.00044)
LnGDPC	0.01681***	0.01279***	0.01484***	0.01445***	0.01596***	0.01823**	0.01823***	0.01259**
	(0.00391)	(0.00407)	(0.00463)	(0.00434)	(0.00469)	(0.00703)	(0.00546)	(0.00559)
lnPOP	-0.00256	-0.01234***	-0.00559	-0.00452	0.00642*	-0.00377	0.00591	-0.00373*
	(0.00195)	(0.00348)	(0.00379)	(0.00456)	(0.00341)	(0.00280)	(0.00389)	(0.00185)
INTERNET	0.00011	0.00027***	0.00011*	0.00012*	-0.00013	0.00027	0.00020	0.00020
	(0.000009)	(0.00005)	(0.00007)	(0.00007)	(0.00009)	(0.00017)	(0.00013)	(0.00012)
_cons	-0.00256	0.18422***	0.05598	0.00069	-0.18843**	0.02442	-0.11812*	0.05911*
	(0.03103)	(0.04093)	(0.05901)	(0.09124)	(0.07307)	(0.05430)	(0.05845)	(0.03412)
AR(2)-Pv	**0.864**	**0.716**	**0.975**	**0.457**	**0.873**	**0.976**	**0.967**	**0.929**
Hansen OIR-Pv	**0.572**	**0.596**	**0.199**	**0.487**	**0.438**	**0.616**	**0.423**	**0.569**
Fisher	**262076.12*** **	**719828.18*** **	**90988.42*** **	**294800.24*** **	**156949.76*** **	**808205.85*** **	**1170000*** **	**77342.42*** **
Instruments	**24**	**22**	**22**	**22**	**22**	**22**	**22**	**22**
Groups	**24**	**26**	**26**	**26**	**25**	**26**	**26**	**25**
N	**275**	**298**	**298**	**298**	**286**	**298**	**298**	**287**

Note. EW- Economic Wellbeing, INCF – Inclusive Finance, NCBB100000 - Number of Commercial Bank Branches per 100,000 adults, NCBB1000 - Number of Commercial Bank Branches per 1,000 km2, NDAwCB - Number of Deposit Accounts with Commercial Banks per 1,000 adults, NLAwCB - Number of Loan Accounts with Commercial Banks per 1,000 adults, ATM100000 - number of ATMs per 100,000 adults, ATM1000 - Number of ATMs per 1,000 km2, FMAI -Financial Market Index, EF- Economic Freedom, INFLA - inflation, EDU is education, UNEMP -unemployment, lnGDPC- log of gross domestic product per capita and lnPOP -log population and INTERNET – Internet. Again, *N is the number of observations,* AR is Arellano-Bond, Pv is the probability value and OIR is a test for Overid Restrictions.

Source: Author's computation

In Column 1 of Table 3, the study discovered a positive and significant relationship between financial inclusion and economic wellbeing. Indicating that when more people are included in the financial system, the economic wellbeing of the masses will improve. Of course, being included in the financial system implies access to credit, savings and investment, which could capacitate a person for a better future. Malekano (2020) put it this way: finance dictates who can access and pay for quality education, health, and other economic opportunities. In support, finance-inequality narrowing theory states that people who are in poor economic condition are normally not using financial services such as borrowing money to invest in physical and human development (Banerjee et al., 1993; Galor et al., 1993). This finding is in support of the first hypothesis, financial inclusion improves the economic wellbeing of people in SSA. Supply-leading hypothesis designates that financial inclusion is necessary for economic wellbeing (Sen et al., 2021). Tanzania et al. (2019), in favour of this outcome, found that financial inclusion exerts a strong positive influence on wellbeing. Likewise, Tita (2017) revealed that financial inclusion has a positive influence on wellbeing.

With regards to individual measures of financial inclusion and economic wellbeing:

The number of commercial banks per 100,000 adults has a positive and significant impact on economic well-being, as seen in Column 2 of Table 3. The number of commercial banks per 1000 km2 also has a significant positive effect on economic health, as seen in Column 3. Consequently, expanding the number of commercial banks in SSA would improve the economic well-being of its citizens. People would find it easier to engage commercial banks for their financial needs, such as loans, savings, and investments, which in turn would improve their economic conditions. Burkhanov (2020) argued that commercial banks ensuring liquidity is an important precondition for financial security. In effect, commercial banks ensured liquidity, increasing business activities and education affordability.

In Column 4, the number of deposit accounts with commercial banks exhibits a significant positive relationship with economic wellbeing. Thus, if SSA's residents cultivate the habit of saving, their economic condition will improve. The logic here is that people who save have enough income to pursue education, businesses and health. Apart from education, business and health benefits, they also earn interest on their savings, which makes them better off financially. Kast and Pomeranz (2014) also explained that saving reduces the need for debt and its associated interest costs.

Again, the number of loan accounts with commercial banks portrays a positive and significant role in boosting the wellbeing of SSA residents (see Column 5). Implying that loans could help improve the economic wellbeing of SSA residents. The argument here is that loans could help a person start a business entirely or complement the income of people to undertake a bigger contract. Also, people borrow for their education, which puts them on a better platform for a better job. In line with this finding, Makuluni et al. (2022) pinpointed that households with access to credit experienced lower levels of inequality than those without.

In addition, the number of ATMs per 100,000 adults revealed an insignificant relationship with economic wellbeing in SSA in Column 6 of Table 3, and the result is supported by Vitenu-Sackey and Hongli (2020). However, in the same table, Column 7 revealed a significate positive effect of the number of ATMs per 1000 km2 on economic wellbeing. These results are contradictory since the two measures are both measuring access to ATMs. Yet, a conflicting result is possible when ATM does not have a direct effect on economic wellbeing. That is, ATMs logically would not boost the wellbeing of people but their ability to easy financial services might cause people to save in financial institutions, which would result in improving the living conditions of citizens.

Furthermore, in Column 8 of Table 3, an insignificant effect of financial market access on economic wellbeing was revealed. Investing in securities should have had a possible positive effect on economic wellbeing. However, compared to the financial institutions in SSA, the financial markets (exchanges) in SSA are few, weak and have a high information asymmetry problem (Mlachila, Jidoud, Newiak, Radzewicz-Bak & Takebe, 2016). Therefore, it is unable to boost the wellbeing of its residents as expected. Table 1 confirmed the underdeveloped nature of financial market access in SSA when the mean score of the financial market index was recorded as the lowest (0.095) among the measures of financial inclusion. Also, Jalilian and Kirkpatrick (2002) stipulated that the fundamental cause of poor wellbeing is market failures and asymmetric information.

From Columns 1 to 8 of Table 3, the study mostly recorded a significant positive effect of economic freedom on economic wellbeing. Like Adam Smith (1776) stipulated, in a free market, demand and supply work for the common wellbeing of citizens. Thus, strengthening certain economic institutions that guarantee freedom can promote economic wellbeing (Acemoglu et al., 2005). This is because, in a free economy, property rights, and freedom to

trade, do business and invest could strengthen the financial wellbeing of residents. Again, free access to education and health care would equip people with knowledge and good health to pursue economic activities. Tyrrell (2019) indicated that greater economic freedom increases economic wellbeing in terms of health outcomes, educational achievement, income and clean natural environments. The results also support the second hypothesis that, in a free economy, the economic wellbeing of residents is improved.

In the 8 columns of Table 3, the control variables' results are presented. Inflation has a positive and significant effect on economic wellbeing, this contradicts our exception of a negative relationship between inflation and wellbeing. This is because an increase in the prices of goods and services increases pressure on income and makes it difficult to access education and health (Olabiyi, 2022). However, an increase in inflation could boost the economic condition of residents if it causes growth. The argument here is that an increase in inflation might encourage production in an economy, which would reflect in the standard of living of residents. Also, an increase in inflation raises returns on savings and investment amounts (Zee, 1998). Unemployment, on the other hand, has a negative impact on economic wellbeing. This indicates that an increase in unemployment in an economy deteriorates the wellbeing of people. Alimova (2021) and Dahliah et al. (2021) support the negative role of unemployment in economic wellbeing. Again, an increase in gross domestic product per capita improves the living conditions of SSA's residents. GDPC-positive inducement of wellbeing is in line with the findings of Škare et al. (2016) and Dewi et al. (2018). Moreso, most of the columns in Table 8 showed that population has a negative, significant impact on economic growth. This implies that when the population of an economy increases, enhancing wellbeing becomes a challenge. Agreeably, Khan et al. (2018) and Neaime et al. (2018) argued that population growth increases poor economic wellbeing in an economy. Finally, in some columns, internet was shown to have a positive impact on economic wellbeing in SSA. Internet usage, according to Galperin et al. (2017), contributes to the economic wellbeing of residents in an economy by promoting social capital, ICT skills, profit and speedy transactions.

Table 4 of paper 3

The interaction effect of economic freedom and inclusive finance on economic wellbeing

Variable	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**
	EW	EW	EW	EW	EW	EW	EW	EW
L.EW	0.97234***	0.89149***	0.92086***	0.78652***	0.95504***	0.72696***	0.69211***	0.78314***
	(0.04400)	(0.05715)	(0.04471)	(0.03759)	(0.05859)	(0.06673)	(0.04814)	(0.06327)
INCF	0.02760**							
	(0.01019)							
NCBB100000		0.01331***						
		(0.00431)						
NCBB1000			0.00844*					
			(0.00415)					
NDAwCB				0.00012*				
				(0.00007)				
NLAwCB					0.00028*			
					(0.00014)			
ATM100000						0.00337		
						(0.00015)		
ATM1000							0.00018**	
							(0.00073)	
FMAI								-0.07576
								(0.08774)
EF	0.01203***	0.01554	0.00258	0.02116***	0.01966**	0.01656***	0.00860***	0.00805**
	(0.00189)	(0.00927)	(0.00407)	(0.00738)	(0.00703)	(0.00261)	(0.00184)	(0.00347)
Interaction	0.00298**	0.00207***	0.00116**	0.00002*	0.00004*	0.00046**	0.00022**	0.00589

	(0.00146)	(0.00063)	(0.00054)	(0.000001)	(0.00002)	(0.00021)	(0.00009)	(0.01120)
				Control Variables				
INFLA	0.00005	-0.0000009	0.00005***	0.00007***	0.00009***	0.00009***	0.00008***	0.00013
	(0.00016)	(0.00002)	(0.00001)	(0.000010)	(0.00002)	(0.00021)	(0.000009)	(0.00017)
UNEMP	0.00112***	-0.00267**	-0.00064	-0.00174**	-0.00089	0.00009***	0.00058	-0.00125**
	(0.00026)	(0.00011)	(0.00061)	(0.00068)	(0.00070)	(0.000008)	(0.00077)	(0.00059)
lnGDPC	0.01681***	0.01429***	0.00582	0.02076***	0.01374***	0.00165**	0.02101***	0.01315**
	(0.00391)	(0.00360)	(0.00450)	(0.00488)	(0.00454)	(0.00065)	(0.00570)	(0.00622)
lnPOP	-0.00302	-0.01963***	-0.00442	-0.00580*	-0.00183	0.01813**	0.00676	-0.00805**
	(0.00302)	(0.00526)	(0.00364)	(0.00327)	(0.00405)	(0.00693)	(0.00477)	(0.00338)
INTERNET	-0.00002	0.00024***	-0.00004	0.00019***	-0.00021*	0.00023**	0.00022*	0.00029**
	(0.00011)	(0.00007)	(0.00010)	(0.00007)	(0.00012)	(0.00018)	(0.00012)	(0.00012)
_cons	-0.01990	0.40096***	0.06817	-0.05861	-0.15085	0.03001	-0.15690**	0.11281*
	(0.05196)	(0.08918)	(0.05451)	(0.04528)	(0.09332)	(0.06606)	(0.06962)	(0.06005))
AR(2)	**0.198**	**0.769**	**0.096**	**0.284**	**0.389**	**0.697**	**0.822**	**0.990**
Hansen OIR	**0.543**	**0.842**	**0.266**	**0.436**	**0.363**	**0.616**	**0.412**	**0.799**
Fisher	**966102.26*** **	**124017.94*** **	**138047.75*** **	**63273.50*** **	**229940.95*** **	**601007.06*** **	**2410000*** **	**49408.75*** **
Instruments	**22**	**22**	**22**	**22**	**22**	**22**	**22**	**22**
Groups	**24**	**26**	**26**	**26**	**25**	**26**	**26**	**25**
N	**275**	**298**	**298**	**298**	**286**	**298**	**298**	**287**

Note. EW- Economic Wellbeing, INCF – Inclusive Finance, NCBB100000 - Number of Commercial Bank Branches per 100,000 adults, NCBB1000 - Number of Commercial Bank Branches per 1,000 km2, NDAwCB - Number of Deposit Accounts with Commercial Banks per 1,000 adults, NLAwCB - Number of Loan Accounts with Commercial Banks per 1,000 adults, ATM100000 - number of ATMs per 100,000 adults, ATM1000 - Number of ATMs per 1,000 km2, FMAI -Financial Market Index, EF- Economic Freedom, INFLA - inflation, EDU is education, UNEMP -unemployment, lnGDPC- log of gross domestic product per capita and lnPOP -log population and INTERNET – Internet. Again, *N is the number of observations,* AR is Arellano-Bond, Pv is the probability value and OIR is a test for Overid Restrictions.

Source: Author's computation

The study uses the interaction results presented in Table 4 to discuss the complementary role of economic freedom on financial inclusion- economic wellbeing in SSA.

It is revealed that the interaction of economic freedom and the number of commercial banks per 100,000 on economic wellbeing is significant and positive (see Column 2). Similarly, the interaction of economic freedom and the number of commercial banks per 1000 km2 has a significant and positive influence on economic wellbeing (see Column 3). This means that in a free economy, access to commercial banks improves the wellbeing of residents better. In Column 4 also, the interaction of economic freedom and the number of deposit accounts in commercial banks had a positive effect on the economic wellbeing of SSA. Thus, in an economy where freedom is enhanced, depositing money in banks maximizes the economic condition of the people. Similarly, in Column 5, the interaction of economic freedom and the number of loan accounts with commercial exerts a positive influence on economic wellbeing of SSA. Implying that capitalizing on freedom boosts the influence of credit on the wellbeing of SSA It also revealed that both the interaction of economic freedom and the number of ATMs per 100,000 adults and the interaction of economic freedom and the number of ATMs per 1000 km2 exhibit positive effects on economic wellbeing (see Columns 6 and 7). An economy with less restrictions causes access to ATMs to have a greater effect on economic wellbeing. However, Column 8 documented an insignificant association between the interaction of economic freedom and financial market access and economic wellbeing. This implies that even when freedom is encouraged in SSA, its financial market would fail to improve economic wellbeing of the populace.

To climax the findings, the first column of Table 4 revealed a significant and positive relationship between the interaction of economic freedom and financial inclusion (the composite) and the wellbeing of the people in SSA. This implies that, in a free economy, financial inclusion achieves a greater role in improving wellbeing. The reasoning here is that when freedom is increased, people are more likely to engage in a variety of activities that can complement financial inclusion in improving people's economic wellbeing. For example, if individuals have access to funds (from loans, savings or investment), they might not be willing to use their funds to engage in business activities or obtain education when there is too much restriction in that economy. Again, high restrictions might deter the financial sector from rendering varieties of services, which could result in financial exclusivity. Moreso, freedom encourages people to involve themselves in the financial systems because property right and contract is enforced. According to Lyons et al. (2018), economic freedom speeds up

technological development and financial institution competition, thereby causing financial institutions to adopt various financially inclusive strategies to capture more customers. Hence, economic freedom indeed complements financial inclusion in boosting the wellbeing of SSA residents. The findings are in support of hypothesis 3, ceteris paribus, economic freedom plays a complementary role in financial inclusion-economic wellbeing nexus of SSA.

In all 8 columns of Tables 3 and 4, the lag of economic wellbeing exhibited autoregressive nature by revealing a significantly positive effect of the lag of economic wellbeing on economic wellbeing. Hence, DGMM is a good technique for this study. Moreso, all 8 columns in Tables 3 and 4 depict that the diagnostic necessities of DGMM are met: Hansen tests supported the assumption of the validity of instruments; thus, all the instruments employed in the models are valid; additionally, the probability value of the AR2 test is in agreement with the null hypothesis of no autocorrelation, and this means that there is an absence of autocorrelation in the DGMM regression results. Fisher statistic tests are also significant, suggesting that the models are generally viable.

7.5 Robustness Check

To check the consistency of the findings in the study, the overall freedom score from the Heritage Foundation was used in place of the economic freedom index from Fraser Institute to measure economic freedom (moderating variable). The study found similar results in the majority of the columns of Tables 5 and 6. Thus, the finding of this study is consistent.

Table 5 of paper 3

Direct effect of financial inclusion and economic freedom on economic wellbeing

Variable	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**
	EW	EW	EW	EW	EW	EW	EW	EW
L.EW	0.87827***	0.88174***	0.85197***	0.80927***	0.77907***	0.88211***	0.80091***	0.93532***
	(0.07324)	(0.06100)	(0.03506)	(0.04529)	(0.03934)	(0.06607)	(0.04083)	(0.07571)
FINC	0.00547*							
	(0.00275)							
NCBB100000		0.00082**						
		(0.00040)						
NCBB1000			0.00013***					
			(0.00003)					
NDAwCB				0.00002***				
				(0.000002)				
NLAwCB					0.00002**			
					(0.00001)			
NATM100000						0.00022**		
						(0.00009)		
NATM1000							0.00015	
							(0.00019)	
FMAI								0.00806
								(0.01685)
EF	0.00046**	0.00054**	0.00044***	0.00047***	0.00057***	0.00032***	0.00032**	0.00077***
	(0.00021)	(0.00022)	(0.00009)	(0.00010)	(0.00009)	(0.00009)	(0.00011)	(0.00025)
				Control Variables				

INFLA	0.00026	0.00005***	0.00005***	0.00004***	0.00005***	0.00004***	0.00005***	0.00028*
	(0.00016)	(0.000007)	(0.000003)	(0.000003)	(0.000004)	(0.000004)	(0.000003)	(0.00014)
UNEMP	-0.00113***	-0.00137***	-0.00038**	-0.00119***	-0.00095***	-0.00044**	-0.00114***	-0.00078*
	(0.00033)	(0.00031)	(0.00018)	(0.00024)	(0.00024)	(0.00020)	(0.00036)	(0.00045)
lnGDPC	0.00883**	0.01281***	0.01239***	0.01740***	0.01550***	0.01084***	0.01757***	0.01109**
	(0.00427)	(0.00423)	(0.00138)	(0.00284)	(0.00276)	(0.00355)	(0.00386)	(0.00455)
lnPOP	-0.00209	-0.00240	0.00110	0.00249	-0.00233	0.00035	-0.00452*	0.00085
	(0.00234)	(0.00219)	(0.00124)	(0.00164)	(0.00334)	(0.00081)	(0.00245)	(0.00301)
INTERNET	-0.00009	-0.00004	0.00011*	-0.00249	0.00018***	-0.00010	0.00015	-0.00017
	(0.00014)	(0.00011)	(0.00007)	(0.00164)	(0.00005)	(0.00007)	(0.00010)	(0.00017)
_cons	0.02596	-0.00751	-0.04608***	-0.00120	0.01874	-0.03093*	0.04566	-0.09037
	(0.05930)	(0.05014)	(0.01643)	(0.03060)	(0.05944)	(0.01687)	(0.05829)	(0.05752)
AR(2)	**0.989**	**0.860**	**0.858**	**0.391**	**0.812**	**0.807**	**0.944**	**0.941**
Hansen OIR	**0.219**	**0.394**	**0.811**	**0.509**	**0.734**	**0.630**	**0.589**	**0.579**
Fisher	**74128.80*** **	**748120.41*** **	**15900000*** **	**4030000*** **	**3400000*** **	**11700000*** **	**6480000*** **	**62751.03*** **
Instruments	**22**	**22**	**26**	**26**	**22**	**22**	**22**	**22**
Groups	**25**	**27**	**27**	**27**	**26**	**26**	**27**	**26**
N	**289**	**312**	**312**	**312**	**300**	**312**	**312**	**301**

Note. EW- Economic Wellbeing, FINC - Financial Inclusion, NCBB100000 - Number of Commercial Bank Branches per 100,000 adults, NCBB1000 - Number of Commercial Bank Branches per 1,000 km2, NDAwCB - Number of Deposit Accounts with Commercial Banks per 1,000 adults, NLAwCB - Number of Loan Accounts with Commercial Banks per 1,000 adults, ATM100000 - number of ATMs per 100,000 adults, ATM1000 - Number of ATMs per 1,000 km2, FMAI -Financial Market Index, EF- Economic Freedom, INFLA - inflation, EDU is education, UNEMP -unemployment, lnGDPC- log of gross domestic product per capita and lnPOP -log population and INTERNET – Internet. Again, *N is the number of observations,* AR is Arellano-Bond, Pv is the probability value and OIR is a test for Overid Restrictions.

Source: Author's computation

Table 6 of paper 3

The interaction effect of economic freedom and financial inclusion on economic wellbeing

Variable	**(1)** EW	**(2)** EW	**(3)** EW	**(4)** EW	**(5)** EW	**(6)** EW	**(7)** EW	**(8)** EW
L.EW	0.78498***	0.79961***	0.85904***	0.79338***	0.83823***	0.82058***	0.84681***	0.92046***
	(0.04620)	(0.05961)	(0.04271)	(0.05027)	(0.06325)	(0.03293)	(0.03112)	(0.08005)
FINC	0.01694***							
	(0.00569)							
NCBB100000		0.00133						
		(0.00130)						
NCBB1000			0.00472***					
			(0.00202)					
NDAwCB				0.00004				
				(0.00004)				
NLAwCB					-0.00018*			
					(0.00010)			
NATM100000						0.00250**		
						(0.00093)		
NATM1000							0.00314***	
							(0.00103)	
FMAI								0.12488
								(0.14532)
EF	0.00002	0.00056	0.00065**	0.00071*	-0.00024***	0.00006***	0.00045***	0.00091***
	(0.00033)	(0.00030)	(0.00012)	(0.00035)	(0.00042)	(0.00019)	(0.00010)	(0.00028)
Interaction	0.00016**	-0.00001	0.00006**	0.0000004	0.000003*	0.00003**	0.00004***	-0.00185
	(0.00007)	(0.00002)	(0.00003)	(0.0000006)	(0.000002)	(0.00002)	(0.00001)	(0.00236)
				Control variables				
INFLA	0.00023	0.00005***	0.00005***	0.00004***	0.00005***	0.00005***	0.00005***	0.00026*
	(0.00017)	(0.000006)	(0.000003)	(0.000003)	(0.00001)	(0.000003)	(0.000003)	(0.00014)
UNEMP	-0.00147***	-0.00052***	-0.00006	-0.00122***	-0.00008	-0.00113***	-0.00038	-0.00107

	(0.00039)	(0.00042)	(0.00019)	(0.000025)	(0.00055)	(0.00033)	(0.00031)	(0.00064)
lnGDPC	0.01550***	0.01788***	0.01148***	0.01847***	0.01427***	0.01590***	0.01360***	0.01323**
	(0.00329)	(0.00512)	(0.00287)	(0.00321)	(0.00438)	(0.00303)	(0.00316)	(0.00589)
lnPOP	-0.00671**	0.00160	0.00223**	-0.00241	0.00397	-0.00144	-0.00008	-0.00112
	(0.00295)	(0.00149)	(0.00097)	(0.00166)	(0.00384)	(0.00213)	(0.00170)	(0.00422)
INTERNET	0.00011*	0.00011	-0.00004	-0.000005	0.00010	-0.00002	-0.00005	-0.00003
	(0.00006)	(0.00009)	(0.00009)	(0.00009)	(0.00012)	(0.00004)	(0.00007)	(0.00021)
_cons	0.13087**	-0.04857	-0.07734***	-0.01582	-0.06462	-0.01995	-0.03382	-0.07286
	(0.05519)	(0.03537)	(0.01788)	(0.03723)	(0.07192)	(0.01793)	(0.02862)	(0.06683)
AR(2)	**0.838**	**0.956**	**0.903**	**0.313**	**0.745**	**0.760**	**0.643**	**0.805**
Hansen OIR	**0.510**	**0.749**	**0.850**	**0.373**	**0.468**	**0.344**	**0.758**	**0.559**
Fisher	**58098.25*** **	**264996.85*** **	**17900000*** **	**957980.77*** **	**750890.36*** **	**119000000*** **	**21300000*** **	**52523.61*** **
Instruments	**22**	**22**	**26**	**26**	**22**	**26**	**26**	**22**
Groups	**25**	**27**	**27**	**27**	**26**	**27**	**27**	**26**
N	**289**	**312**	**312**	**312**	**300**	**312**	**312**	**301**

Note. EW- Economic Wellbeing, FINC - Financial Inclusion, NCBB100000 - Number of Commercial Bank Branches per 100,000 adults, NCBB1000 - Number of Commercial Bank Branches per 1,000 km2, NDAwCB - Number of Deposit Accounts with Commercial Banks per 1,000 adults, NLAwCB - Number of Loan Accounts with Commercial Banks per 1,000 adults, ATM100000 - number of ATMs per 100,000 adults, ATM1000 - Number of ATMs per 1,000 km2, FMAI -Financial Market Index, EF- Economic Freedom, INFLA - inflation, EDU is education, UNEMP -unemployment, lnGDPC- log of gross domestic product per capita and lnPOP -log population and INTERNET – Internet. Again, *N is the number of observations,* AR is Arellano-Bond, Pv is the probability value and OIR is a test for Overid Restrictions.

Source: Author's computation

7.6 Hypotheses and Outcomes

Table 7 of paper 3

Hypotheses and outcomes

Hypotheses	Outcomes
$\mathbf{H_{3a}}$: Inclusive finance improves economic wellbeing of the people in SSA.	Maintained
$\mathbf{H_{3b}}$: In a free economy, the economic wellbeing of residents is improved.	Maintained
$\mathbf{H_{3c}}$: Ceteris paribus, economic freedom complements inclusive finance in enhancing the economic wellbeing of SSA.	Maintained

7.7 Conclusions and Recommendation

In the quest to examine the complementary role of economic freedom in financial inclusion-economic wellbeing nexus in SSA. The study reveals that financial inclusion enhances the wellbeing of SSA residents, economic freedom improves the wellbeing of the populace in SSA and a freedom environment maximizes the role of inclusive finance in enhancing economic freedom in SSA. Thus, the public needs to be educated on the need to involve themselves in the financial system. Again, government should ensure that payments (such as salaries, pensions and utility bills) pass through the financial systems. Financial institutions should reduce the cost of using financial services as much as possible. Furthermore, less restrictions are recommended to be adopted by policymakers in SSA when it comes to enhancing financial inclusion's influence on economic wellbeing. This can be achieved if the approval procedure for rendering a new service in financial institutions is minimized; the minimum capital requirement for financial institutions should be reasonably low. Also, policies that protect property rights, enforce contracts and ensure less restriction on business activities, education and health access should be instituted so that people with access to finance can freely engage in economic activities, obtain education and access health facilities.

7.8 Limitations and Suggestions for Further Studies

Mobile money, insurance and microfinance were not included in the computation of the financial inclusion index because the data available on them was not enough based on the number of SSA countries and the time period employed in this study. Hence, other researchers can consider mobile money, insurance and microfinance in addition to the already employed measures of financial inclusion in their study. Also, even though economic

wellbeing has been conceptualized in this study as the income level, education and health of people in the economy and was therefore measured by human development index. The study recognizes the reality that economic wellbeing is broad and goes beyond these three. Implying that relevant factors like corruption, poverty and unemployment were not captured in the human development index (Klugman, Rodríguez and Choi, 2011). Therefore, other studies can compute a broader measure of economic wellbeing and reexamine the role of economic freedom in the relationship between financial inclusion and economic wellbeing.

CHAPTER EIGHT
SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

8.0 Introduction

This chapter gives a summary, key findings, conclusions and policy recommendations for the three papers examined in this thesis.

8.1 Summary

Due to the low level of financial inclusion and poor economic conditions of people in SSA. This thesis presents three empirical papers that investigate the interaction among financial development, regulations, economic freedom, innovative facilities and financial inclusion in improving the financial inclusion and economic wellbeing of SSA. Employing a generalized method of moment for 30 SSA countries between the years 2008 and 2020:

- The first paper analysed the role of regulations in the relationship between financial development and financial inclusion in SSA.
- The second paper examined the collaborative role of economic freedom and innovative facilities on financial inclusion in SSA.
- The third assessed the complementary role of economic freedom in financial inclusion-economic wellbeing nexus of SSA.

To achieve the above three objectives:

Paper one, which concerns itself with the role of regulation in the relationship between financial development and financial inclusion in SSA (see chapter 6), employed financial development measures from International Monetary Fund and Global Financial Development, financial inclusion from International Monetary Fund and regulations from Fraser Institute. Paper one examined various relationships, including the direct relationship between financial development and financial inclusion, the direct effect of regulation on financial inclusion and the moderating role of regulation on the relationship between financial development and financial inclusion. The study found a significant positive direct effect of financial development on financial inclusion and a significant positive direct influence of regulation on financial inclusion, but it also found a significant positive role of regulation in the relationship between financial development and financial inclusion up to a coverage of 6.3354. Hence, in as much as financial development enhances financial inclusion in SSA and regulation on its own brings more people into the financial system, increasing the regulation

that restricts financial sector activities in the region would hinder financial development from improving financial inclusion after the coverage of 6.3354.

Also, in chapter seven, paper two sheds light on the role of innovative facilities on the effect of economic freedom on financial inclusion in SSA. To achieve the innovative measures (such as mobile phone usage, internet usage, fixed broadband and telephone usage), financial inclusion measures from International Monetary Fund and economic freedom index measures from the Fraser Institute were used. Specifically, paper two analysed the effect of economic freedom on financial inclusion, the role of innovative facilities on financial inclusion and the collaborative effect of economic freedom and innovative facilities on financial inclusion. The study recorded a positive effect of economic freedom on financial inclusion but documented a negative role of innovative facilities on financial inclusion. It also recorded a positive role of innovative facilities in the relationship between economic freedom and financial inclusion at various thresholds (mobile usage 100.75, internet usage 34.1064, fixed broadband usage N.A., telephone usage 13.3494 and innovative facility index 1.5619). These findings imply that improving economic freedom promotes financial inclusion while expanding innovative facilities in SSA inhibits it. Again, the impact of economic freedom on financial inclusion is diminished by innovative facilities in SSA after certain thresholds.

For the complementary role of economic freedom in the financial inclusion-economic wellbeing nexus in Sub-Saharan Africa, paper three assessed the direct relationship between financial inclusion and economic wellbeing, the direct nexus between economic freedom and economic wellbeing and the complementary role of economic freedom on the influence of financial inclusion on economic wellbeing. A positive relationship was revealed from financial inclusion to economic wellbeing. A positive nexus was again exhibited from economic freedom to economic wellbeing. Finally, a positive complementary role of economic freedom on the influence of financial inclusion on economic wellbeing was recorded. The finding implies that financial inclusion enhances the wellbeing of SSA residents, economic freedom improves the wellbeing of the populace in SSA, and a free environment maximizes the role of inclusive finance on economic freedom in SSA. Data for paper three includes financial inclusion measures such as the number of deposit accounts with commercial banks per 1,000 adults, the number of loan accounts with commercial banks per 1,000 adults, the number of commercial bank branches per 100,000 adults, the number of commercial bank branches per 1,000 km2, the number of ATMs per 1,000 km2, the number of ATMs per 100,000 adults and financial market. Economic freedom summary index from

Fraser Institute was a proxy for economic freedom and human development index for economic wellbeing.

8.2 Key Findings

This section presents the main findings in the thesis based on the three empirical papers.

Paper one

1. This study found a significant positive direct effect of financial development on inclusive finance in SSA.
2. This study recorded a significant positive direct influence of regulation on inclusive finance in SSA.
3. This study documented a significant positive role of regulation in the relationship between financial development and inclusive finance in SSA up to a threshold of 6.3354, after which a negative role is guaranteed.

Paper two

1. This study indicates that improving economic freedom promotes inclusive finance in SSA.
2. This study found that expanding innovative facilities in SSA inhibits inclusive finance.
3. This study also discovered that the impact of economic freedom on financial inclusion in SSA is improved by innovative facilities but becomes undesirable after certain thresholds (see Table 5 of Paper 2).

Paper three

1. It reveals that inclusive finance enhances the wellbeing of SSA residents.
2. It also proved that economic freedom improves the wellbeing of the populace in SSA.
3. Moreso, a free environment maximizes the role of inclusive finance in promoting economic freedom in SSA.

8.3 Hypotheses Tested, Decisions and Its Implications

The sections present the conclusion made based on the hypothesis tested

Table 5

Hypotheses, Decisions and Implications

Hypotheses	Decision	Practical implications
Paper one		
H_{1a}: There is a significant positive effect of financial development on inclusive finance in SSA.	Accepted	This implies that when the financial sector of SSA economies improves, their financial services will be robust enough to achieve improved financial inclusion.
H_{1b}: There is a significant positive effect of regulations on inclusive finance in SSA.	Accepted	The results show that when people perceive regulations in an economy as efficient and reliable, they are willing to engage in financial services.
H_{1c}: Ceteris paribus, the presence of sound regulations enhances the relationship between financial development and inclusive finance in SSA.	Partially accepted	This suggests that when regulation exceeds the threshold of 6.3354 in SSA, it subsequently hinders the financial sector from rendering enough services that can help improve financial inclusion.
Paper two		
H_{2a} : Economic freedom affects inclusive finance in SSA, positively.	Accepted	This implies that economic freedom encourages the financial sector to provide a variety of services that encourage people to be involved in financial services.
H_{2b} : Innovative facilities affect inclusive finance in SSA, positively.	Rejected	This indicates that the use of innovative facilities hinders growth in the financial inclusion of SSA. This could be a result of traits such as low financial and technical literacy and high cost of accessing innovative facilities in SSA.
H_{2c} : Ceteris paribus, innovative facilities positively influence the effect of economic freedom on inclusive finance in SSA.	Partially accepted	This study also discovered that the impact of economic freedom on financial inclusion in SSA is improved by innovative facilities but becomes undesirable after certain thresholds. In effect, innovative facilities weaken financial inclusion growth, even in a free economy, after certain thresholds. Low literacy, high cost of using innovative facilities to access financial services and poor governance in SSA could be the reasons the undesired

		result is recorded after certain thresholds (see Table 5 of Paper 2).
Paper three		
H_{3a} : Inclusive finance improves economic wellbeing of the people in SSA.	Accepted	This suggests that financial services such as credit, savings and investment guarantee a better economic condition for the people of SSA.
H_{3b} : In a free economy, the economic wellbeing of residents is improved.	Accepted	Hence, a free economy encourages people to undertake activities such as business and education to enhance their wellbeing.
H_{3c} : Ceteris paribus, economic freedom complements inclusive finance in enhancing the economic wellbeing of SSA.	Accepted	Freedom in an economy improves the willingness of people to participate in financial services; it also enables financial services to render more financial inclusion services.

8.4 Contributions to Empirics

Several important contributions will be made to the body of knowledge. But the overarching one is the computation of an inclusive finance index that includes the financial market. Most of the inclusive finance index used in earlier studies was limited to financial institutions and failed to include the financial market aspect of the financial sector in SSA. The contributions of each paper are enumerated below:

For paper one

Firstly, paper one is the first to assess the influence of financial development index (comprising financial efficiency, depth, concentration and stability) on financial inclusion in SSA. Hence, this study creates a novel financial development index.

Secondly, no study has moderated financial development-financial inclusion nexus with regulation; hence, paper one contributes to literature investigating it.

Also, since no study has employed regulation measures from Fraser Institute when examining the link between regulation and inclusive finance, employing these measures is unique.

Moreso, the study computed the threshold level that policymaker should consider when employing regulation to strengthen the impact of financial development on inclusive finance in SSA.

For paper two

SSA is deficient in the link between economic freedom and inclusive finance, implying that paper two fills a pertinent gap in SSA's literature.

In addition, the financial inclusion indexes computed by earlier studies ignored the financial market sector; paper two included the financial market of SSA in the financial inclusion index.

Furthermore, there is a paucity of empirical works on the relationship between economic freedom and inclusive finance moderated by innovative facilities; this gap is being filled by paper two.

In addition, the study computed the threshold level required for innovative facilities to have a desirable impact on freedom-enhanced inclusive finance in SSA.

For paper three

There is no study that has moderated the nexus between inclusive finance and economic wellbeing with economic freedom.

8.5 Conclusions and Policy Recommendations

This section makes conclusions based on finding recorded in each paper and suggest policies for SSA:

Paper one

Financial development enhances inclusive finance in SSA; regulation on its own brings more people into the financial system, but increasing the regulations that restrict financial sector activities in the region should not be above the level of 6.3354, or it would hinder financial development from improving financial inclusion. The paper recommends that first, the financial sector should introduce user-friendly products, including low-cost financial services that overcome distance barriers. Second, the central banks of SSA economies can recognise or award financial firms that are the best contributors to financial inclusion. This will encourage other financial firms to do their best. Additionally, the study recommends that when employing regulations (especially those that limit the services of the financial sector) to improve the financial sector's enhanced inclusive finance in SSA, policymakers should consider the threshold. Regulations such as requirements for starting a business, minimum capital requirements and tax laws should be made considering the threshold to prevent the

negative role of regulation after the threshold and to encourage the financial sector to go above and beyond to make financial services available and accessible to residents. Specifically, policymakers should always check the mean of their economies' regulations before deciding whether to be more restrictive or not. Tchamyou (2019) indicates that the mean of the current two years would help make more appropriate and current-fitting policies.

Paper two

Strengthening economic freedom encourages financial inclusion; increasing innovative facilities in SSA reduces financial inclusion; and innovative facilities strengthen the effect of economic freedom on inclusive finance, but after certain thresholds (see the various thresholds in Table 5), they start weakening the relationship. Thus, to increase financial inclusion, first, policymakers in SSA should ensure freedom in their economies by ensuring that bureaucracy for establishing financial institutions is minimized, licensing regulations for financial services are friendly and institutions that ensure property rights and free will should be instituted to encourage people to participate in financial services. When it comes to using innovative facilities to enhance freedom-induced inclusivity in finance, technical and financial knowledge should be enhanced in addition to lowering the cost of using innovative facilities to access financial services to prevent negative influence after the thresholds (mobile usage 100.75, internet usage 34.1064, fixed broadband usage N.A., telephone usage 13.3494 and innovative facility index 1.5619).

Paper three

Financial inclusion enhances the wellbeing of SSA residents; economic freedom improves the wellbeing of the populace in SSA; and a free environment maximizes the role of inclusive finance in enhancing economic freedom in SSA. Thus, the public needs to be educated on the need to involve themselves in the financial system. Again, government should ensure that payments (such as salaries, pensions and utility bills) pass through the financial systems. Financial institutions should reduce the cost of using financial services as much as possible. Furthermore, less restrictions are recommended to be adopted by policymakers in SSA when it comes to enhancing financial inclusion's influence on economic wellbeing. This can be achieved if the approval procedure for rendering a new service in financial institutions is minimized; the minimum capital requirement for financial institutions should be reasonably low. Also, policies that protect property rights, enforce contracts and ensure less restriction on business activities, education and health access should be instituted so that people with

access to finance can freely engage in economic activities, obtain education and access health facilities.

8.5 Limitations and Suggestions for Further Studies

Based on the limitations and findings revealed in this study, suggestions for further studies are made:

Paper one

In as much as the financial development index employed in this paper is comprehensive (depth, efficiency, stability and concentration) compared to previous studies, competition was not included due to the time period employed. Also, it cannot be denied that the main platform through which most SSA has been involved in the financial system is the mobile money platform. Yet, this paper was not able to include mobile money usage in the calculation of the inclusive finance index because the date range for mobile money is just three years, which is insufficient for the time period and the number of countries considered in this paper. Apart from the listed limitations, all efforts were made to come out with a robust result that can help policymakers enhance financial inclusion in SSA. Based on the limitations of the paper and its findings, the following research suggestions are put forth: other researchers can include competition measures to the indicators employed in computing financial development index in this paper; other studies can also consider mobile money in the computation of the inclusive finance index; and finally, other researchers can examine the role of freedom in the relationship between financial development and inclusive finance in SSA. This can help reaffirm the argument made in support of the final finding in this paper.

Paper two

It cannot be denied that the main platform through which most SSA s have been involved in the financial system is the mobile money platform. However, mobile money usage was not included in the calculation of the inclusive finance index because the time range for data available on mobile money is short and insufficient for the time period and the number of countries considered in this study. Hence, other researchers can reduce the time coverage and the number of countries considered in the study to be able to include mobile money in inclusive finance index computation and reexamine the role of innovative facilities on the effect of economic freedom on inclusive finance in SSA. Again, based on the findings, this study suggests a study should be conducted on the role of literacy and the cost of using technology on the effect of technology use on inclusive finance in SSA. This is to confirm the

high cost and low literacy justifications given for the negative impact of innovative facilities after the threshold. Additionally, even though Akpa et al. (2022) have considered the role of governance in the internet-inclusive finance nexus in SSA and their findings support the negative effect of the internet on inclusive finance in SSA, on the basis that the internet alone does not represent the overall technological use in SSA, the role of governance in the relationship between technology and inclusive finance in SSA should be examined. ' This is to confirm the argument that poor governance causes the negative role of technology in inclusive finance after the threshold, which is built on Akpa et al. (2022) findings. Finally, other studies can consider threesome interactions such as:

- the interaction among innovative facilities, economic freedom and cost of using innovative facilities on inclusive finance in SSA.
- the interaction among innovative facilities, economic freedom and literacy on inclusive finance in SSA.
- the interaction among innovative facilities, economic freedom and governance on inclusive finance in SSA.

This is to see if statistically the threshold on the positive role of innovative facilities on economic freedom and inclusive finance in SSA would reduce or be eliminated with the present cost of using innovative facilities, literacy, or governance.

Paper three

Mobile money, insurance and microfinance were not included in the computation of the financial inclusion index because the data available on them was not enough based on the number of SSA countries and the time period employed in this study. Hence, other researchers can consider mobile money, insurance and microfinance in addition to the already employed measures of financial inclusion in their study. Also, even though economic wellbeing has been conceptualized in this study as the income level, education and health of people in the economy and was therefore measured by human development index. The study recognizes the reality that economic wellbeing is broad and goes beyond these three. Implying that relevant factors like corruption, poverty and unemployment were not captured in the human development index (Klugman, Rodríguez and Choi, 2011). Therefore, other studies can compute a broader measure of economic wellbeing and reexamine the role of economic freedom in the relationship between financial inclusion and economic wellbeing.

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APPENDIX

Exemption from Ethics Review

18 July 2023

Ms Victoria Abena Nutassey (221118947)
School Of Acc Economics&Fin
Westville

Dear Ms Victoria Abena Nutassey,

Original application number: 00019124
Project title: Financial development, economic freedom, economic wellbeing and financial inclusion in Sub-Saharan Africa.
Amended title: Financial development, economic freedom, innovative facilities, economic wellbeing and inclusive finance in Sub-Saharan Africa.

Exemption from Ethics Review

In response to your **amendment** application received on 11 July 2023 , your school has indicated that the amendment has been granted **EXEMPTION FROM ETHICS REVIEW.**

Any alteration/s to the exempted research protocol, e.g., Title of the Project, Location of the Study, Research Approach and Methods must be reviewed and approved through an amendment/modification prior to its implementation. The original exemption number must be cited.

For any changes that could result in potential risk, an ethics application including the proposed amendments must be submitted to the relevant UKZN Research Ethics Committee. The original exemption number must be cited.

In case you have further queries, please quote the above reference number.

PLEASE NOTE:
Research data should be securely stored in the discipline/department for a period of 5 years.

I take this opportunity of wishing you everything of the best with your study.

Yours sincerely,

[redacted]

Prof Josue Mbonigaba
Academic Leader Research
School Of Acc Economics&Fin

UKZN Research Ethics Office
Westville Campus, Govan Mbeki Building
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